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MODELS OF DIVIDEND DISTRIBUTION AND TAXATION

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Abstract: *The aim of this paper is to provide a comprehensive theoretical background of dividend distribution and taxation from a view of investors. We compare and analyse key related theories and concepts. For instance, Lintner (1956) concludes that dividends represent the primary and active decision variable for investors in most situations. The most controversial theory of dividend policy was developed by Modigliani and Miller (1961) who demonstrated that in the perfect and complete capital markets the dividend policy is irrelevant and the value of the company is independent of its payout policy. Nevertheless, in the real world the capital markets are imperfect and therefore practical results of these theories are rather limited.*

Keywords: *Dividend, Taxes, Modigliani and Miller Theorem, Lintner's Model.*

JEL Classification: *C53, E40, H20, G39.*

1. Introduction

The aim of this paper is to provide a comprehensive theoretical background of dividend distribution and taxation from a view of shareholders. Firstly, we define basic terms. Dividends may be in the form of cash, stock or property. Most secure and stable companies offer dividends to their stockholders. Their share prices might not move much, but the dividend attempts to make up for this. A distribution from a company is anything that the company gives to one of its shareholders without the shareholder giving full payment in return. The most common type of distribution is a dividend, a cash distribution of the company's profits.

Dividend payments are considered ordinary income and are taxed as such, the same as if the taxpayer had earned the income working at a job. In many jurisdictions, the government requires the company to withhold at least the standard tax, paying this to the national revenue authorities and paying out only the balance to the shareholders. Depending on the jurisdiction dividend income along with interest income, collected rents, or other may also be taxed and is the subject of recurring debate as to whether or not these taxes should be eliminated. Some who want to keep the dividend tax as-is claim it is unfair from a social policy standpoint to tax generated through active work at a higher rate than generated through less active means. Proponents make the related point that reducing or eliminating dividend taxes helps the wealthiest individuals who can afford to buy large quantities of stock, as they could feasibly live off the dividend payments without any income tax on their earnings. There are also worries that companies may not have paid their full share of income tax due to legislated tax preferences.

The paper is structured in the following way. First of all, we review the existing literature with focus on theoretical background of dividend distribution. The following

section describes Modigliani-Miller Dividend Irrelevance Theorem and firm's payout policy and taxation with the clientele effect. Finally, the last section concludes the paper and state final remarks.

2. Theoretical background

Businesses find dividends obvious', whereas 'economists find dividends mysterious [12]. The dividend in the business dictionary is defined as "share of the after-tax profit of a firm, distributed to its shareholders/stockholders according to the number and class of shares/stock held by them". From business point of view, the dividend is obvious. As concluded by the survey-based research the managers believe the investors have dividend preference [5]. The same may be concluded from investor's point of view, thus the investors want dividend [10]. On the other hand the economists consider the dividend controversy to be "one of the 10 unsolved problems in finance" [7]. Which amount should be distributed from company's cash? Should it be distributed in the form of dividend payment or rather by share repurchasing? In fact the crucial question one may ask "Why do corporations pay dividends", if they have the possibility to distribute the cash via lower-taxed methods (ex. Share repurchase) „Why do investors pay attention to dividends? Perhaps the answers to these questions are obvious. Perhaps the answers are not so obvious. I claim that the answers are not obvious at all. The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just don't fit together“ [5].

2.1 Dividend distribution

For decades, US companies have tremendously preferred to pay out cash in the form of dividends. In the US, during the period 1973-1996, the total amount of dividends distributed to shareholders was continually increasing and in 1996 reached the level of USD 297.7 billion [2]. The same trend is present in France. The French companies are more and more generous with their shareholders. According to the INSEE study (2008) the proportion of dividends as percentage of gross operating income has grown from 18 % in period 1995-2001 to 25 % in 2007. In general, the total dividend payout ratio does not decline. Within the years 1972-1998 it happened only twice, in 1992 and 1998 [2]. This phenomenon is called the dividend smoothing.

2.1.1 Dividend distribution from investors point of view

Different studies have been performed in order to answer the question, if the dividends are important for investors. Some of them analyzed the reaction of the market on the dividend announcement [9], 0, [11] and found out the change of dividend policy is associated with abnormal returns around the dividend announcement date. Moreover they concluded the investors react positively if the dividend increases, but negatively if it drops down. Another researches directly questioned the investors about their dividend preferences and beliefs. The best known survey-based studies are those conducted by Dong [10] on the sample of Dutch investors and by Maditinos et al. [24] on the Greek sample. The key findings of these studies may be summarized up as follows [3]:

- The most strongly held belief is that the investors appreciate the dividend and want to receive it. However a sizable minority of shareholders does not want dividends or is indifferent to dividend payments
- The dividend increase provides positive signal, whilst the decrease provides the opposite one. It confirms the conclusion of the previous studies of Charest, Aharony and Swary and Eades et al.
- Dividend seems to be relevant, but the rational for dividend preference differs.

So the question, which arises, is: Why do the investors want the dividend?

Various theories were developed on this subject. Some of them explain the dividend preference by the existence of transaction costs. An investor, who has the option to choose between the stocks paying dividend and stocks non paying dividend, should choose the first option. The reason is the lower transaction cost of cashing in the dividends compared to regular selling of the part of his/her portfolio [2].

Another explanation relies upon the uncertainty of future capital gains from questionable investment, the Bird-in-the-hand theory. According to this theory, the investors prefer the dividends today, because they are less risky.

The next explanation developed by behavioral finance; “behavioral life cycle” of dividends; is based on self-control. Shefrin and Statman [29] argue, the investors want to restrict their present consumption and postpone it for retirement, when they have no labor income and are more dependent on their securities holdings.

The agency cost theory underline the role of dividends as a useful tool for shareholders to control the overinvestment problem (According to the overinvestment theory of Jensen [15], managers tend to expand the size of the firm, and therefore may take on negative NPV projects instead of paying dividends). Easterbrook [12] proclaims that dividends reduce the overinvestment problem because their payment heightens the frequency with which companies have to go to equity markets in order to raise supplementary capital. In the process of “equity acquisition”, firms subject themselves to the monitoring of these markets.

One of the dominant explanations is the dividend signaling theory. This theory implies the managers have private information about the firm, so they know more about the company’s true value than do its investors. The game-theoretic literature suggests various signals, which the managers can use to convey this information to the market [23]. The signaling theory formalized by Bhattacharya [4], John and Williams [17], and Miller and Rock [25] implies that growth in dividend value is a credible signal that the firms perspective has ameliorated (ibid).

2.1.2 Dividend distribution from companies point of view, The Lintner model

According to Wouters [30] one may distinguish 2 different approaches to the dividend payout policy:

- **Dividend policy being residual decision of the company:**

In abeyance with this theory the dividend policy is subordinated to the investment policy. Thus the firm invests in all investment projects having NPV greater than zero and only the remaining cash flow is distributed to the shareholders.

- **The real dividend policy:**

The dividend policy is considered as very important for some companies. The firms behaving according to this theory endeavor after the stable and rather increasing dividend policy. Consequently some of the possible future investments have to be financed by debt issuance, instead of free cash flow.

However the empirical studies show that the most of the firms adopt the second approach. Labour and Dementia (1992) conducted a dividend study on the sample of 4200 French companies during the period 1982-1986 and found out the size and the profitability of the company have strong influence on the payout policy decision. His research discovered that 9 of 10 companies with high profitability pay dividend.

Moreover as already mentioned the firms in general increase the dividends and rarely cut them, the so called dividend smoothing. Lintner [22] was the one who showed this phenomenon is widespread. In his study he created a list of 15 observable characteristics and factors, which might be expected to have an important impact on dividend policy. From 600 listed companies, he selected 28 for detailed investigation, such that there was a minimum of 3 firms within each major group of each of these characteristics.

The most important finding of his research is that “dividends represent the primary and active decision variable in most situations”. In general nearly all managers are convinced that the shareholders appreciate stable and increasing dividend policy. They strongly believe the market puts a premium on firms with a stable or gradually growing dividend policy. Hence the management tries to avoid considerable changes in the payout policy. Only when the change is considered to be necessary, the managers are obligated decide how large it should be. Nevertheless Lintner has found no instance in which such a decision was considered without regard to the existing rate of dividend payment.

Secondly he showed the current net earnings were the most important factor determining the change in dividends. The management needed to explain to investors the reason for its actions and needed to establish its explanations on the simple and perceptible factor. Current net earnings meet this condition better than any other indicator.

Lintner’s third finding was that dividend policy was determined by management on the first place. Other policies were subordinated and adjusted, taking dividend policy as given. Lintner formalized the following model, which captured the most important elements of firms’ dividend policies. For firm i ,

$$D_t - D_{t-1} = a_i + c_i(D_{it}^* - D_{i(t-1)}) + u_{it} \quad (1)$$

$$D_{it}^* = \alpha_i E_{it} \quad (2)$$

Where for firm i

D_{it}^* is desired dividend payment during period t

D_{it} is actual dividend payment during period t

α_i is target payout ratio

E_{it} are earnings of the firm during period t

a_i is a constant relating to dividend growth

c_i represents partial adjustment factor

u_{it} is error term

His model was able to explain 85 % of the dividend changes in his sample of companies. Later on the model was tested by other researches who confirmed the Lintner model performed well. The most famous research is the one of Fama and Blahnik [13].

3. The Modigliani-Miller Dividend Irrelevance Theorem

The best known and perhaps the most controversial theory of dividend policy was developed by Modigliani and Miller [26]. They demonstrated in the perfect and complete capital markets the dividend policy is irrelevant and the value of the company is independent of its payout policy [26]. In their framework the investors are indifferent between share repurchases and dividends because the investors can replicate any desirable payout either by selling holdings in the companies that don't pay dividends or by reinvesting their dividends [16].

In contrast with the previous subchapter, from Modigliani and Miller point of view the dividend payout ratio is not considered as important for the companies and the amount of dividends distributed by the company has no impact on the wealth of the shareholders. Each payout policy is equivalent, because none of them may increase (or decrease) the value of the company. They pointed out that what really counts is the company's investment policy. As long as it does not change, altering the mix of payout and retained earnings will not affect the value of the firm.

The key assumptions of Modigliani and Miller's theory [26] are:

- **Perfect markets:** in a perfect capital markets no buyer or seller is enough strong to influence the market price and the investors have perfect information. This world is free of transaction costs and of brokerage fees. Moreover no taxes and tax differentials between distributed and undistributed profits and between dividends and capital gains exists.
- **Rational behavior:** rational behavior means that each investor prefers more wealth to less and he is indifferent to form (cash payments or increase of holding of his shares) of the wealth he receives
- **Perfect certainty:** the perfect certainty may be compared to an assurance on each future profit of corporation or all future investment. As a consequence,

there is no need to distinguish between bonds and shares as a source of financing.

Under these assumptions the “fundamental valuation principle” may be written as:

$$\frac{d_i(t) + p_i(t+1) - p_i(t)}{p_i(t)} = \rho(t) \quad (3)$$

$$\Rightarrow p_i(t) = \frac{d_i(t) + p_i(t+1)}{1 + \rho(t)} \quad (4)$$

Where

$d_i(t)$ denotes dividend per share paid by firm i during the period t

$p_i(t)$ is the share price (ex any dividend in $t-1$) of firm i at the start of period t

$\rho(t)$ denotes rate of return independent of i .

That means the price of each share has to be such that the required rate of return on every share will be the same across the whole market over each interval of time. In other way, the owners of low-return (high-priced) stock could increase their wealth by selling these shares and purchasing shares with higher rate of return. This process will bring down the price of low-return shares and push up the prices of high-return shares.

The effect of dividend policy may be seen more easily if the equation (4) is restated in terms total value of the firm.

$$V(t) = \frac{D(t) + n(t)p(t+1)}{1 + \rho(t)} \quad (5)$$

$$\Rightarrow V(t) = \frac{D(t) + V(t+1) - m(t+1)p(t+1)}{1 + \rho(t)} \quad (6)$$

Where

$n(t)$ denotes the number of shares at the start of period t

$m(t+1)$ denotes the number of new shares issued during the period t at the ex-dividend closing price $p(t+1)$, so that $n(t+1) = n(t) + m(t+1)$

$V(t) = n(t)p(t)$ the total value of the firm

$D(t) = n(t)d(t)$ the total amount of dividend paid to the shareholders at the record date.

The equation (5) illustrates very well how the current dividends may affect the current market value of the enterprise $V(t)$:

- The current dividend will clearly affect the $V(t)$ via the first term $D(t)$
- The current market value may be influenced as well indirectly via the second term $V(t+1)$, the new ex-dividend market value. Anyhow Modigliani and Miller assume the future dividend policy is known and given for the period $(t+1)$ and is independent of current dividends $D(t)$

- The third term $m(t+1)p(t+1)$ has an impact on the $V(t)$ too. The higher dividend payout in any period has to be compensated by the raise of capital from external sources in order to maintain any desired level of investment.

Therefore the market value of the company is affected by two contradictory factors. Taking into account the assumptions we did at the beginning “the two dividend effects must always exactly cancel out so that the dividend policy to be followed in t will have no effect on the price at t ” [26].

Let's express $m(t+1)p(t+1)$ as function of $D(t)$:

$$m(t+1)p(t+1) = I(t) - [X(t) - D(t)] \quad (7)$$

Where

$I(t)$ is the given level of company's investment during the period t

$X(t)$ is the firm's net profit for the given period

Substituting (7) in equation (6) we get

$$V(t) = \frac{X(t) - I(t) + V(t+1)}{1 + \rho(t)} \quad (8)$$

The term does not appear anymore in the equation, therefore we can conclude the dividend policy has no affect on the firm's current market value.

4. Firm's payout policy and taxation

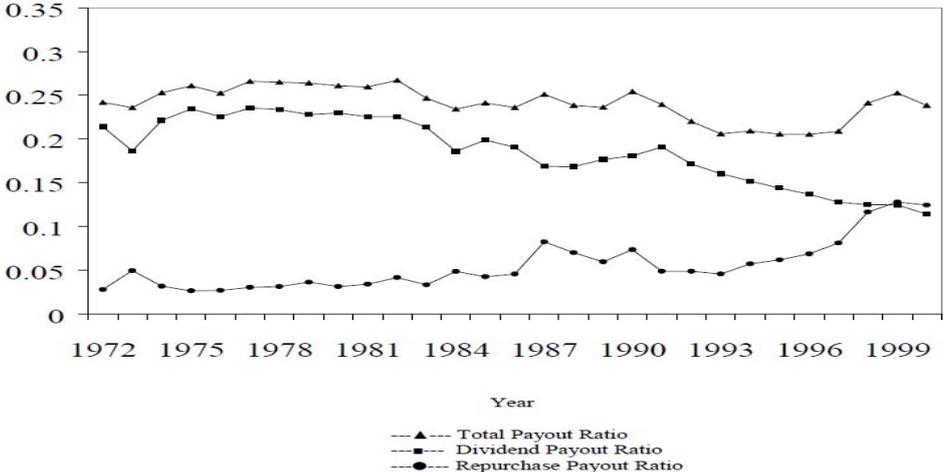
Modigliani and Miller [26] demonstrated the value of the company in the perfect and complete capital markets is independent of its payout policy. Nevertheless, in the real world the capital markets are imperfect, because of asymmetric information, transaction costs, incomplete contracting possibilities and taxes. Moreover the empirical observations show positive correlation between the volume of dividend payments and stock price, thus the dividends do matter [18]. Much of the literature has tried to clarify the pattern in firm's payout policies. The taxation plays crucial role for the company's and investor's decisions. Heterogeneous taxes for the assets conduce to discrepancies between their immediate pre-tax market prices; therefore the taxation has an impact on asset pricing. The investor's dilemma can be expressed as: is the value of a 1 CZK of taxable dividend higher or lower than the value of a 1 CZK of capital gain? The investors confronting higher taxation on dividends relative to the taxation of capital gains may call for higher pre-tax returns on high dividend yield securities [19]. The firm's face the question how to distribute the profit among the shareholders.

In the nearly perfect world, that is no transaction costs, no information asymmetry, but with diverse tax rates on capital gains and dividends, the companies should choose the payout policy, which is the most tax effective [27]. From a tax perspective, there is an evident incentive for companies to replace dividends by share repurchases due to their more favorable tax treatment [14]. But as the empirical evidence shows, the companies still distribute huge amount in the form of dividend payments. Why do they do so? Much of the empirical literature has tried to solve the phenomena of dividend puzzle, and it seems to be still unexplained. Recently, the researchers documented, that

the companies avoid making extreme changes in their payout policy as it may induce changes in the structure of ownership, and consequently negatively affect the share price [5]. The detailed discussion about the dividend puzzle is out of scope of this diploma thesis. In more details, only the explanation related to the fiscal effect will be discussed in the next subchapter. An excellent overview of dividend theories may be found in Kinkki [20].

On the other side the empirical evidence suggests some kind of linkage between the taxes and dividend policy [21]. It seems the companies started to change the dividend payout as a consequence of changes in relative dividend rate (see Casey et al. [8]). In the works of Fama and French [14], or Grullon and Michaely [14] one can find a documentation of an increase in the share repurchases payout accompanied by decrease of firms paying dividends. Although the huge and already established companies had not reduce the dividend payments, the growth rate in dividend payout have been much lower than it used to be, and the amount of stock repurchases have grown significantly [14].

Fig. 1: Dividend and Repurchase Payout Ratios



Source: (Grullon and Michaely, 2002)

In general the dividends are taxed more heavily than capital gains, so rationally no dividends should be paid. But the firms still distribute the dividend on regular basis. The clientele effect theory tries to explain the logic behind such a behavior. In reality not all investors are taxed the same way. The tax regime for individuals and corporate bodies differs. Moreover some institutional investors are tax exempt. These shareholders have no reason to prefer capital gains to dividends. Additionally as pointed out by Allen and Michaely [2] for capital gains, there is no obligation to realize them immediately, thus the associated tax may be postponed. The postponement possibility may create considerable value.

According to the tax-clientele theory the investors are divided into dividend tax clienteles and each clientele owns tax-specific portfolio. The model suggests that the shareholders in high (low) tax bracket should, ceteris paribus, concentrate their portfolios in tax-favored (explicitly taxed) assets [28]. As consequence the firm's dividend policy, in some measure, determines the ownership structure.

5. Conclusion

To conclude, the aim of this paper – to provide a comprehensive theoretical background of dividend distribution and taxation from a view of shareholders – has been fulfilled. Different studies have been performed in order to answer the question if the dividends are important for investors. Some of them analyzed the reaction of the market on the dividend announcement and found out the change of dividend policy is associated with abnormal returns around the dividend announcement date. Another researches directly questioned the investors about their dividend preference and beliefs. Lintner [22] was the one who showed phenomenon that in general increase the dividends and rarely cut them. The most important finding of the Lintner's model is that dividends represent the primary and active decision variable in most situations and that the current net earnings were the most important factor determining the change in dividends. Linter's third finding was that the dividend policy was determined by management on the first place. The most controversial theory of dividend policy was developed by Modigliani and Miller [26] who demonstrated that in the perfect and complete capital markets the dividend policy is irrelevant and the value of the company is independent of its payout policy. Nevertheless, in the real world the capital markets are imperfect (because of asymmetric information, transaction costs, incomplete contracting possibilities and taxes) and therefore practical results of these theories are rather limited.

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SOVEREIGN RISK – HOW CAN WE MEASURE IT?

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Abstract: *This paper focuses on sovereign credit risk meaning a hot topic related to the current Eurozone crisis that started in early 2010. In the light of the recent financial crisis, market perception of the creditworthiness of individual sovereigns has changed significantly. Before the outbreak of the financial crisis, market participants did not differentiate between credit risk born by individual states despite different levels of public indebtedness. In the proceeding of the financial crisis, the market participants became aware of the worsening fiscal situation in the European countries and started to discriminate among government issuers. Concerns about the increasing sovereign risk were reflected in surging sovereign risk premium. The main aim of this paper is to shed light on the characteristics of the sovereign risk with the special attention paid to the mutual relation between credit spread and the CDS premium as the main measures of the sovereign risk premium.*

Keywords: *Cointegration, Credit Default Swap, Credit Risk, Credit Spread, Sovereign Risk.*

JEL Classification: *G01, G15, G32, H12.*

1. Introduction

This paper focuses on sovereign credit risk meaning a hot topic related to the current Eurozone crisis that started in early 2010. Sovereign credit risk arises when government is not able to meet its contractual obligations, i.e. the government fails to repay principal, regular interest payments in a timely manner or does not fulfill its obligations in the form of guarantees that it provided to the entities in both public and private sector. With the financial crisis, that affected to a large extent the banking sector in the Europe due to the recent trend of globalization, the governments even in Europe became highly aware of the stability of its banking sector and potential contagion abroad in case of a default of any of the important player on the banking sector. Therefore the European governments accepted various measures to strengthen the liquidity of the banking sector, provided capital injections or impaired asset relief [8]. These actions affected the fiscal deficits and increased the level of public debt to a large extent. Fiscal situation further deteriorated due to lower economic activity resulting in lower tax receipts, higher unemployment, increased state subsidies etc. Due to all these impacts, the market became more aware of the creditworthiness of individual European countries than prior to the crisis. The pre-crisis period was characterized by the generally low sovereign risk measures such as the credit spread or the credit default swap (CDS) premium. These measures and their development will be discussed further in more detail.

This paper is organised as follows; the second part discusses two main measures of the sovereign credit risk while the third part describes no-arbitrage conditions related to sovereign risk. The fourth part analyzes a CDS basis as one of the key terms of sovereign credit risk measurements. In the fifth part we summarize the paper.

2. Measures of the sovereign credit risk

There are two main measures of the sovereign credit risk. Firstly, the riskiness of an asset is reflected by its yield. The higher the risk embedded in the bond, the higher price the investor requires in order to be compensated for the risk he bears by investing into the asset. The amount of risk of a bond is expressed in relation to a reference entity which is generally perceived to be risk-free, since its probability of default is very low. The most widely used risk-free assets are US Treasury bonds, German government bonds (so called Bunds) or swap curve rates. In our case, we used the German government bond yields. The resulting spread (also called credit spread) measures the additional risk of a bond relative to the risk-free security.

The second measure of default risk is credit default swap (CDS) premium. CDS is a bilateral agreement to transfer the default risk of one or more entities from one party to another [13]. In fact, CDS can be likened to an insurance contract, in which an insured agent (protection buyer) pays an insurance premium. As stated in [7] “the market price of the premium is therefore an indication of the perceived risk related to the reference entity”. In return, the insured agent obtains coverage for a loss given the occurrence of a credit event. The basic structure of a CDS contract is illustrated in Fig. 1.

“The main advantage of a CDS is that these contracts allow isolation the risk of default on credit obligation” as referred to in [5]. As a result, the party seeking for protection against default gets rid only of the credit risk and the underlying asset remains in her ownership.

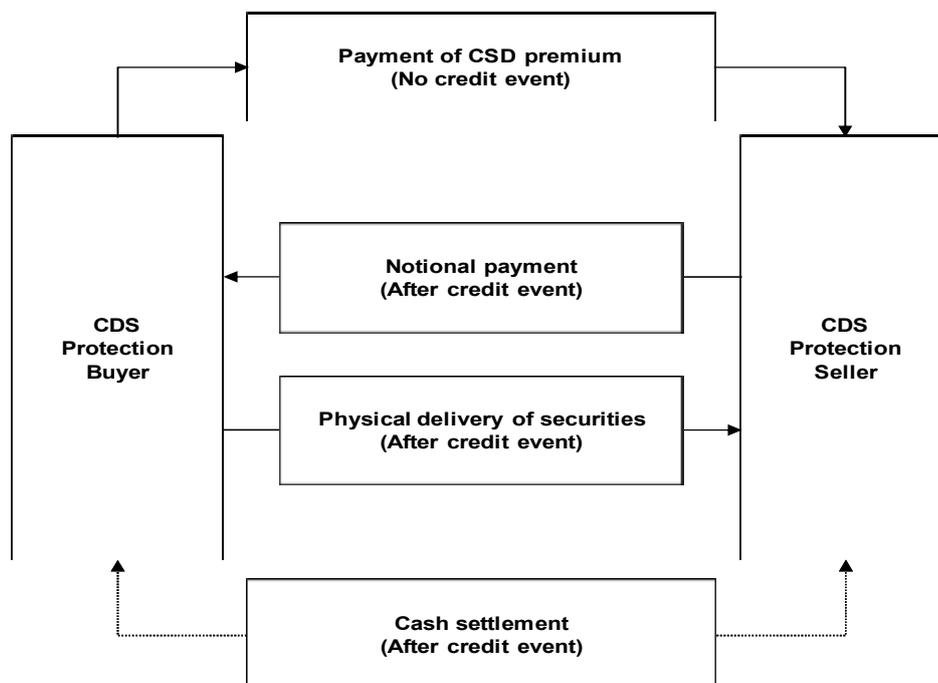


Fig. 1: Structure of a CDS contract

Source: (ECB, 2009)

Despite different levels of fiscal indicators such as a deficit-to-GDP ratio or debt-to-GDP ratio, the sovereign risk was priced similarly in all countries. However, with the outburst of the crisis, the market participants became to differentiate between the countries even within Europe. To the most affected countries belonged Portugal, Italy, Greece or Spain (so called “PIGS” countries) with the most severe impact of the financial crisis with respect to the increase in the deficit-to-GDP ratio. The increased uncertainty of investors was expressed by the surging levels of the sovereign risk measures (see Fig. 2 for the CDS premiums of selected European countries and Fig. 3 for credit spread as a difference between the sovereign yield of a respective country and a German government bond as a “risk-free” reference asset).

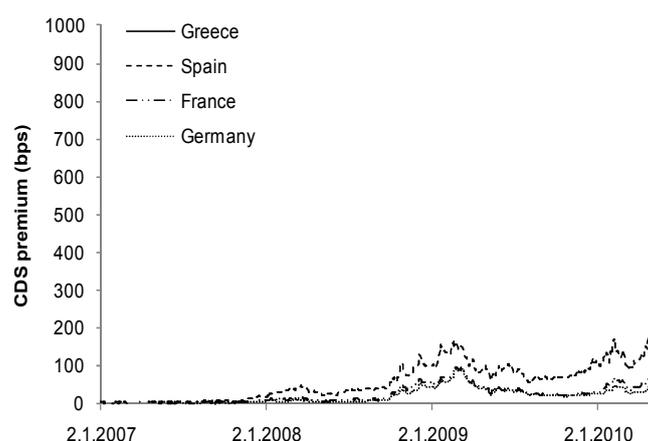


Fig. 2: Premium for 5Y sovereign CDS

Source: (Bloomberg)

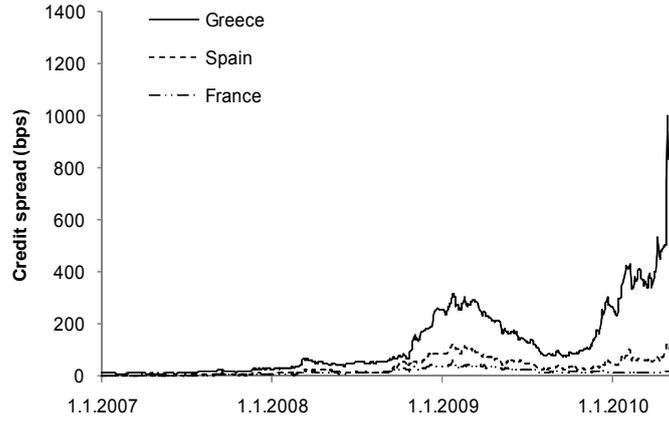


Fig. 3: Credit spreads based on 5Y sovereign bond

Source: (Bloomberg)

3. No-arbitrage condition

CDS premium is defined as the internal rate of return that equates the expected premium flows over the life of the swap to the expected loss if default occurs at various dates [13]. Given no arbitrage theory, the CDS spreads should approximately equal to the bond yield spread. Both measures are supposed to provide equal information regarding perception of the credit risk of the same asset (e.g. an obligation). If this assumption proves to be correct, the so called no-arbitrage condition holds. Otherwise, the market participants could gain from arbitrage opportunities by undertaking the most favorable trading strategy.

When deriving the theoretical framework of the no-arbitrage condition, we essentially refer to [19]. The fundamental assumption, underlying the no-arbitrage condition, is that the outcomes of two alternative investment strategies should be equivalent. We assume the following strategies. Under Strategy 1 we assume that the investor enters a CDS contract on the bond. Under Strategy 2, the investor shorts the bond and invests the proceeds into purchasing a risk-free note.

When entering a CDS contract (Strategy 1), both parties involved, i.e. the entity selling credit risk and the party assuming the risk, expect that the present value of all future outflows will be balanced by the present value of the future inflows. In other words, the protection buyer assumes that the present value of the CDS payment p_{CDS} , he pays regularly at time t_1, t_2, \dots, t_N unless a credit event occurs, will be equal to the contingent payment the protection seller is obliged to pay in case of a credit event. For simplicity we assume that the face value of a bond equals 100. According to the risk neutral valuation principle in Equation (1) is received in [19].

$$\sum_{i=1}^N e^{-rt_i} Q(t_i) p_{CDS} = \int_0^{t_N} e^{-rt} (100 - M_t) q(t) dt \quad (1)$$

Where is $q(t)$ the risk neutral probability of default of the reference asset at time t , $Q(t)$ stands for the risk neutral survival probability until time t , r is a risk-free rate which is assumed to be constant over time, M_t denotes the market value of the bond of interest. The market value M_t reflects the recovery rate of the bond – the investor does not receive the whole par value of a bond but only its proportion. The left side of the

equation (1) expresses the present value of the premium payments which are paid by the protection buyer until credit event or maturity of the contract, whichever comes first. The right hand of the equation stands for the present value of the contingent payment the buyer of protection can receive should the credit event occur.

Valuation of Strategy 2 will be based derivation of the current price of a par fixed coupon bond. Under this strategy, we assume that the investor goes short on a defaultable bond (he is relieved of a credit risk). In return, he purchases a risk-free note which yields a coupon rate of r . By this procedure, the CDS is replicated synthetically. As in the Strategy 1 we assume zero initial investment and bond face value equal to 100. The valuation of Strategy 2 is derived in (2).

$$0 = - \left[\sum_{i=1}^N e^{-rt_i} Q(t_i) c + e^{-rt_N} 100 Q(t_N) + \int_0^{t_N} e^{-rt} M_t q(t) dt \right] + \left[\sum_{i=1}^N e^{-rt_i} Q(t_i) r + e^{-rt_N} 100 Q(t_N) + \int_0^{t_N} e^{-rt} 100 q(t) dt \right] \quad (2)$$

The first bracket approximates the proceeds from short selling the bond. The first component in the bracket denotes the value of expected coupon payments c . The second term relates to repayment of the principal at the maturity date on condition that a credit event does not occur. The last term approximates the market value of the bond after a credit event. Components in the second bracket reflect the cash flow from purchasing the par fixed rate risk-free note. Meaning of individual terms is equivalent to the corresponding terms in the first bracket. Only one remark should be noted with respect to the last term. Since the risk-free rate, which determines the coupon rate of the risk-free note r , is constant the risk-free note can be always sold at its face value assumed to be equal to 100.

Equation (3) shows a modified version of (2) which is more convenient for further proceeding.

$$\sum_{i=1}^N e^{-rt_i} Q(t_i) (c - r) = \int_0^{t_N} e^{-rt} (100 - M_t) q(t) dt \quad (3)$$

Since we can see that the right sides of (1) and (3) are identical we can put the left sides of these equations into equality. Equation (4) shows the resulting form which enables us to define the essential condition for the so called no-arbitrage condition to hold.

$$\sum_{i=1}^N e^{-rt_i} Q(t_i) [p_{CDS} - (c - r)] = 0 \quad (4)$$

So that the last equality is fulfilled, the expression in the bracket must be zero. Equation (5) describes the no-arbitrage condition.

$$p_{CDS} = c - r = p_{CS} \quad (5)$$

According to the no-arbitrage condition in (5), the credit spread noted as p_{CS} should reach exactly the same value as the CDS premium, otherwise the traders can profit from arbitrage opportunities. If the CDS premium overweighs the credit spread, the trader can gain from selling the CDS contract, invest in a risk-free asset and short the bond. Reverse strategy will be adopted, if the credit spread is higher than the CDS premium. In the later text, we will also mention the term CDS basis (hereinafter also

noted as basis only) which expresses the difference between the CDS premium and the credit spread as shown in (6).

$$Basis = p_{CDS} - p_{CS} \quad (6)$$

4. CDS basis

In reality the theoretical relation shown in Equation (5) does not always hold, however. In the recent economic research dealing with the problematic of CDS contracts, the main impediments affecting the basis have been identified. These six general barriers will be shortly discussed in this section.

First, a cheapest-to-delivery option tends to widen the CDS basis. Upon the credit event, if the physical settlement was contracted, the protection buyer does not have to deliver a concrete bond as in the contract specifying the conditions, there are only general characteristics determined but not the concrete bond which becomes deliverable in case of credit event occurrence. Instead he has the possibility to deliver the less valuable bond from the basket of deliverable bonds. Since the protection sellers are aware of this option, CDS spreads tend to result in the wider basis. [3] also provided the evidence, that after the issuance of new bonds or loans the probability of utilization of the cheapest-to-deliver option increases which consequently causes the basis to widen. For more detailed discussion of the consequences of the cheapest-to-deliver option see [2].

Second, difficulties in shorting the bonds contribute to the widening of the basis. This constraint is accentuated if the creditworthiness of the issuer deteriorates due to impaired liquidity. According to [1], the CDS markets serve as a financial tool for investors and traders to short the sovereign bonds without any liquidity problem instead.

Third, counterparty risk tends to have negative effect on the basis meaning that it causes the basis to tighten. When entering a CDS contract the protection buyer is exposed to the uncertainty that default of the reference entity might induce the protection seller to default as well. In case of such a simultaneous default, repayment of the difference between par and the recovery value of a defaulted bond would be at stake. Moreover, the additional counterparty risk is stemming due to a long and complex risk transfer chains with high contagious potential. The protection seller enters subsequently another CDS contract to hedge himself against the default risk. The protection buyer therefore loses track who is the final party of the "chain" as the CDS contracts are over-the-counter (OTC). Counterparty risk is further discussed in [7], [16] or [6].

Fourth, accrued interest differences on default tend to tighten the basis. [11] argues that a purchase of the CDS contract provides the protection buyer with the right to sell the par bond for its face value plus the accrued interest. However, in practice, the protection buyer receives only a face value of a par bond. Therefore, the CDS spread should be lowered by the amount of the foregone accrued interest.

Fifth, synthetic CDO issuance is expected to have a negative effect on the basis. However, as the widespread and almost unregulated use of complex structured credit products is deemed to exacerbate the recent financial turmoil, its future importance is

questionable. Moreover, according to the survey realized by [9], market participants expect that complex credit derivatives products such as CDO squared, CDS on structured finance, CDOs on ABS will not make a comeback in future.

Sixth, liquidity in segmented markets is another important factor influencing the basis. If the liquidity deteriorates, the risk the investors are exposed to increases. Consequently, the investors require higher spreads to be compensated for the less liquid (more risky) market. Therefore, if the CDS market becomes more liquid compared to the bond market, the CDS basis narrows, and vice versa. According to [12], the CDS should be traded at higher spread than the referenced bond since they found sovereigns bond markets to be more liquid relative to the CDS market. Hence, higher CDS spreads are required to compensate the investor for higher risk due to less liquid market. On the other hand, some authors such as [18] or [15] give the evidence that during the periods of distress when the bond liquidity might be seriously constrained and even credit squeeze may occur, the activity moves on the CDS market where the trading continues. This is supposed to hold especially for the mature markets.

Structured classification of the main factors driving the basis either up or down are summarized in Table 1.

Tab. 1: Overview of the CDS Basis Drivers

	<i>Positive Effect</i>	<i>Negative Effect</i>	<i>Undecided</i>
<i>Fundamental Factors</i>	•Cheapest-to-deliver option	•Funding issues	•Coupon specificities
	•CDS spread is always non-negative	•Counterparty default risk	
	•Problematic restructuring clause	•Accrued interest differences on default	
	•Bond trading below par	•Bond trading above par	
<i>Technical Factors</i>	•Limited ability to short bonds	•Synthetic CDO issuances	•Relative liquidity in segmented markets
	•Issuance patterns		

Fundamental factors – factors related to a precise specification of a CDS contract which can cause the CDS to behave diversely from the market where the bonds are traded

Technical factors – factors related to the nature of the CDS and bond market

Positive effect – equivalent to widening of the basis

Negative effect – equivalent to tightening of the basis

Undecided – direction of the movement depends on the precise specification

Source: (De Wit, 2006)

5. Links between the CDS and bond market

As discussed in the previous part, there are factors which cause the CDS basis to deviate from the theoretically derived level. For instance, the theoretical relation does not hold for the countries in the sample, i.e. Greece, Spain and France, (see Fig. 4).

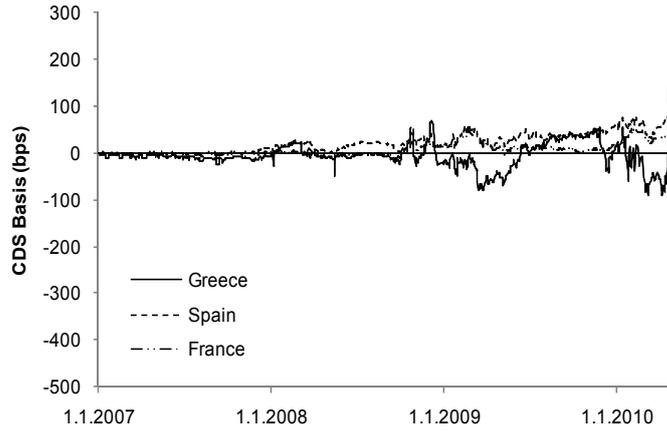


Fig. 4: CDS Basis

Source: (Bloomberg)

However, these deviations are expected to be only short run. The data shown in Fig. 4 indicate that the largest differences between the CDS basis and corresponding credit spread were recorded in the stress period, i.e. in autumn 2008 with the Lehman Brothers bankruptcy and in Greece in 2010 when the real fiscal conditions were revealed. The absolutely biggest difference was recorded in May 2010 in Greece and is related to the sudden decrease in both CDS premium and credit spread after the announcement of launching the Securities Markets Programme on May 10, 2010 [10].

According to the economic research (see [18], [3], [12] or [14]), both measures are linked through a long run relationship. For testing the hypothesis of the long-run relationship, the cointegration procedure has been used. This method is recommended since both time series – CDS premium and credit spreads – have been proven to usually follow a unit root process (i.e. the series are non-stationary).

As stated in [17], the cointegration equation has the form derived in (7).

$$p_{CDS,i} = \alpha + \beta p_{CS,i} + \varepsilon_i, \quad (7)$$

where ε_i is stationary. Should both measure co-move in the long run, the parameter β is supposed to be equal to zero, the cointegration vector should be [1,-1] and α equal to zero. However, these very strong assumptions are not usually fulfilled in reality. In reality, there is evidence for a weaker form of relation allowing for short term deviation. In [17] both measures cointegrate for the selected countries (e.g. for Hungary, Poland, Slovakia) in the long run, but they deviate in the short run (i.e. the hypothesis of the cointegration vector equal to [1,-1] is rejected) due to different liquidity and additional unobserved factors. For developed sovereigns, similar results were obtained in [4] and for developing countries e.g. in [12], [2] or [1]. Cointegration between CDS premium and credit spread holds also for corporate entities (see e.g. [18] or [19]).

The obtained results suggest that one of the markets leads the other market in the price discovery. The vector error correction framework (VECM) has been adopted to test which market is more efficient in the price discovery process and in providing the most up-to-date information about the market perception of the sovereign credit risk and which market lags behind. [17] provides interesting evidence and observed the

price discovery process in the period 2005-2008. In this long time range, the CDS market has a leading role only in three countries out of the sample which included ten countries in total. However, in 2008 the situation reversed – the leading role of the bond market has been proven only for three countries. This indicates that the CDS market began to overtake the leading role in the pricing of the sovereign credit risk. This is consistent with the results obtained in [4] who showed that the CDS market is ahead of the bond market for the riskier areas such as developing countries or the group of the so called “PIGS” countries in Europe. On the other hand, the bond market seems to be more efficient in pricing the credit risk in the less risky countries such as Austria, Denmark or Finland.

6. Conclusion

This paper discusses main measures of the sovereign credit risk which has become a matter of great concerns due to the future situation in Greece, Ireland and Portugal and even contributed to discussions regarding the future of the Euro as a single European currency. We have presented basic characteristics of two sovereign credit risk measures: the credit spread and the CDS premium. Despite short run deviations, these measures have been proven to cointegrate in the long run. In the short run, these measures differ due to various factors such as liquidity differences and other unobserved factors.

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EXTREMIST SCENE IN THE CZECH REPUBLIC AND ITALY

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Abstract: *Extremism issue is becoming an important part of state policy in European Union. There should be also distinguished basic forms of extremism and its threats for different states of European Union. The Czech Republic extremism is characterized mostly by extreme right - wing and left - wing groups or parties and there can be expected its growing. This paper also aims at identifying and analysing the sources of terrorism threats posed to Italy, either international and national sources of threat. Italy's military presence in critical areas, such as Lebanon and Afghanistan, references to Italy made by Al Qaeda on the media, and the presence of Jihadist elements in the national territory are some of the sources of terrorism threat identified in this paper. In terms of "domestic" terrorism, this paper examines a recent phenomenon that recalls the late 1970s Red Brigades terrorism. Finally, this study analyzes the threat of individuality or anarcho-insurrectionist groups and concludes that it is still of high relevance. The aim of this paper is to describe The Czech Republic and Italian extremist scene.*

Keywords: *Extremism, Terrorism, the Czech Republic, Italy, Scene, Comparison, Threat.*

JEL Classification: *H56.*

1. Introduction

Extremism and terrorism have become part of modern European history. If this issue in some countries regarded as marginal, since 11th September fight against these phenomena has become an important part of domestic and foreign policy. Although the extremism and terrorism tend to generalize, EU countries have in this area its unique features.

This article was created as a part of The International University Network and the aim is to describe and compare extremist scenes in the Czech Republic and Italy. This work shows an example of the Czech Republic and Italy in order to describe diversity of extremism and terrorism in EU.

2. Extremism in the Czech Republic

Extremist scene in the Czech Republic shortly before and after the fall of the communist system in 1989 is characterized by closeness, low severity of extremist acts and small dangerousness for the society. Extremists, who at that time were mainly members of the skinhead movement, had very limited linkage with foreign countries. This led to the scene in the Czech Republic was almost exclusive presence of the typical right-wing extremism which was particularly apparent racist attitudes against Roma and foreigners. During nineties, extremist scene in the Czech Republic began to

diversify, radicalized, becoming more dangerous and there was an adoption of certain formulas from abroad, trend which is typical for the present. *"A significant feature of violent attacks is increasing of brutality manifested as attacks against physical integrity, and private property of citizen."* [1] Despite the fact that in today's Czech Republic can be identified extreme left-wing and religious extremism, extreme right wing remains the majority.

2.1 Right-Wing Extremism in the CR

As I mentioned in introduction, extremist scene in the Czech Republic can be divided into:

- Extreme right wing
- Extreme left wing
- Religious extremism

Extreme Right Wing

Development of the extreme right wing in the Czech Republic is characterized by the progressive radicalization and increasing level of violence during the 90th years. Despite racially motivated crimes did not become mass matter, it is necessary to treat such acts with a high dose of attention. *"The total number of crime committed in the Czech Republic as a crime with an extremist subtext, including racially motivated crimes is statistically insignificant number. Notwithstanding this fact, it is necessary to extremist attacks treated as a very serious and socially dangerous phenomenon, which in itself carries a certain degree of latency"* [1] Since 2000, extreme-right wing scene split with greater vigor to open and hidden racist parts. This happened for two basic reasons. The first is that law enforcement pressure, have begun to monitor extremists and racist activity has become more successful. The second is an effort to gain broad public support and the opportunity to enter politics. Hidden racist scene begins to dominate in 2003. The proof are election results of extreme - right Workers' Party of social justice (DSSS) below and the indirect evidence is the declining number of crimes with an extremist subtext. Covertly racist parties can balance on the edge of the law and do not cross it.

Both groups are typical of racist attacks. J. Chmelik in his book [1] defines three basic forms of racially motivated attacks, namely:

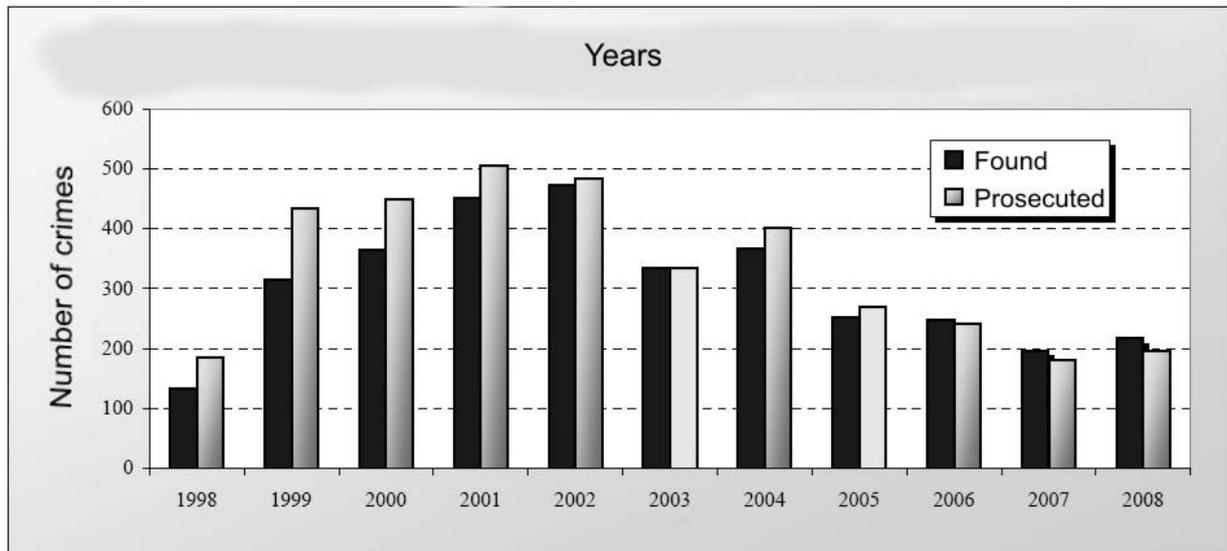
- Verbal abuse (verbal).
- Attacks against the physical integrity (brachial).
- Graphic (media).

Czech extremist scene is represented by all the above three forms. Frequency of each is different due to the fact that group or individual are openly or hidden racist. Open racism is typified by all forms of attacks but brachial attacks dominate. Hidden racism distances itself from physical attacks and mostly use verbal and graphic forms.

Typical feature of far-right extremism in the Czech Republic is "Roma racism". Coexistence of Roma and the majority in the Czech Republic is generally problematic. *"(The experience with Roma and possibility of a good coexistence with them.) - As regards the coexistence of Roma, 73 % of the respondents who had with them everyday experience (less than half of total number of those interviewed), they*

regarded the experience as bad.” [5] Although racially motivated crimes are also aimed against immigrants and anti-Semitic, Roma are the most frequent victims, which is due to the position of Czech society towards Roma logical. Along with economic globalization and the increasing number of foreigners in the Czech Republic there can be expected that there will increase attacks also against other minorities

Fig 1: Detected crimes with an extremist subtext and their perpetrators - Czech Republic in years 1998-2008



Source: (Strategy to combat extremism: <http://www.mvcr.cz/soubor/strategie-extrem-2009-pdf.aspx>)

Open Racism in the Czech Republic

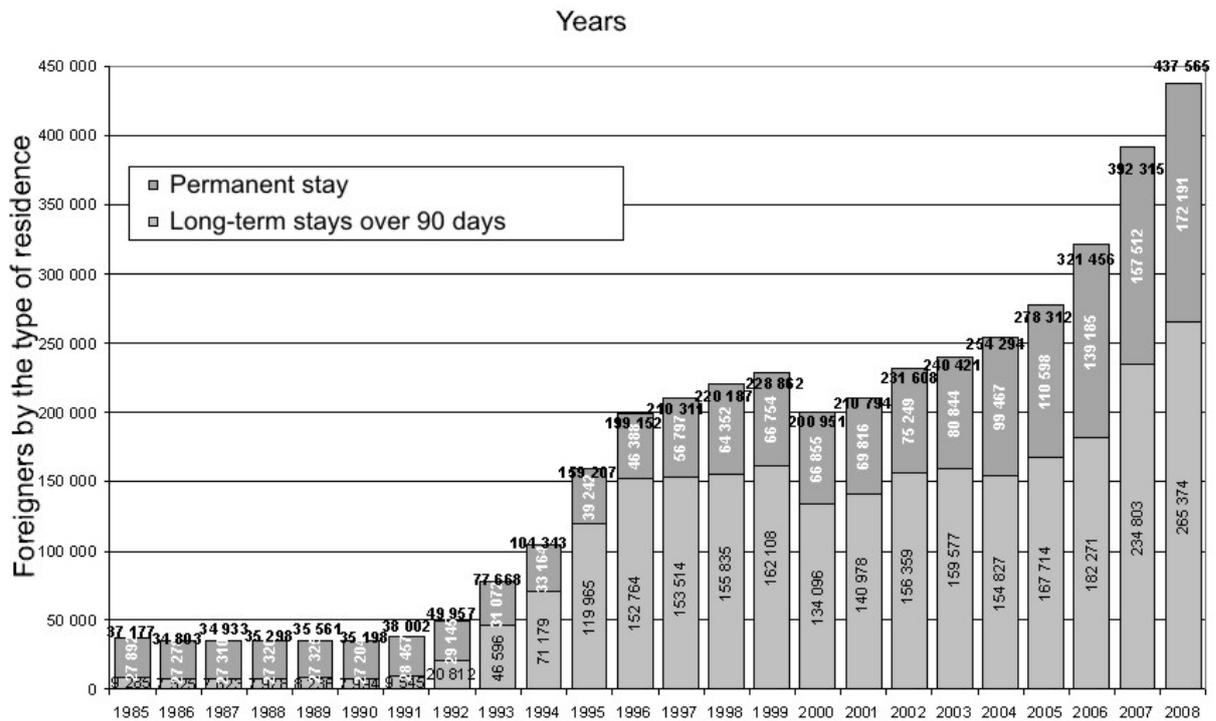
Openly racist attitudes are represented especially by members of right-wing part of skinhead movement. Skinheads are not homogeneous group, which originated in Great Britain in late sixties of subculture known as Mods. They were young people who had shared often not very good social status. Over time, this subculture led to establishment skinhead movement, which in its pure form was not racist or xenophobic, but rather it was a protest against former conservative British society.

The crisis in the seventies and wave of immigration in the UK has meant that part of the movement became to be radical. Immigrants were accused of socio - economic problems. It led to the foundation of political party - British National Front. It was extremist party, which made no secret of nationalism, racism and its base were mainly right-minded members of the skinhead movement. Because there were still strong movement of traditional skinheads, who distanced themselves from political ambitions of the British National Party, racist skinheads were renamed to boneheads who have openly proclaimed German fascism.

In the Czech Republic territory skinhead movement started to in larger scale after 1989 but without similar genesis, which passed the Skinheads in Western Europe. In the Czech Republic, the development was skipped and in the early nineties, the skinhead movement has formed as racist. In the Czech Republic was founded a number of openly racist associations and movements, some with national and European importance. *"Organizations with national importance were Bohemia Hammerskins (especially in the years 1993 - 1996), Blood & Honor Division Bohemia*

(from 1996 to 1999), the National Resistance (since 1990) and more recently the Anti - antifa." [2]

Fig. 2: Foreigners in the Czech Republic



Source: (Czech Statistical Office <http://www.czso.cz/csu/cizinci.nsf/tab/B900334F9B>)

Hidden Racism in the Czech Republic

Ambition of hidden racist associations is to operate on current Czech political scene. Such parties distance itself from open expressions of racism, xenophobia, nationalism or homophony. Extreme right - wing movements in Europe have similar ideology and the Czech Republic is not exception. Although intellectual roots are similar, they differ in details. Common themes are resistance to the European Union, globalization and NATO. The differences are due to national specifics. *"It Causes Slovak and Romanian nationalists against the Hungarian minority in the Slovak and Romanian, Hungarian demands for revision of the Trianon Treaty, or anti- Germany sentiment linked to Czech and Polish right - wing extremist."* [3]

At this time, these parties in the Czech Republic are mainly represented by Workers' Party of social justice (DSSS). DSSS was founded in 2003. Chairman is Tomas Vandas. The aim is to get as much public support. From a macroeconomic perspective, official priority is to tackle unemployment and to change foreign policy. Partial agenda is reinstating the death penalty, health care reform, education, the abolition of the Senate. Party is openly against minorities, particularly Roma and homosexuals. Preferences increasing demonstrate election results. Overall, DSSS won in 2010 elections to the Chamber of Deputies of Parliament 59,888 votes, in percentage.

2.2 Left-Wing Extremism in the CR

Extremist left - wing in the Czech Republic is represented primarily by orthodox anarchists, communists, and eco-terrorists. In general, left side contains more diverse spectrum of opinion than the right side and in number of cases it is rather radical groups or individuals. This applies especially to anarchist and anarcho autonomous ideological currents. *" So called left - wing extremist scene brings, rather political radicals than extremists, their criticism leads to correct the errors in the existing system, but the means for correcting errors are unusual due to the promotion of alternative lifestyles based on various social values."* [4]

Among left-wing radicals can be sorted also eco-terrorists. Eco-terrorism in the Czech Republic is since its inception in 1989 strongly linked with the anarchist movement. Their activity is uncoordinated and lies in the protest blockades, demonstrations and media spreading of their views. Perhaps the most significant events in the CR, was an attack against Biotest Ltd. This company is engaged in research and development in the field of toxicology and pharmaceuticals. This company breeds laboratory animals, which was the main reason for the attack, during which the property damage was over 200 000 CZK (80 000 EUR).

3. Terrorism in Italy

Although the complete retreat of Italian military contingent from Iraq represented an undoubted element of terroristic threat decrease, caused by international Jihadist weaving factories, the level of risk whose our Country expose itself is high. This, first of all, due to Italian military's commitment in several critical areas, such as Lebanon and Afghanistan, where a fresh outbreak of Islamic violent events has been noticed for some months.

Concerns also result from the latest US military action in Somalia, against Al Qaeda battle stations, all that to avoid the real risk that further "military front" in Islamic land represent a new call-up to "holy war" for old and young jihadists.

Moreover, in the same framework, we cannot neglect references to our Country, and especially to Rome, noticed in media sorties of Al Qaeda underworld, on the occasion of invectives periodically directed against Catholic Church and its Pope. The results of intelligence and investigative police activities, on the other hand, keep on underlining a persistent practicality of elements having reference to radical structures, potentially dangerous for the security, on our territory.

As mentioned above, in fact, the investigations allowed to identify some North Africans which, among their embryonic terroristic projects, had included targets of high symbolic value, such as the Basilica of San Petronio in Bologna, that houses the famous fresco of Mohammed in hell.

The investigative outcomes have shown that Italy is considered an operationally viable option, according to the Jihadist strategy, with the aim of ending hostile actions, inspired not only by the will in influencing its political-military choices, but also by mere retaliatory dynamics. Jointly with this, it is possible to understand how concrete is the risk of terroristic attack in Italy, considering the offensive ability showed by the

attacks' authors in Madrid on March 2004 and in London on July 2005, or those ones foiled by the Britannic1 and German police in summer 20062. Concerning the investigations on the attacks, that have been foiled by the Britannic authorities, data resulting from these researches have not made out specific threat elements concerning Italy, but they have pointed out another preoccupation, based on the involvement of young people- the most part from Pakistan, who were born in England or have been living there since long time- who recently have started a path of radicalization. This circumstance lead to a deeper examination of the monitoring of all the aggregation environments whose radical inspiration is sure, in which a process of Islamic fundamentalist indoctrination finds a possible realization. In this domain, it is impossible to ignore the phenomenon related to mujahedeen groups: after their participation in the religious and interethnic conflicts, they went to Italy and to other European countries where they spread jihadist ideologies, tanks to their charisma. The attention is currently for those mujahedeen groups who came back to Europe and to Italy after the conclusion of conflicts that were already ended (Bosnia, Chechnya and Algeria), also with the aim of preventing a dangerous connection with the possible future veterans of the Iraqi and Afghan conflict. Beside the threat of the Islamic fundamentalist terrorism, it should be collocated, also, the threat coming from the possible repercussions in Italy of the conflicts that take place in other nations. The possible entry of Turkey in the European Union, indeed, is contributing to elevation of the risk connected to the possible "exportation", also in the old continent, of terroristic actions both from the most violent parts in the Kurdish separatism, which are not so disposed to accept the unilateral ceasefire, established by the separatist movement for a political solution of the conflict, and from Marxist-Leninist groups, as DHKP/C, that are well-known opponent of the Turkey integration in Europe3.

Red Brigades For the Construction of the Fighting Communist Party

In terms of "domestic" Terroristic, in recent years in Italy there has been a phenomenon that recalls the late 1970s Red Brigades terrorism. This phenomenon is almost entirely ended in 2006, with the imprisonment of the RB-FCP leaders (Red Brigades for the construction of the Fighting Communist Party- militarist wing) and with the dissolution of the organization. The general probative framework emerging from the investigations and the suits, that have been carried out so far, has confirmed that the successes obtained against the RB-FCP allow to consider the subversive group as disjointed. It can be said that only some lower-ranking militants "have shunned" the identification, and before October 2003 they were already out of the organization. A short-medium turn revival of RB-FCP armed struggle strategy did not seem to be likely. From investigations it emerged a correspondence exchange that dated back to a period after D'Antona's murder, between the RB-FCP and another group named "Red Brigades fighting revolutionary organisms for the constitution of the fighting Communist Party". This group had never appeared before and its aim was the development of a possible communication relationship between the two unities.

Although this contact seems to be interrupted, it is not possible to deny that the absence of terroristic acts from this group could be connected to a "freeze" of the political and military activity, after the RB-FCP annihilation. Noteworthy is the role of "address" played by the militants in the "circuit prison" – that is the "irreducible" prisoners- who have always given ideological support to the external "militants" and

recently have addressed their own documental production also against the prison regime, regulated by the law 41bis in the Code of Civil Procedure. An extensive campaign against the application of the law to the “political” prisoners, that involve different parts of the most radical antagonism is ongoing. In this domain the activism of association is distinguishable.

The Second Position (Movimentist Wing)

From a different point of view, the perspective of the so called RB4 “second position” has to be considered. This position supports the construction of a party in a strong relationship with the masses’ necessities and a not necessarily violent praxis, using an useful army intervention for the political project. The turmoil, that seems to characterize the movimentist range, appears to be confirmed by the large diffusion of propagandistic material, through both official channels and clandestine publications, only for the restricted environment in the revolutionary area. This is the case of “L’Aurora” review, whose first three editions have been acquired. In the three issues the starting of a revolutionary project is postulated. The final goal of the project is the armed rising, but it is nowadays based on violence, “with the aim of making politics and not yet the war”, that is on the necessity of taking roots in some environments of extremist antagonism, which are inclined to “take action”, so that they can give vent to their revolutionary impatience through the armed propaganda instrument. The pamphlets revive the strategy that during 1980s claimed itself in open contrast with the RB-FCP militarists wing line, the RB “second position”. Correspondingly, the attacks against “Vannucci” barracks in Livorno, “Galileo Avionica” firm in Milan and the Journalist Renato Farina, appear to belong to the activity of the terroristic formations, that have been noticed in the RB movimentist wing positions. These attacks are part of a significant propaganda activity, within a project of radical fight, which is potentially subversive-terroristic.

Concerning the present political situation in Italy, a concrete danger of “domestic” terrorism coming from right extra-parliamentary group, is not found.

The Anarcho – Insurrectionist Movement

The threat of individuality or anarcho-insurrectionist groups is, in a perspective view, still of high relevance. In fact, if on the one hand, we can say that police actions, in latest years, as well as a significant importance in judicial response, have achieved an undoubted precautionary effect, on the other hand, it is obvious that fragmentation of groups and horizontal and informal diffusion of the anarchical “galaxy”, form a consistent organizational system.

The acronym AIF – Anarchical Informal Federation– particularly, since its first appearance in December 2003, as its compilers intent, means to represent an open “cartel”, in which all the individualities or groups can identify themselves, regardless of their direct mutual acquaintance, on the only basis of fight campaign sharing, all in general aimed at attacking, through direct action to State, its authorities and capital. This informal view of social structure attack opens up to every violent counter system instinct that– out of Marxist Leninist organizations “Party plan” –can identify itself on the basis of selected aims. However, the latest documental production about this field, underlines the wish “to break with” attitudes considered waiting, by an increase of actions level against traditional insurrectionist targets, and, especially, “counter-

repressive” (having reference to judiciary-prison system, political control of illegal immigration and temporary stay centres) “anti-imperialist” and “ecologist” campaigns.

4. Conclusion

Extremist scene in the Czech Republic and in Italy may have different characteristics and dynamics nevertheless they all pose serious challenges for both societies and states.

Nowadays, in the Czech Republic, extreme right wing and extreme left wing are the most represented forms of extremism. Yet, the extreme right wing is still the majority. In the recent decade, the extreme right wing scene developed with greater vigor into open and hidden racist parts. A typical feature of far-right extremism in the Czech Republic is the "Roma racism", although it is expected its hatred and attacks to be increasingly directed at foreigners and minorities.

In terms of covertly racism, election's results conveying a strengthening of the extreme right wing political party Workers' Party of social justice (DSSS) witnesses the development of such trend. Covertly racist associations aim at operating inside the Czech political scene. Usually such parties do not use open expressions of racism, xenophobia, nationalism, or homophobia, nevertheless DSSS is openly against minorities, particularly Roma and homosexuals. The fact that such parties are increasingly conquering more people's votes should be source of concern.

On the opposite side of political spectrum, extremist left-wing in the Czech Republic is mainly represented by orthodox anarchists, communists and eco-terrorists. In general, in Czech Republic, extreme left wing contains more diverse spectrum of opinion than the extreme right wing and in number of cases it is rather radical groups or individuals.

As to the extremist scene in Italy, there are mainly two sources of extremism: the Islamist terrorist threat and the anarcho–insurrectionist movement.

Concerning the Islamist terrorist threat posed to Italy, there are some elements of concern. Firstly Italian military presence in several critical areas. It is true that the complete retreat of Italian military contingent from Iraq represented an decisively element of terrorist threat decrease however the Italian military presence in other theatres such as Lebanon and Afghanistan keeps the level of risk high. Secondly, explicit references to Italy, and especially to Rome, made by Jihadist terrorist groups in the media is an unsettling piece of information. Thirdly, Italian authorities have detected in the country the presence of Jihadist elements, suspected of belonging to terrorist cells and of preparing embryonic terrorist attacks against Italian targets. Moreover, the arrival in Europe and in Italy of mujahedeen groups after the conclusion of conflicts in places like Bosnia, Chechnya and Algeria is another element that should be under the authorities attention.

As to “domestic” extremist scene, Italy had witnessed in the recent years a phenomenon that recalls the late 1970s Red Brigades terrorism. However, this phenomenon was almost entirely ended by 2006, with the imprisonment of the RB-FCP leaders (Red Brigades for the construction of the Fighting Communist Party-militarist wing) and with the dissolution of the organization.

Nevertheless, the RB “second position” (movimentist wing) is still very active and diffusing its propaganda and ideas, through both official and clandestine channels. Although initially its position supported the construction of a party in a strong relationship with the masses’ necessities and a not necessarily violent praxis using an useful army intervention for the political project, the truth is that nowadays its final goal is based on violence. Recent attacks taking place in Italy proved to integrate a significant propaganda activity, within a project of radical fight, which is potentially subversive-terroristic.

Finally, the threat posed by individuality or anarcho-insurrectionist groups is, in a perspective view, still very relevant. Although police actions and judicial response have achieved an indisputable precautionary effect, we currently assist to a fragmentation of groups and horizontal and informal diffusion of the anarchical “galaxy” that is forming a consistent organizational system. For instance, AIF (Anarchical Informal Federation) aims at being an open “cartel”, in which individualities or groups can identify themselves with, on the basis of fight campaign sharing, aimed at attacking the state, its authorities and capital.

Extremist scenes in the the Czech Republic and Italy has its typical features and also similar ones. One of the them is criminalization of their activities. Although extremist scene may only be responsible for a statistically small number of crimes both in Czech Republic and in Italy, it does not mean that it is a less threatening or dangerous phenomenon. Rather the opposite. By describing the extremist scene in Czech Republic and in Italy, this study shows that extremist scene and attacks are a socially dangerous phenomenon, posing serious challenges to our societies nowadays.

¹ The attacks (foiled by the Britannic police on August 2006) should have happened contemporaneously with the explosion of devices in different airplanes, presumably belonging to English and American airlines and leaving from stopovers in United Kingdom for United States, with the involvement of several suicide attackers.

² On the 31st of July and on the 1st of August 2006 at Dortmund and Koblenz stations respectively, two explosive devices have been founded in regional trains. The first one did not explode because of a flaw in the mechanism of activation, while the second one was defused by the experts. The German police’s investigation was directly addressed to the Islamic extremism environments and in the following days it allowed to arrest five Lebanese citizens, two of them taken in Lebanon. Recently, the Court of Assizes of Perugia has condemned a Turkish citizen to 7 years imprisonment for international terrorism, for his assessed central role in the Turkish terrorist group DHKP/C and his role of European “collector” for fugitives of organization or for units, operating in their native country.

³ Recently the Court of Assizes of Perugia has condemned a Turkish citizen to 7 years imprisonment for international terrorism, for his assessed central role in the terroristic group of DHKP/C, and of his role of European “collector” for fugitives of organization and for units, operating in their native country.

⁴ Between 2001 and 2003 two terroristic groups emerged in the Lombard area. They were referable to the RB movimentist wing, that is the “Revolutionary Front for the Communism” and the “Revolutionary Communist Nuclei”, which had claimed responsibility for a series of attacks against union offices, temporary agencies and other political targets. These groups were in a perfect harmony with the ideological line, that had historically characterized the 2nd

position, and they acknowledged the RB-FCP historical experience as a fundamental part of their heritage. Nevertheless, they wandered from the “militaristic drift” of the new RB, by proposing a new “alternative” way, consisting of the “armed propaganda” tactical instrument that is the realization of lower grade terroristic actions, characterized by a high symbolic content. In a few words, the “armed propaganda” should be essentially useful for the diffusion of the party line among the masses, and so for the gradual growth of the revolutionary forces in the perspective of the takeover.

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DAY OF THE WEEK EFFECT IN THE EUROPEAN EMERGING STOCK MARKETS: RECENT EVIDENCE FROM THE FINANCIAL CRISIS PERIOD

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Abstract: *This paper reports the results of regression analysis of the day of the week effects using daily observations on the five indexes representing the European emerging stock markets, the Czech PX Index, the Hungarian Budapest SE Index, the Polish Warsaw SE WIG Index, the Slovak SAX Index, and the Turkish Istanbul SE National 100 Index. In order to investigate 2008 financial crisis of the weekday effect anomaly, the period is divided into sub-periods. The first sub-period is covering from Monday 3rd January 2005 to Friday 30th May 2008 while the second sub-period is from Monday 2nd June 2008 to Friday 26th November 2010. The paper new reports anomalies on the examined stock markets appear only during the period of financial crisis.*

Keywords: *Day of the Week Effect, Stock Market, Czech Republic, Hungary, Poland, Slovak Republic, Turkey, 2008 Financial Crisis.*

JEL Classification: *G12, G14.*

1. Introduction

Even many investors predicted that the mortgage crisis will break out from U.S., they did not take precautions because they could not predicted its certain time. Since the global markets tightly coupled, many investors around the world effected from this crisis. Contamination and effects of economic crisis have been shown differences by countries and behaviour of investors. Decision making and risk taking behaviour could have differences before, during and after economic crisis periods. There is risk taking behaviour differences between global and local investors. In terms of having more information about markets, global investors have advantages than local one. Before, during and after an economic crisis there can be divergences between investors behaviour. *Gottschalk and Griffith-Jones* (2003) have investigated investors' behaviour before and during financial crisis by using international and global emerging market funds data for 1996-1999 and 2000-2003 economic crisis. *Bandopadhyaya and Truong* (2010) searched investors' crisis prediction and behave for U.S. They used the breaking point of the Lehman Brothers bankruptcy as the onset of the financial crisis in 2008 and developed an index that measures investor sentiment. They report that this index declines during crisis. The researchers also reports investors behave as if a financial crisis was approaching.

“...in aggregate foreign equity investors did pull out heavily from countries where a crisis erupted, although they did not have a major role in causing the crises. It will also be seen that investors' behaviour pattern converged over time towards herding, and that the smaller funds based in small jurisdictions tended to be the most

speculative ones. Looking specifically at the individual global emerging market funds, we could observe some degree of divergence in their behaviour during the East Asian crisis. That is, whilst many funds pulled out quite heavily from the crisis countries both before and during the crises, a few others stayed in...”¹

Decades ago the efficient market hypothesis was accepted by academic financial economists. The main influence had the *Fama's* survey (1970), “*Efficient Capital Markets*”, where the efficient capital markets were promoted. The efficient market hypothesis (EMH) suggests that all past financial information is already reflected in current stock market prices or returns. This theory divides the efficiency into three main variations, weak efficiency, semi-strong and strong efficiency. Weak form efficiency states that technical analysis, which is the study of past stock prices in an attempt to predict future prices, is ineffective and the prices are on a “random walk“. Random walk is a term used in the finance literature to characterize a price series where all price changes are represented by the random departures from previous price. That means, if the flow of information is unimpeded and information is immediately reflected in stock prices, then tomorrow's price change will reflect only tomorrow's news and will be independent of the price changes today (Malkiel, 2003).

We know that investors more strictly follow the markets before and after economic crisis. If we take into consider this phenomenon, we claim that markets information efficiency should different before and after economic crisis. Nowadays, both investors and academics disagree, on how well the model of the weak efficiency works. However, it is less controversial than its stronger variations. Semi-strong form efficiency suggests, that markets deal with almost all information (public information) and reflects it in prices immediately. Strong form efficiency suggests usage of all information on the market (both public and private information).

By the start of the twenty-first century, the dominance of the efficient market hypothesis had become less universal. Many financial economists and statisticians began to believe, that stock prices are at least partially predictable (Malkiel, 2003). Examination of the calendar effects on the markets represents new way that markets can be shown to be inefficient, instantly increasing the vulnerability of EMH. Seasonality effects challenge the EMH because they imply that, in the absence of transaction costs, excess returns can be made simply by knowing what day of the week it is, whether it is January, if it is around the turn of the month, and so on. Moreover, any persistence over time of a seasonality effect is an additional threat to EMH, because in the efficient market, once a seasonal inefficiency comes to light it should immediately self-destruct as being part of the newly updated body of information available to the public which prices are supposed to full reflect (Doyle and Chen, 2009). However, if the weekday effect is found within the stock market, the inefficiency of the market is clear.

However, examining the same markets not always brings the same results, too. The explanation of this problem could be another challenge to EMH. Different results are to be expected if data have been sampled in different time frames (Doyle and Chen, 2009). According to this, the new challenge to EMH is that there is possibility of

¹ Bandopadhyaya and Truong (2010), Who knew: Financial Crises and Investor Sentiment.

continual flux seasonality, rather than fixed one over time. As an example, Mehdian and Perry (2001) found that negative Monday returns during the time period before 1987 had become significant positive Monday returns during the examined period after 1987. Rogalski (1984) confirmed the phenomenon which changes over time, examining longer periods and choosing the DJIA index. Agathee (2008) argues, that one must consider the fact that those anomalies may not necessarily mean that these markets are inefficient. It may turn out that gains on a specific time period may be insignificant when transactions costs are taken into account. Also, one must control for risk premium which may be time varying such that high returns on a specific day may be associated with high risk on that same day.

Day seasonality (calendar effect, weekday effect, day of the week effect) has several formulations. It is generally talking about the Monday negative returns effect and Friday positive return effect. Since the results provided by Cross (1973) shows negative returns on the Standard and Poors index on Mondays, many researchers have detected a day effect on stock returns. On the different markets has been found different calendar effects. For instance, the standard Monday effect suggests that Monday's returns are lower than those for Tuesday through Friday (French 1980, Kamara 1997). Generally, weekday effect or day-of-week effect according to Ke et al. (2007) is simply that weekdays differ in their expected returns. Wide variety of assets has been examined for the week-day-effects, especially in the context of the Monday effect. They range from stocks (Chang et al. 1993; Tong, 2000; Basher and Sadorsky, 2006), to bonds (Jordan and Jordan 1991), to commodities (Gay and Kim, 1987; Crain and Lee, 1996) or even to exchange rates (Yamori and Mourdoukoutas, 2003).

The most studies are related to the stock indices. Aggarwal and Rivoli (1989) examine seasonal and daily patterns in equity returns of four markets: Hong Kong, Singapore, Malaysia and Philippines. Returns in the month of January were found higher than any other month in all markets except the Philippines and the low Monday returns effect was found as well. Brooks and Persaud (2001) tested weekday effect on five South East Asian stock exchanges and did find some evidence for positive Monday effects. Hui (2005) compares various Asia Pacific markets with the US and demonstrate significant evidence of day-of-the-week effects. Hourvoulides and Kourkoumelis (2010) investigate the nature of the day-of-the week effects during the contemporary financial crisis within five equity markets: Greece, Turkey, Bulgaria, Romania and Cyprus. Their results are mixed, according to the different level of maturity and interdependence of each market.

Previous studies generally detected daily abnormal returns by using an analysis of variance. This method is not fully satisfactory because returns are required to be normal, independent and stationary. However, studies, which used the non-normality and heteroskedasticity techniques, for instance Connolly (1991) and Chang et al. (1993) found out that the day of the week effect is weak (Dubois and Louvet, 1995). The aim of our paper is compared differences in changes of weekday effect between five selected European emerging stock markets. The two periods our concluded are from January 2005 to May 2008, and from June 2008 to November 2010 (divided due to start of the financial crisis in the United States). This study examines the daily earnings behaviour of the indexes of the Bratislava, Budapest, Istanbul, Prague, and

Warsaw stock exchange by the least squares regression method and the other econometrical describes.

2. Formulation of the problematic our estimated

2.1 Literature review

The weekday effect refers to the abnormality within the returns of the common stocks on the special days of the week. In general, there are usually negative returns on Mondays and positive returns on Friday. The standard economic theory says that stock prices should follow a martingale process and returns should not exhibit systematic patterns (Samuelson, 1972; Lucas, 1978).

There have been a lot of researches done, examining the anomalies of the stock markets all around the world. However, there are few of them, which are focused on the countries, selected for our study, as the Czech Republic, the Hungary, the Poland, the Slovak Republic, and the Turkey.

The day of the week effect within the European stock markets was studied by Apolinario et al. (2006). Their study includes the Czech stock market and index PX-50 as well. According to their results, the Czech market shows no changes with regards to the day of the week and it was found asymmetric behavior in all selected markets except the Czech one. The Czech Republic was the one of the selected examining countries in the study of Chukwuogor-Ndu (2006), as well as the Slovak Republic. The results shown, that Slovakia, together with other selected countries, experienced lowest returns on Monday. On the other hand, Friday as highest daily return was found out for the Czech Republic.²

Patev et al. (2003) studies the day of the week effect of the Central European transition stock markets. Results of this study show that both the Slovak and the Polish stock markets have highest negative returns on Wednesday. The Hungary has significant and negative returns on Thursdays and the Czech stock markets do not exhibit any significant day-of-the-week effect. Similar research was done by Lyrودي et al. (2004), where different results were indicated. The Czech market has significant negative returns on Monday, while the Polish and the Slovak markets have no day-of-the-week effect anomaly.

Turkish stock market and its calendar anomalies were studied by Dicle and Hassan (2007). Paper shows that there is statistically significant day of the week effect for Mondays with negative returns. The general explanation of this effect is the release of new information over the weekend. On the other hand, for Thursdays and Fridays was found the day of the week effect with positive returns. Since Friday is the last working day, investors are optimistic and therefore cause positive returns.

² Tonchev and Kim (2004) examined the calendar anomalies of the stock markets and their study includes both, the Czech Republic and the Slovak Republic. In the empirical analysis study found out very weak evidence for the calendar effects in these countries, and these effects have different characteristics in the different stock markets.

The weekday effect for all the countries, selected for our study, was examined by Yancil and Yucel (2003). Their research for the Slovak Republic, Mondays and Thursdays exhibits higher day of the week effects as compared to Wednesdays, for the Czech Republic dummies have significant negative coefficients in the variance specification, indicating that the variance of Friday returns is significantly lower than that of Wednesdays. For the Hungary, coefficient estimates for Monday dummies are negative and significantly different from those of Wednesdays. For the Poland on Tuesdays and Thursdays the variance is higher for the other days of the week. For the Turkey, Thursdays have a significant positive effect on returns and the highest return compared to Wednesdays occurs on that day.

The study of calendar effects is relevant for investors mainly for developing profitable trading strategies. According to their studies and results, the researchers try to advise the investors, which days of the week are more suitable for selling and which for buying the stocks. Nevertheless, there are not found out the same results within the researches focusing on the day of the week effect within the selected countries for this paper and the results differ study to study. This can be the problem of the various methods, used for the examining this kind of stocks returns behavior. Another explanation of these differences should be the diversity of the examined time periods. Borgers (2009) wrote in her study focused on the calendar effects in stock markets that her results are not immune to the critique that calendar effects may only be a “chimera” delivered by intensive data mining.

2.2 Data and Methodology

The approach used in this study is analyzing daily returns of stock market indexes, comparing the daily returns on specific days of the week with the daily returns of the remaining days. Calendar effects can be investigated either using observations of returns of individual stocks of a specific country, but Officer (1975) claims that calendar effects are likely to be detected in market indexes or large stock portfolios than within the individual stock prices.³

We used numerical data series from PATRIA statistical financial database, concrete, closing prices of our selected stock Exchange indexes were used. We chose five indexes representing the European emerging stock markets, the Czech PX Index, the Hungarian Budapest SE Index, the Polish Warsaw SE WIG Index, the Slovak SAX Index, and the Turkish Istanbul SE National 100 Index. We conducted using divided data in two periods to illustrate differences which may exist due to financial crises. The first sub-period is from Monday 3rd January 2005 to Friday 30th May 2008. The second sub-period is in form of daily data from Monday 2nd June 2008 to Friday 26th

³ According to the Doyle and Chen (2009), the standard way to analyze weekday effect was using regression model with daily returns as the dependent variables and weekday dummy variables as the independent variables it was preferred by some of the researchers (Kamara, 1997), but nowadays there are more sophisticated econometrics methods for analyzing this kind of development within the stocks markets. According to their work, the ARCH/GARCH family of models has become standard. On the other hand, some of the researchers are still using the regression model (Agathe, 2008), which is used in our study as well. Al-Rjoub (2004) explains, that it is well known in the econometrics literature that full information maximum likelihood estimation (FIML), such as GARCH models, is more efficient than instrumental variables estimators, such as the two-step regression, although both estimators can be used if the model is correctly specified.

November 2010, which represents the financial crises period. The impact of this crisis on stock markets of selected European emerging markets could be investigated through these time series. Totally there were used more than 1400 observations (it depends on free days of each country in the estimated period).

We adjusted selected time series to make them homogenous within the time, while we chose five day week. To complete the data series, which are necessary for our model, the dummy variables for all week series are estimated. Our model will operate with logarithm values for day to day stock percentages earnings (rate of the returns) according next equation (1).

$$R_i = \log (i_t / i_{t-1}) * 100 \quad (1)$$

So daily logarithmic earnings of the all our selected indexes are used for our model. We create regression model with dummy variables where the return of each index is depend variable, which explore just the time effect through dummy regressors. Our theoretical model is described with next equation (2):

$$R_{t\ Stock} = \beta_1 * D_{MON} + \beta_2 * D_{TUE} + \beta_3 * D_{WED} + \beta_4 * D_{THU} + \beta_5 * D_{FRI} + \varepsilon \quad (2)$$

Explanation:

$R_{t\ Stock}$...dependent variable, stock day to day earnings of each country,

D_X ...time regressors by dummy variables of each day of week,

β ...our calculated coefficients for regressors,

ε ...residuals of regression model.

Our hypotheses:

H_0 : Rates of the returns are not significantly different across the five trading days.

H_1 : Rates of the returns are significantly different across the five trading days.

3. Empirical results

Analyzing the day of the week effect by the regression with dummy variables brings the several results, which differs for individual countries. In Table 1 we can see selected statistics descriptions of time series of stock indexes earnings, and also of each weekday earnings in percentages. We can see one common attribute for all of our selected stock indexes in negative mean or average of all Tuesday earnings.

Tab. 1: Descriptive statistics

		ALL	MON	TUE	WED	THU	FRI
	<i>Mean</i>	-	0.1283	-0.0893	-	0.0638	-0.1233
Czech	<i>Std. Dev.</i>	1.7665	0.8068	0.6985	0.7361	0.8061	0.8880
	<i>Maximum</i>	11.0931	9.9547	10.0345	3.5834	8.7716	11.0931
	<i>Minimum</i>	-	-	-7.0373	-	-	-16.1855
	<i>Mean</i>	0.0155	0.2297	-0.0418	-	-	0.0020
Hungar	<i>Std. Dev.</i>	1.8734	0.7869	0.7679	0.9559	0.8660	0.7968
	<i>Maximum</i>	13.1778	10.6743	8.8386	13.1778	5.2417	8.7572
	<i>Minimum</i>	-	-	-6.3358	-	-	-6.6132
	<i>Mean</i>	0.0243	0.0919	-0.0319	0.0321	0.0461	-0.0168
Poland	<i>Std. Dev.</i>	1.4464	0.6835	0.6494	0.6570	0.6571	0.5828

	<i>Maximum</i>	6.0837	6.0204	4.1246	6.0837	5.7991	4.7581
	<i>Minimum</i>	-8.2888	-	-6.8813	-	-	-8.2888
	<i>Mean</i>	-0.0276	-	-0.0473	-	0.0458	-0.0791
Slovak	<i>Std. Dev.</i>	1.2397	0.6242	0.5461	0.4766	0.4351	0.6579
	<i>Maximum</i>	11.8803	11.8803	3.7348	2.9125	3.9228	4.3890
	<i>Minimum</i>	-	-	-8.9254	-	-	-14.8101
	<i>Mean</i>	0.0532	0.0408	-0.0100	0.0388	0.1455	0.0511
Turkey	<i>Std. Dev.</i>	1.8825	0.8915	0.7696	0.8365	0.8706	0.8369
	<i>Maximum</i>	12.1272	9.4253	5.2929	6.4843	5.6468	12.1272
	<i>Minimum</i>	-9.0137	-	-5.8351	-	-	-8.0306

Source: (Authors calculations)

In Table 1 we can also see and compare rate risk of investing of each weekday in form of standard deviation value. The highest rate risk is detected in the Turkey, the second in the Hungary for all time series. The financial crisis impacts and changes in volatility of indexes we can see in Graph 1. For understandable presentation of the output of volatility for indexes returns, it is better to use the graph demonstrating day to day returns. We can also see that the lowest decrease of indexes earning was in the Czech Republic and the higher volatility due to financial crises is detected in the Hungary and the Slovak Republic.

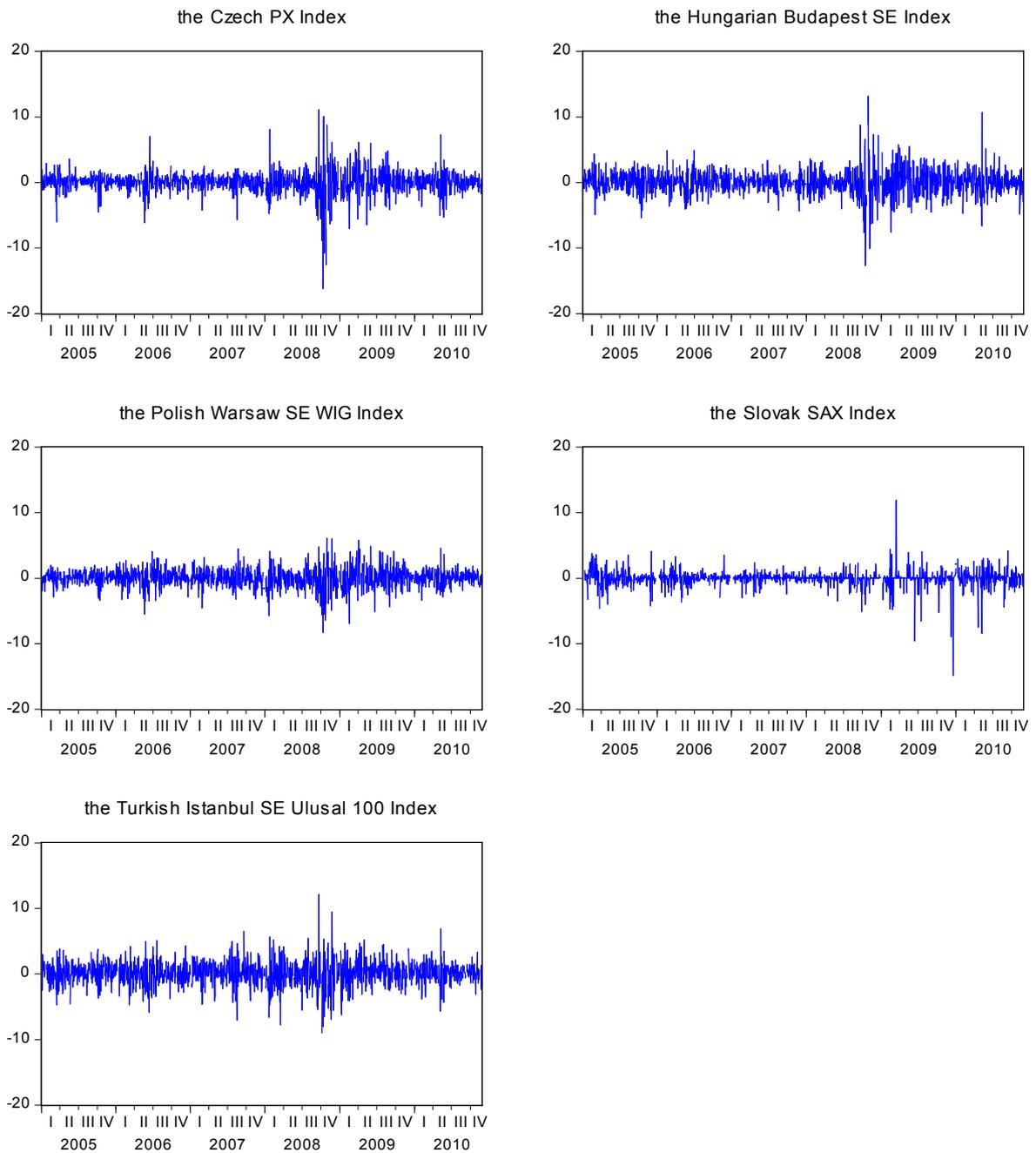


Fig. 1: The volatility of earnings on the stock indexes

Source: (Authors calculations)

We can also see positive Monday mean in all countries except the Slovak Republic. In this stage of our research we are not able to confirm statistical significant differences between the days' returns. In Table 1 we just investigate all earnings on indexes in undivided time series, but for the construction of our regression models we use both, whole time period data and sub-periods separately. We will see if some weekday trend does really exist and if it is statistical significant in context of the financial crisis. In statistical descriptions we can see in which day of the week reached indexes earnings their minimum and maximum values, too. Maximum and minimum returns during the period are observed in different days within the countries. The highest and the lowest return appears on Friday for the Czech stock exchange and on

Friday there is the highest risk as well. For the Hungarian stock exchange extreme returns are observed on Wednesday, what is connected with the highest standard deviation value observed this day. The Polish stock exchange is different, because the maximal return appears on Wednesday and the minimal return appears on Friday. The highest risk is on Monday. The highest return is detected on Monday and the lowest on Friday in the Slovak stock exchange. Friday is the day with the highest standard deviation. Finally, in the Turkish stock exchange, there is the maximal return found out on Friday and minimal on Monday, so the results are opposite those in the Slovak Republic. The highest risk in the Turkish stock exchange is detected on Monday.

Table 2 included in Appendix chart of our paper is divided into 3 parts. We can see that in period before financial crisis there is no weekday effect in all our selected European stock markets. One of the most important indicators of the regression model Adjusted R squared (which would reveals the effectivity of the model) has even reached negative values or close to zero values. It is due to the fact, that we explain differences between earnings of stock indexes without any fundamental exogenous variables, only through time dummy variables in form of the day of the week. Our model is not explaining the returns of the indexes but only the calendar anomalies, so the indicator Adjusted R-squared is not important for the findings of our research. Durbin-Watson stat value (which would reveal the correctness of the model and indicate autocorrelations) is not important for us as well, because we do not examine autocorrelations in time series, but in all cases its value is close to number 2. We illustrate error of our regression models as well, because our opinion is that in crises we will have worse models with higher value of SE of regression.

In the second part of period (in our second sub-period) including the financial crisis, we see some differences in the weekday effect of stock market earnings development in two countries. In the Czech Republic we found out Friday decreased weekday effect at 10 % statistical significance level. In the Hungary we found out Monday increased weekday effect at 5 % level. These facts may exist due to financial crisis and its impacts on the stock markets. In the other selected countries, the Poland, the Slovak Republic, and the Turkey, there are no statistical significant developments between indexes returns in any day of the week. Adjusted R-squared is near to zero again. Our hypothesis that error value of regression models will be worse in this period is reflected in all cases.

In the third part of Table 2 we can see that the period of the financial crisis influences the output of the model for all time series. The Hungarian Monday increase effect is still detected on 5 % statistical significance with lower coefficient in percentage of growth.

According to the comparison of the results in Table 1 and Table 2 we would say, that Monday Hungarian increasing has the second lowest rate risk of the weekdays. In the Czech Friday decreasing there is the highest rate risk of the weekdays. From our results we should strongly reject hypothesis that the stock returns in selected countries are significantly different across the five trading days only in the period before the global financial crisis.

4. Conclusions

Our paper provides the empirical research of weekday effect in five our selected European countries stock exchanges and impacts of the financial crisis on them. The aim of the article was compared differences in changes of weekday effect between our selected European emerging stock markets and during the two sub-periods: before and after the global financial crisis. Our findings for the remaining countries are not united. The results of the regression models with dummy variables proved that there are some differences in two countries in form of the Czech Friday decreasing effect, and stronger the Hungarian Monday increasing effect on stock returns' differences. These statistically significance differences of returns on stock emerging markets exist due to our results only in period affected by global financial crisis. Our results found out calendar effects that are rather different from those, founded by the previous researches. In generous, if the difference on returns on Monday is statistically significant, the decreasing earnings are expected while if the difference on return is significant on Friday, the increasing earnings are expected

According to our results, anomalies on the examined stock markets of the selected countries appear only during the period of financial crisis. Selected stocks markets seem to be efficient, except the period of the global financial crisis, so the crisis brings the inefficiency into the behavior of stock markets. However, to confirm the efficiency for some of the selected markets, the trading activity has to be considered. For example, the Slovak stock market is known as market with very low level of trading activity.

Our opinion is that regression analysis with dummy variables to estimate day of the week effect on the capital markets is not usable to reflect impacts on the real management and production of companies. It is usable for individual advice to investors but not to whole market, because some weekday effect won't exist in future due to behaviour of investors. Also we demonstrate that through using selected stock indexes data, and also some of our selected markets, are definitely not typical for that kind of analysis due to their business properties. Therefore our work is useable maybe for speculation of some investors on the secondary capital markets.

To evaluate our research and to confirm our results we could also use other econometrical and statistical methods than the regression method. GARCH method or Kruskal-Wallis tests are two of the possible alternative methods, which could be used for our research. It could be interesting to compare empirical results using other methods from the same data for these countries.

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Appendix 1

Tab. 2: Modeling of the day effect in regression models

Period before 1 st June 2008						
	β_1	β_2	β_3	β_4	β_5	S.E. of reg.
Czech Republic	0.0017	0.0451	-0.0113	0.0847	0.1061	1.2381
Hungary	0.0407	0.0717	-0.0661	0.0222	0.1633	1.4117
Poland	0.0524	-0.0183	0.0430	0.0571	0.1107	1.2354
Slovak Republic	0.0156	0.0348	-0.0077	0.0899	0.0662	0.9301
Turkey	-0.1437	0.0854	0.0172	0.1203	0.1437	1.7782

Period after 1 st June 2008						
	β_1	β_2	β_3	β_4	β_5	S.E. of reg.
Czech Republic	0.3086	-0.2739	-0.0605	0.0332	-0.4348 ^{***}	2.2958
Hungary	0.5208 ^{**}	-0.1884	-0.0558	-0.1445	-0.2315	2.3524
Poland	0.1491	-0.0496	0.0158	0.0305	-0.1958	1.6946
Slovak Republic	-0.0515	-0.1585	-0.0942	-0.0144	-0.2708	1.5621
Turkey	0.2937	-0.1417	0.0675	0.1819	-0.0806	2.0217

All periods						
	β_1	β_2	β_3	β_4	β_5	S.E. of reg.
Czech Republic	0.1317	-0.0903	-0.0318	0.0630	-0.1217	1.7664
Hungary	0.2460 ^{**}	-0.0427	-0.0616	-0.0476	0.0019	1.8727
Poland	0.0934	-0.0319	0.0313	0.0458	-0.0171	1.4477
Slovak Republic	-0.0127	-0.0476	-0.0443	0.0450	-0.0794	1.2407
Turkey	0.0414	-0.0099	0.0383	0.1461	0.0513	1.8844

*Explanation: symbols *** and ** mean statistical significance of probability on 10 %, and strictly 5 % threshold.*

Source: (Author's calculations).

ACCELERATING VECTOR CALCULATIONS ON GPU

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Abstract: *Multicore computational accelerators such as Graphics Processor Units (GPUs) became common for gaining high-performance computing on a larger scale. Programming GPUs requires detailed knowledge of the underlying architecture in order to get maximum performance. In this paper we present solution of vector distance calculation on NVIDIA's parallel computing architecture CUDA (Common Unified Device Architecture), where we optimize the performance of a parallel algorithm and get significant speedup.*

Keywords: *Vector Calculations, GPU, CUDA, Parallel Programming.*

JEL Classification: *C61.*

1. Introduction

Current trends on high performance computing are moving towards the deployment of several cores on the same chip of modern processors in order to achieve substantial execution speedup through the extraction of the potential fine-grain parallelism of applications. At the forefront of this trend we find nowadays the modern Graphics Processor Units (GPUs), which due to their simplistic design are able to encompass hundreds of independent processing units on a single chip in contrast to their respective CPUs, which at the moment include only a few cores on the same chip.

CUDA-enabled [10] GPUs are SIMT (Single Instruction Multiple Threads) architectures and provide stream processing capabilities allowing the programmer to execute the parallel portion of the code on GPU devices. CUDA exposes three special programming abstractions: a hierarchy of thread groups, shared memories, and barrier synchronization.

Programmers use these abstractions by dividing the program into coarse-grain sub-problems that can be executed independently in parallel. These sub-problems are further divided into finer-grain slices, which can also be solved cooperatively in parallel. This arrangement leverages one of the key benefits of threads: enabling them to cooperate with each other while solving individual sub-problems.

In recent years, a large amount of work has explored how to use GPUs for general purpose computing, sometimes known as “GPGPU” (General-Purpose Computation on GPU). Before the advent of general purpose languages for GPGPU, GPU implementations could only be achieved using existing 3D-rendering APIs: OpenGL [4] or DirectX [9]. The syntax, the need to pose problems in the context of polygon rasterization, and the limits imposed by pixel independence all made this approach cumbersome. Independently from GPU vendor efforts, several new languages or APIs were created to provide a general-purpose interface and abstract

away the necessary 3D API calls. Brook [1], Sh [8] and its commercial successor RapidMind, and Microsoft's Accelerator [13] are notable examples.

Recognizing the value of GPUs for general-purpose computing, GPU vendors added driver and hardware support to use the highly parallel hardware of the GPU without the need for computation to proceed through the entire graphics pipeline (transforming vertices, rasterization, etc.) and without the need to use 3D APIs at all. NVIDIA's solution is CUDA language, an extension to C. AMD's solution was the combination of a low-level interface, the Compute Abstraction Layer (CAL) and extensions to Brook.

A wide variety of applications have achieved dramatic speedups with GPGPU implementations. A framework for solving linear algebra problems on graphics processors is presented by Krüger et al. [6]. Harris et al. present a cloud dynamics simulation using partial differential equations [3], and molecular dynamics simulations (e.g. [11]) have also shown impressive speedups. Some important database operations have also been implemented on the GPU by using pixel engines [2], and a variety of other applications, such as sequence alignment [12] have been successfully implemented on GPUs.

The rest of paper is organized as follows: in chapter 2 we describe CUDA architecture and programming model, and principle of vector distance calculation. In chapter 3 we present the possibility of accelerating vector calculations using GPU. Three different approaches are presented and the obtained results are compared. We demonstrate step-by-step optimization of the sequential algorithm applying the knowledge of modern GPU architecture. In conclusion the gained results are summarized.

2. Statement of a problem

2.1 CUDA architecture and programming model

Computing system, which uses CUDA consists of a host that is a traditional CPU and one or more devices that are massively parallel processors equipped with a large number of arithmetic execution units. In modern software applications, there are often program sections that exhibit rich amount of data parallelism, a property where many arithmetic operations can be safely performed on program data structures in a simultaneous manner. The CUDA devices accelerate the execution of these applications by harvesting a large amount of data parallelism.

CUDA programming model is shown at Fig.1. Code executed by host (CPU) is written in ANSI C and after compiling runs as standard process. The device code is written using ANSI C extended with keywords for labeling data-parallel functions, called *kernels*, and their associated data structures.

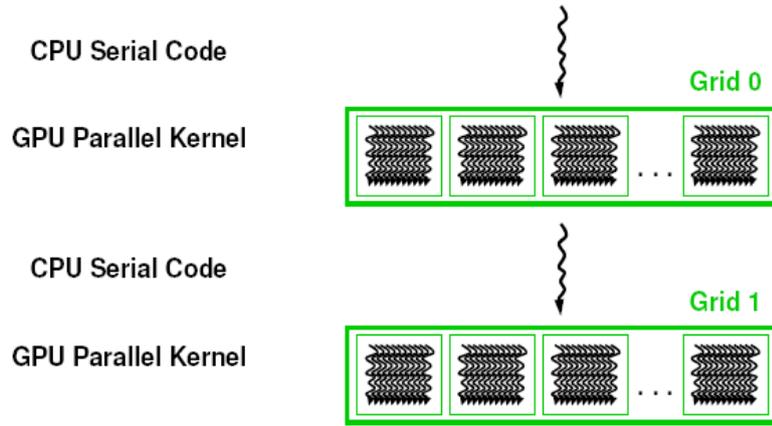


Fig.1: CUDA Programming model

Source: [5]

2.2 Vector Distance Calculation

One of the problems solved in linear algebra packages is the problem of vector distance calculation. Let us consider two matrices \mathbf{A}, \mathbf{B} of dimensions $M \times N, K \times N$ respectively, representing a list of N -dimensional vectors. We need to calculate distances of the vectors in the matrix \mathbf{A} from vectors in the matrix \mathbf{B} . Resulting matrix \mathbf{C} is of dimension $M \times K$ and its element $c_{i,j}$ represents the distance of vector in row i of matrix \mathbf{A} from vector in row j of matrix \mathbf{B} , for $i = 1, 2, \dots, M$ and $j = 1, 2, \dots, K$. To calculate all elements of resulting matrix \mathbf{C} , sequential algorithm (Fig. 2) can be applied.

```

for (i = 0; i < M; i++) {
  for (j = 0; j < K; j++) {
    sum := 0
    for (k = 0; k < N; k++)
      sum += (A[i,k] - B[j,k]) * (A[i,k] - B[j,k]);
    C[i,j] = sum;
  }
}

```

Fig. 2: Sequential algorithm for calculation the distances among vectors

Source: (Authors)

It is quite obvious, that particular iterations are independent. Such kind of problem is suitable for parallel processing. To speedup the calculation of matrix \mathbf{C} , its elements can be determined in parallel. For matrices which fit into main memory of computer, the shared memory parallel architecture is suitable. If such system contains p processors, we can expect linear speedup of up to p times.

In case when matrices do not fit into main memory, some distributed memory architecture (e.g. MPI, grid or cloud technology) can be considered. In such case the problem would be divided and distributed among p processors, each processing only part of the problem. In the end the partial results would be combined into final result. This approach can suffer from overhead needed to distribute data among processors and collecting results.

3. Problem solving

In this chapter we present the possibility of accelerating vector calculations using Graphical Processing Unit (GPU). Three different approaches will be introduced and the obtained results will be compared. We will demonstrate step-by-step optimization of the sequential algorithm (Fig. 2) applying the knowledge of modern GPU architecture.

Basic paradigm of using GPU for calculation is to divide the solved problem into smaller parts. Each part will then be solved using a thread executed on GPU. Before executing calculation of GPU, necessary data must be transferred from main memory of CPU to main memory of GPU. This introduces some overhead to the calculation.

To obtain some baseline for comparison of results, we have performed the distance calculations on square matrices (i.e. $M = N = K$) of different sizes applying sequential algorithm. Parallel calculation on multi-core CPU using OpenMP was also carried on. Experiments were performed on computer equipped with two quad-core processors Intel Xeon E5530 2.40GHz. Calculation times for different problem size are summarized in Tab. 1, column denoted CPU (sequential algorithm) and column denoted OpenMP (performed on all eight cores). GPU calculations were performed on the same computer, using NVIDIA Tesla C1060 card equipped with 4GB of main memory.

3.1 Naive approach

As was mentioned before, to use the GPU for calculation, one has to divide the solved problem into parts and then assign the parts to the particular threads. In many tutorials on CUDA, authors encourage to create as many threads as possible, and leave the scheduling of them to GPU. Applying this approach to the problem of vector distance calculation leads us to a simple modification of sequential algorithm. We create $M \times K$ threads, each thread calculating exactly one element $c_{i,j}$ of matrix C . The code of each thread will perform only the inner-most loop of the sequential algorithm to calculate distance of two vectors. The modified code is on the Fig. 3. This implementation uses exclusively the main GPU memory.

Results obtained using this algorithm are summarized in Tab. 1, column denoted GPU1. As can be seen, the speedup is of maximum factor 3, which is not satisfactory. This algorithm performance is poor because of the slow access to the main memory of GPU.

```

int i, tmp;
int vysl = 0;

int row = blockIdx.y * blockDim.y + threadIdx.y;
int col = blockIdx.x * blockDim.x + threadIdx.x;

for (i = 0; i < N; ++i) {
    tmp = (A[row][i] - B[col][i]);
    vysl += tmp * tmp;
}
C[row][col] = vysl;

```

Fig. 3: Code executed by threads on GPU - version 1

Source: (Authors)

3.2 Local memory usage

The detailed knowledge of the GPU architecture allowed us to improve the performance of the algorithm by using faster shared memory. Threads on GPU are organized into blocks. Each block contains memory for private data of threads and local shared memory. This is used to exchange data among threads.

NVIDIA GPUs contain shared memory, which is significantly faster than main memory, but is limited in size. Each block of threads has 8KB of shared memory available.

To use shared memory, the algorithm has to be modified. It consists of two different phases. During first phase data are transferred from main memory of GPU into shared memory of a block. In second phase these local data are used to calculate partial results. Modified algorithm is presented in Fig. 4. The principle is explained on Fig 5. Resulting matrix **C** is divided into square blocks of dimension `BLOCK_SIZE`. Each block is processed by `BLOCK_SIZE2` threads, executed in parallel. Let us consider block of matrix **C** marked by gray color. To calculate elements in this block, we have to access the stripes of matrices **A**, **B** also marked by gray color. These stripes are divided into blocks of dimension `BLOCK_SIZE`. In the first step of the algorithm, first blocks of matrices **A**, **B** are transferred into shared memory and used to perform calculations. Then second blocks of both matrices are transferred and used for calculations. This process continues until all blocks are processed and final results are obtained.

Parameter `BLOCK_SIZE` is essential for optimization of the algorithm performance. Maximum number of threads executed in one block is limited by properties of particular GPU. Typically, for recent NVIDIA GPU families it is usually equal to 512. This determines maximum value of `BLOCK_SIZE` to be not larger than 22.

```

int m;
int i, tmp, vysl = 0;

int row = blockIdx.y * blockDim.y + threadIdx.y;
int col = blockIdx.x * blockDim.x + threadIdx.x;

__shared__ int sA[BLOCK_SIZE][BLOCK_SIZE];
__shared__ int sB[BLOCK_SIZE][BLOCK_SIZE];

for(m = 0; m < N / BLOCK_SIZE; m++) {
    sA[threadIdx.y][threadIdx.x] = A[row][m * BLOCK_SIZE + threadIdx.x];
    sB[threadIdx.y][threadIdx.x] = B[col][m * BLOCK_SIZE + threadIdx.x];
    __syncthreads();
    for (i = 0; i < BLOCK_SIZE; ++i) {
        tmp = (sA[threadIdx.y][i] - sB[threadIdx.x][i]);
        vysl += tmp * tmp;
    }
    __syncthreads();
}
C[row][col] = vysl;

```

Fig. 4: Code executed by threads on GPU - version 2

Source: (Authors)

Second constraint which limits the possible values of `BLOCK_SIZE` is warp size. Warp is the set of 32 threads which is executed simultaneously and represents a unit for threads planning. To have all warps full, number of threads in a block must be an integer multiple of warp size.

For our experiments the value of parameter `BLOCK_SIZE` was set to 16. This gives us 256 threads in block and eight full warps in each block.

In previous algorithm the execution of threads was completely independent. This does not hold in this algorithm. It is obvious that threads in a block depend on each other. Second phase of the algorithm cannot be performed before all the threads have transferred relevant part of data into shared memory. To guarantee this, some kind of synchronization among threads is required. To ensure that all the threads have transferred their respective data into shared memory, `__syncthreads()` call is used. It represents a barrier. The calculation continues after barrier only when all the threads have reached it.

Results obtained by this algorithm are summarized in the column GPU2 in Tab. 1. It can be seen, that speedup of the factor 30 was achieved, which is better comparing to the previous algorithm.

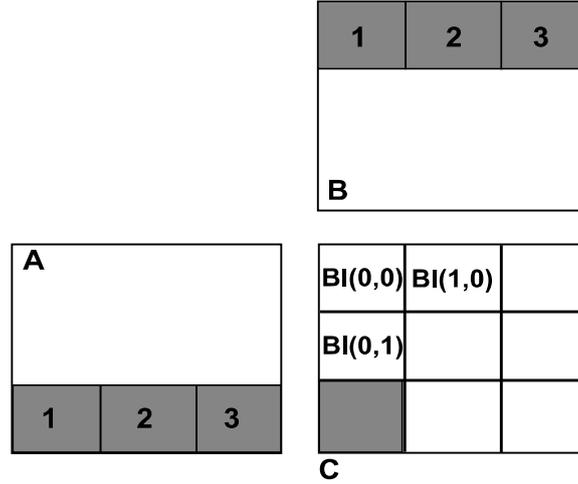


Fig 5 Principle of modified algorithm

Source: (Authors)

3.3 Minimizing bank conflicts

Third step in optimizing the performance of the parallel algorithm is to avoid bank conflicts. Shared memory is organized into banks. If two or more threads executed in the same warp access the same shared memory bank, conflict occurs. This conflict is solved by serializing the access to memory, which decreases the performance [10].

Tesla C1060 organizes shared memory into 16 banks. Brief inspection of the parallel code (Fig. 6) reveals that bank conflicts can occur. To avoid them, we can scatter data of the shared memory matrices among memory banks (Fig. 6).

Applying this modification, we were able to improve the performance of the algorithm. Obtained results are summarized in column GPU3 in Tab. 1. It can be seen, that speedup of a factor 90-100 was achieved.

Tab. 1: Summary of calculation times for different algorithms and problem size

Matrix dimension (M, K, N)	Execution time [ms]				
	CPU	OpenMP	GPU1	GPU2	GPU3
128	7.6339	4.7381	2.5	0.25	0.12
256	48.594	12.1866	29.47	1.27	0.51
512	324.39	54.868	350	9.15	4.3
1024	2551.6	372.86	1245	70	27
2048	21096	2819	6950	563	206
4096	168920	20580	53557	4505	1647

Source: (Authors)

GPU Shared Memory

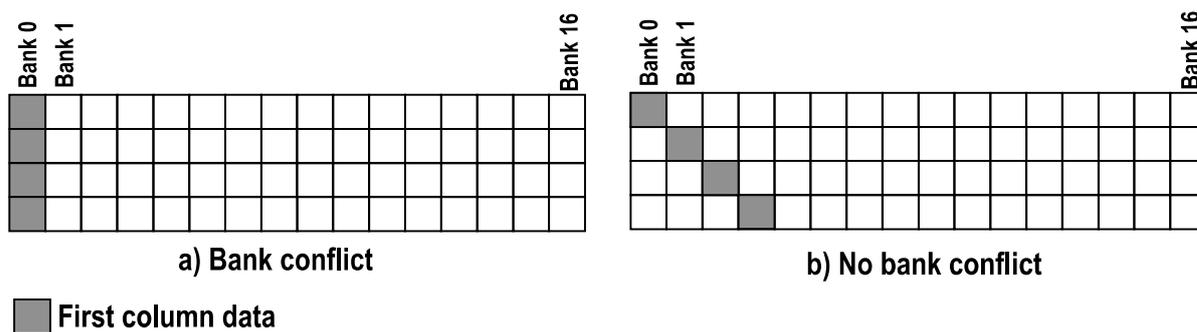


Fig. 6: Memory banks of shared memory

Source: (Authors)

4. Conclusion

In this contribution the possibility of vector calculations acceleration using GPU was presented. Recently the CUDA technology attracts the attention of researchers involved in numerical calculations. Massive parallelism achievable by this technology is used to speedup time-consuming calculations.

One of the areas, where application of massively parallel processor is applicable is the vector and matrix manipulation. This paper deals with simple vector calculation. First the serial algorithm run on CPU was presented. Next, the parallel version suitable to run on GPU was presented. Obtained results indicate, that naive transformation of the serial algorithm into parallel one does not lead to significant performance improvement. To achieve optimal performance, detailed knowledge of the underlying parallel technology is necessary. Vector distance calculation is essential in such areas as signal recognition, data clustering and data mining. Acceleration of the vector distance calculation can significantly improve the performance of these algorithms.

To motivate other scientists we have presented step-by-step procedure of optimization of the parallel algorithm. Final version of the parallel algorithm is approximately 90 – 100 times faster than serial one.

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THE ROLE OF DEVELOPMENT CENTERS IN MANAGERS' EDUCATION

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Abstract: *The paper called „The Role of Development Centres in Managers Education“ is focused on the description of a development centre and the identification of its value for managers' education. The paper contains a case study describing the implementation of development centres into managers' education in one of international companies performing in the Czech Republic.*

Keywords: *Development Centre, Leadership Competencies, Managers, Leaders, Education, Development.*

JEL Classification: *J240.*

1. Introduction

Managers are the key employees for every organization because they create and execute the organization strategy, manage all processes and lead their employees to the achievement of defined objectives. This is the reason why managers' education is planned and carried out with special attention employing the most effective forms of education. One of the most frequently implemented tools in managers' education is a development centre.

Development centre is a special tool used for the analysis of current level of competencies, for the identification of the strengths and weaknesses and for the projection of the individual development plan. This paper is aimed at identification of benefits which arise from using the development centres in managers' education. A case study which illustrates the implementation of development centres in the praxis of an international company is a part of the paper.

The paper is one of the outcomes of the research connected with the dissertation thesis called “The role of communication in knowledge management” which is being written by the author of the paper and which is focused on communication of knowledge in international, non-manufacturing companies that have an affiliate of more than 250 employees in the Czech Republic and that deliver complex solutions to customers. Four companies meeting these criteria were researched (observation, structured and non-structured interviews with employees and managers), results summarized in case studies and analyzed in cooperation with personal management experts. The experts also identified recommendations on improvement.

Only one of the researched companies is continuously using development centres. The other companies are aiming to implement this concept in one or two years.

2. Development centres

2.1 Definition of development centre

Development centre (DC) is one of educational activities focused primarily on the current development level of a person; it compares real behaviour with defined competencies, identifies strengths and weaknesses of the observed person and defines recommendations on his/ her further development. Psycho-diagnostic methods and techniques are used during the development centres to achieve the above listed objectives.

The main feature of DC is a presence of two groups of people: participants and observers. DC is a sophisticated combination and sequence of various techniques selected and applied so that the evaluation of these characteristic features and competencies that are targeted by the organization is enabled. It is the social skills that are focused on; such as presentation skills, team cooperation, managers' skills, sales skills, etc. Moreover, it is possible to evaluate the personality in general.

The main DC characteristics are:

- focused on personality characteristics and the identification of development needs of the selected and often key, employees. All information collected at the DC is used for the establishment of individual development plans of the observed employees;
- aimed at employees important for an organization, they are often managers, high potential employees or employees looking for a stable position within the organization;
- participants undergo various activities at the DC, e.g. simulation of real life situations, interview, model problems discussions and solving, psychological testing;
- DC participants get feedback that is considered to be the basis for their better self-understanding and for further development planning;
- organization shows its interest in its employees, helps them to find the ways how to achieve excellence in their job role, which has a positive impact on their value on the market.

2.1 Benefits of implementing the development centres

In general, benefits of implementing development centres can be summarized as follows:

Tab. 1: Benefits of development centres implementation

Organization	Employee
<ul style="list-style-type: none"> • improved employee development planning that is based on his/her strengths and weaknesses (compared with competencies) identified at the DC; • means of finding high potential employees, e.g. organization is searching for employees who are good candidates to become managers in future; • way how to stabilize employees: organization using the DC shows interest in the career and professional development of its employees and readiness to support its employees in further education and qualification improvement. 	<ul style="list-style-type: none"> • gets feedback on his/ her behaviour and acting that is related to competencies defined by the organization; • gets individual development plan focused on identified strengths and areas for improvement; • reinforced motivation because of his/her awareness of the fact that he/she belongs to the key or high potential employees.

Source: [1, 3, 4]

Organizations using the DC improve education activities planning, as well as conducting personal changes and searching of good candidates for new positions within the organization, furthermore they can stabilize employees and reinforce their loyalty. The DC is of a big benefit also for the attending employee, which motivates employees to participate in the DC.

Benefits of the DC are stressed by Kyrianova and Gruber (p. 126): “DC can handle social skills best. That is why it makes sense to use it for jobs demanding communication with people and in contrary it does not make sense for jobs like technicians and specialists.” Taking into consideration costs connected with DC realization, it is clear that only key employees can be involved. Managers are for sure key employees for every organization, so they are the best target audience for DCs.

3. Case study

3.1 Development centres in praxis an international company

An international company meeting the criteria stated in the introduction above uses development centres in managers’ education in two ways:

- a) for potential managers to check whether they are really good candidates for a manager role and to give the right direction to their development (= strengths reinforcement and weaknesses removing/ improvement);
- b) for successful managers who could become top level managers, e.g. managers of a business unit on a regional level.

Both versions of the development centre have following things in common:

- they are embedded in a strategic program of talented employees development. The program is focused on potential candidates for managers positions in the first place and on good current managers who could be promoted to more important roles in the second place;
- DC participants are selected on grounds of nominations by their managers that are validated by HR department;
- DC participants come from various countries in the Central and Eastern Europe, the DC is conducted in English;
- there are current managers acting as observers at DCs. Observers observe all participants during the DC in order to achieve as much of objectivity as possible;
- participants go through a set of individual and group activities at the DC – discussions, simulations, role plays, interviews, ... All activities were created for the purpose of evaluation of leadership competences;
- feedback to participants is structured according to their leadership competencies. The set of leadership competencies is the same for both versions, difference is in the level required.

Differences between the both versions are summarized in the table below:

Tab. 2: Differences between DC for potential and current managers

	Potential managers (ad a)	Current managers (ad b)
length	3 days	2 days
activities at DC	created for simulation of a department manager position	created for simulation of a business unit or country manager position
observers	current managers with at least 3 years of praxis	current top managers with at least 10 years of praxis
No. of participants from CR/ per year	cca 20	cca 3
frequency	regularly, based on a plan that is created always for a year (cca 20x per year in the region)	accidentally, always based on the needs in the region (Central and Eastern Europe)

Source: (author's research, 2010)

It is obvious that aiming the DC at different target groups does not significantly change its purpose and main principles. Differences are in the way how the DC is organized because it is necessary to ensure appropriate conditions for every target group. Frequency of DCs and number of its participants correlate with the average number of managers on the adequate level in company's hierarchy and with the natural need of their renewal.

3.2 Benefits and risks of the DCs identified in the researched company

Benefits and risks connected with DCs implementation into managers' education were studied in an international company. The survey focused on potential managers (ad a) because of higher number of participants which ensures higher validity and reliability to the results gained. Following groups of people were involved in the survey: DC participants from the Czech Republic, their managers, managers from the Czech Republic acting as observers, HR employees and experts from an external vendor delivering the DC to the organization.

Tab. 3: Benefits and risks connected with implementation of development centres

Benefits	Risks
Employees (participants)	
<ul style="list-style-type: none"> • get feedback from experienced managers who do not know them in their usual working environment; • have opportunity to interact with other candidates for manager role, can compare/ benchmark and self reflect; • receive individual development plan aimed at leadership competencies development; • meet with other participants and observers, build relationships and social networks throughout the organization. 	<ul style="list-style-type: none"> • evaluated is only the performance at the DC which can be negatively influenced by higher level of stress, misunderstanding concerning the instructions for activities, limited time for preparation, topics of activities etc.; • results achieved at the DC are often considered the main criterion for promotion/ non promotion to manager role, development activities are not of such an importance for them.
Employees (observers)	
<ul style="list-style-type: none"> • practicing of observation skills and of feedback providing; • gaining inspiration for own employees development, opportunity to discuss own opinions and approaches with experienced facilitators specialized in managers' education; • meeting managers and interacting with them, counter-inspiration, negotiation in discussion on participants evaluation; • contacts with future managers, building of social networks within organization. 	<ul style="list-style-type: none"> • high performance demanding/ exhausting (12 hours of continuous concentration and hard work every day); • time consuming – there is no chance to deal with usual daily duties at the DC because the timetable of the observers is rather full (more than the timetable for the participants).
Company	
<ul style="list-style-type: none"> • continuous analysis of the level of leadership competencies of the 	<ul style="list-style-type: none"> • high expenses connected with delivery of the DC (venue, qualified

<p>company employees, possibility to identify trends, access to data useful for hiring of employees and education planning, etc.;</p> <ul style="list-style-type: none"> • development of employees – both participants and observers; • motivation of employees to continue with their satisfactory achievements at the company – they are aware of being considered high potential employees for the company; • company creates a pool of employees able to quickly overtake a manager position; • building of social networks throughout the company which is very important e.g. for knowledge management. 	<p>facilitators, travel expenses of participant and observers, ...);</p> <ul style="list-style-type: none"> • necessity to ensure the same conditions for all the DCs which means the company has to be able to assemble comparable groups of participants and observers (various countries, genders, level of experience, age, ...); • candidates for the DC are often nominated on the grounds of duration of their employment at the company, not of the level of their leadership competencies; • some managers refuse to accept DC results and feedback on their employees and do not work with the recommendations obtained.
--	---

Source: (author's research, 2010)

Following recommendations were formulated on the basis of the discovered facts and in cooperation with experts from companies specialized in development centres.

Recommendations

- continuous promotion of development centres among potential participants and their managers so that they receive correct information, can create real expectations, correctly interpret results and feedback and know how to work with recommendations proposed. The promotion could be as follows:
 - regular information about the DC and its purpose delivered to managers (e.g. in an email newsletter, at a managers meeting etc.) and it is also needed to attach criteria for nominations to the DC;
 - an HR specialist organizes a meeting with candidates nominated and their managers, explains the DC's purpose and the role of results/ feedback from DC for further candidate's career;
 - follow-up meeting after the DC with participation of the HR specialist, the participant and his/her manager. Feedback report analysis with special focus on actions recommended for further development. Planning how and when to make the recommended actions happen.
- offer some special benefits to the managers attending the DC as well as the observers because they sometimes put more effort and energy into it than participants. Benefits can be e.g. an extra free day, a special bonus, wellness vouchers etc.;
- continue to have the DC as a strategic tool for high potentials development, define exact criteria for nominations. The DC is expensive and its delivery difficult - that

is why only really talented candidates proving high level of leadership competencies in real life situations should attend. The length of employment at the company does not measure level of leadership competencies. And development is not only about promotion to manager role.

The recommendations are addressed to the HR department that is responsible for employees' development in the company and is also the "owner" of the DC.

4. Conclusion

The paper defines development centre (DC) in general, summarizes benefits and risks of its implementation, which leads to conclusion that managers are very good target group for this activity. This is given especially by the character of their work and by the important role they play for the organizations. The paper also gives an example of how the DC can be embedded into the structure of personal changes planning in a company. It continues with the analysis of positive and negative effects the DC have on three parties: employees – participants, employees – observers and the entire organization.

The DC discovers the actual level of leadership competencies possessed by people, results in establishment of individual development plans (which gives valuable data also for education planning on the entire organization level), contributes to stabilization of the high potential and key employees, reinforces their motivation and supports social networks building throughout the organization. It also contributes to the development of the current managers acting as observers. In order to achieve all of the positive benefits, it is necessary to motivate employees (especially observers) to participate, communicate purpose of the DC properly, define the target group (and check whether all the criteria are always met) and explain how the results will be utilized.

The paper was written as one of the outcomes from the research done for the dissertation thesis called "The role of communication in knowledge management". The dissertation thesis works with case studies in some international companies.

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TRENDS IN THE INSURANCE BUSINESS IN THE CZECH REPUBLIC

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***Abstract:** This article brings an overview of development of the insurance industry in the Czech Republic in the period since the establishment of the independent the Czech Republic in 1993 till 2009. Into these parameters belong both general data such as the number of insurance companies and their distribution by type of insurance (life, non-life, universal), and statistics of the several indicators of written premium during the monitored time interval.*

***Keywords:** Insurance, Insurance Company, Written Premium.*

***JEL Classification:** G 22.*

1. Introduction

The aim of this paper is to present survey of development trends in insurance in the Czech country. It summarizes the development of selected important parameters in the period since the establishment of the independent the Czech Republic in 1993 till nowadays. Both general data such as the number of insurance companies and their distribution by the insurance type (life, non-life), and specific statistics of the amount of insurance and evaluation of their development during the monitored time interval belong among these parameters.

Insurance is among the major sector of the economy with significant impact on the function of other areas of the whole economy. It is an integral component of financial and credit system as well as special financial service industry. Insurance is one of the most significant parts of the national economy with huge impact into other parts of the whole economy too. It is not only a special standalone part of financial services, but also an integral part of financial and credit system. Insurance, considered as non-manufacturing industry, is specialized in insurance protection and in creation, administration, evaluation and use of insurance reserves. Insurers, reinsurers, insurance brokers and possibly others subjects are the parts of the insurance business.

2. History of insurance in the area of the Czech Republic

Insurance has a long tradition in the area of the Czech Republic, first noted back to the 17th century. Initially, it was only the experiments, which didn't last long time or weren't eventually implemented, such as John Christopher Borek proposal for introducing obligatory buildings fire insurance in 1699. As the basic of the Czech insurance sector can be considered the establishment of the institute called "Imperial-royal privileged Czech joint damage by fire seduced by insuring institute" in 1827. This name was later changed to "The First Czech mutual insurance company in Prague". Furthermore, same time in Brno also originated Moravian-Silesian mutual insurance company. Both insurance companies had initially the same focus on real

estate fire insurance and they gradually expanded their activities into other areas of insurance.

As the significant event may be also considered the establishment of the First Czech hedging bank in 1872 in Prague. This institute was the first hedge institution in the Czech Republic.

In the eighties of the nineteenth century the First Czech mutual insurance company was so strong that with its economical stability didn't shake even the biggest compensation for damage per one insured accident, which was the fire of the National theatre in 1881.

After the establishment of independent Czechoslovakia the national economy was extensively damaged after the First World War 1914 - 1918, but even that didn't prevent the establishment of new insurance companies. Except them, there were also some foreign insurance companies operating in our country.

A significant loss for insurance market in our country meant the Protectorate during Second World War. Even in 1945 there were 733 registered insurance companies and insurance associations, which is associated with the successful period before Second World War.

By presidential decree from the 24th of October 1945 insurance companies were nationalized and from the 1st of January 1947 their number was limited to five. In 1948 a single national insurance company - Czechoslovakian insurance company was created and for several decades the natural development of insurance market in our country was interrupted. From the 1st of January 1969 the Czechoslovakian insurance company was divided into two separate subjects. On the Czech national insurance company with headquarters located in Prague and on the Slovak insurance company with headquarters located in Bratislava, both locations connected with the new federal state structure.

Year 1989 was beginning of transformation from controlled economy to market economy. This was the period of dynamic changes for insurance market the.

3. Development of insurance in the Czech Republic

By amendment of act No. 185/1991 coll., About Insurance, subsequently amended, a basic legal framework and business rules in insurance sector was established. The Czech state insurance monopoly was repealed by this act and the forming a competitive home insurance companies and one year later also foreign insurance companies may begin. Diverse insurance market offering a wide range of insurance products was built gradually.

No less important and necessary step was to restore the state regulatory authority - the state insurance supervision. This authority is the Ministry of Finance, which is responsible for monitoring of compliance with defined rules and frameworks for insurance business, as well as decides on granting of permission for new establishing insurance companies. In the 1993 republic was divided into Czech and Slovak

Republic. For further monitoring of trends in insurance market in the Czech Republic is the year 1993 is selected as starting year.

3.1 Development of insurance companies

In the first half of the nineties the dominance on domestic insurance market was held by Czech insurance company, which originated from the Czech state insurance company by changing its legal form from state enterprise to stock company. As already mentioned, new insurance companies on our market were established in this period. On the 3th of December 1993 20 insurance companies operated in the Czech Republic, of which 5 were operated only in life insurance, 7 of them only life insurance and 8 offered both life and non-life insurance (universal insurance companies). Their number has changed over the period so that at the end of 2009 on the Czech insurance market there were 52 insurance companies, of which operated only 7 life insurance, 29 non-life insurance and only 16 were universal insurance companies. Until the 30th of September 2010 was added to our market one insurance company offering only life insurance.

In Tab. 1 there is shown the trend in the number of insurance companies in the Czech Republic from 1993 until the 30th of September 2010.

There isn't shown only the total number of insurance companies in the Czech Republic, which is shown in Fig. 1, but also their distribution in different types, namely in life, non-life and universal insurance. Development of insurance companies by type of insurance is shown in Fig. 2.

Tab. 1: Development of number of insurance companies in the Czech Republic since 1993

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Number of insurance companies	20	27	35	35	40	41	42	41	43
of it: Life	5	4	5	2	4	5	3	3	3
Non-life	7	10	15	14	18	19	21	20	23
Universal	8	13	15	19	18	17	18	18	17

	2002	2003	2004	2005	2006	2007	2008	2009	30.9.2010
Number of insurance companies	42	42	40	45	49	52	53	52	53
of it: Life	3	3	3	5	6	6	7	7	7
Non-life	22	23	21	23	27	29	29	29	30
Universal	17	16	16	17	16	17	17	16	16

Source: www.mfcr.cz, www.cnb.cz, www.cap.cz

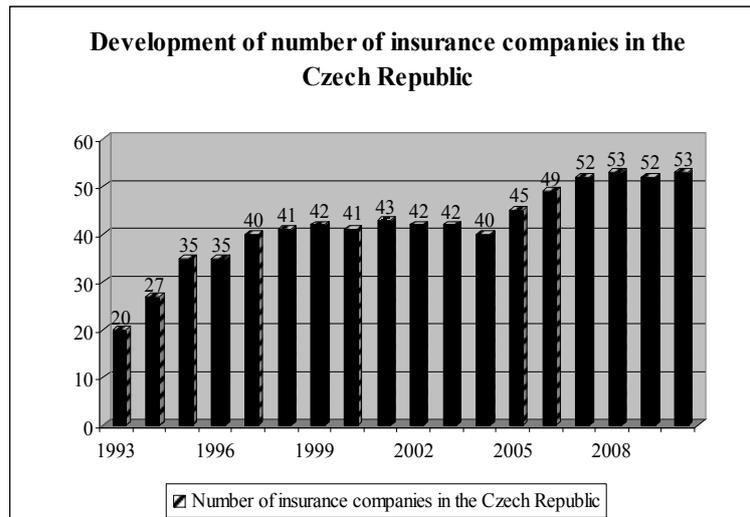


Fig. 1: Development of number of insurance companies in the Czech Republic since 1993

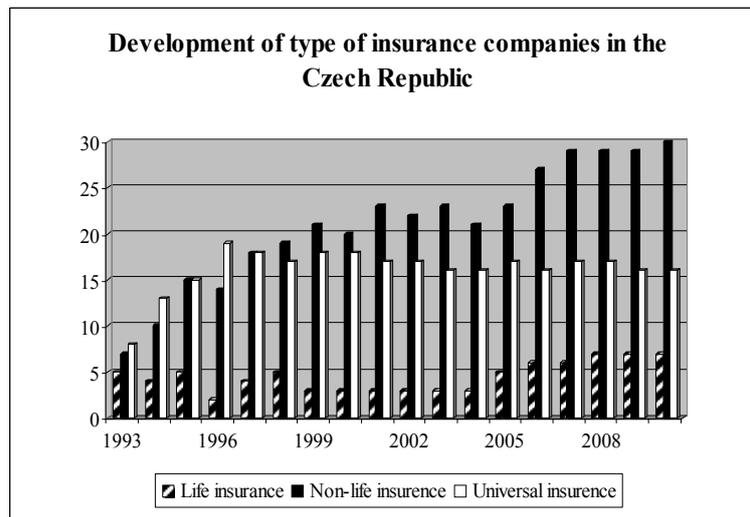


Fig. 2: Development of type of insurance companies in the Czech Republic

As shown in Tab. 1 and also in Fig. 2, during the consideration period there was only a slight increase in insurance companies providing life insurance and universal insurance but there was high increase in number of insurance companies, which provide only non-life insurance - from 7 non-life insurance companies in 1993 to 30 non-life insurance companies to 30th of September 2010.

3.2 Development of written premium

In assessing insurance market development several indicators are used, which include (for example according to Daňhel, 2002):

- the amount of written premium,
- distribution of written premium for life and non-life insurance,
- the annual growth in written premium,

- size of the written premium per one inhabitant,
- insurance rate measured by the size of written premium relative to gross domestic product.

Development of several indicators for the Czech Republic is analyzed in the next part of this article; starting from generated independent state at 1.1.1993.

The first of these indicators is development volume of written premium in the Czech Republic from 1993 to 2009, as can be seen in Tab. 2. This indicator quantifies premium volume of all insurance contracts in the year. This indicator of the volume of written premium is developed separately for life insurance and non-life insurance.

Tab. 2: Development of the volume of written premium in the Czech Republic in millions CZK

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total written premium	22 792	29 669	33 940	41 125	47 985	55 637	62 784	69 284	79 197
of it: Non-life insurance	16 915	22 222	24 598	30 188	35 293	40 548	42 991	46 514	50 915
Life insurance	5 877	7 447	9 342	10 937	12 692	15 089	19 793	22 770	28 282

Year	2002	2003	2004	2005	2006	2007	2008	2009
Total written premium	91 072	104 635	111 585	115 527	120 411	130 780	136 574	139 915
of it: Non-life insurance	56 797	63 512	67 384	70 609	73 179	76 659	80 288	80 761
Life insurance	34 275	41 123	44 201	44 917	47 232	54 121	56 285	59 154

Source: (www.mfer.cz, www.cnb.cz, www.cap.cz)

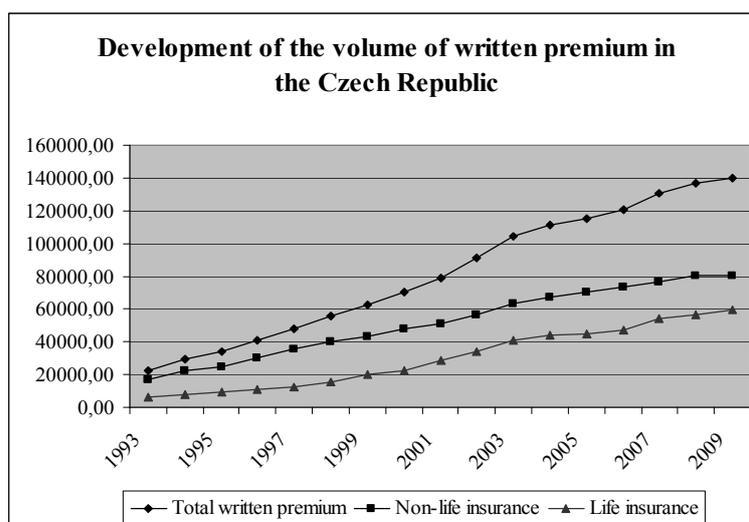


Fig. 3: Development of the volume of written premium in the Czech Republic in millions CZK

As shown in Tab. 2 and Fig. 3, in all areas of monitoring the increase of premium is visible. Total written premium increased from 1993 to 2009 more than six times, whereas it has grown five times in non-life insurance and even more than ten times in life insurance. This increase of written premium is given by general economic changes in society, from legislative changes and from development of burned of losses too. We may call this increase written premium as above-average as this is related to development of Czech insurance market. This market was artificially forced outside market environment from 1948 to 1989. After this period this is market which is able to adapt to market conditions. The increase growth in life insurance especially related with different perception of people to this class of insurance. This trend is shown in Fig. 4 too.

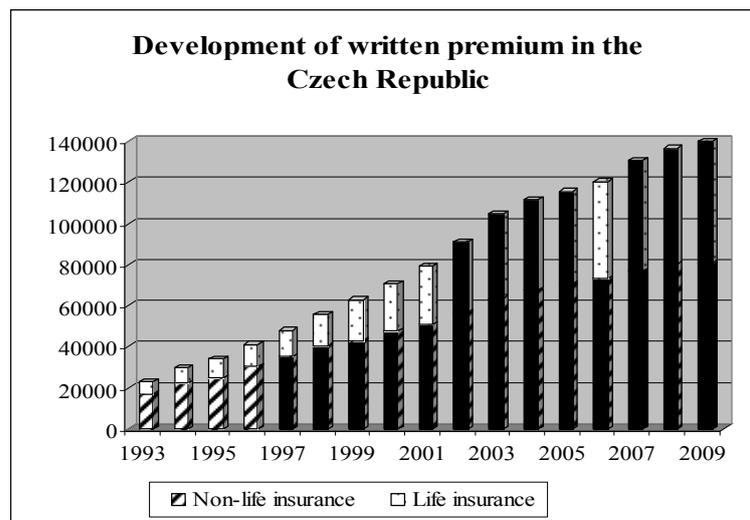


Fig. 4: Development of written premium in the Czech Republic – share of life and non-life insurance in total written premium

Development of share of life and non-life insurance to volume of written premium in the Czech Republic is shown in percents and it is shown in Fig. 5. From this figure we are able to read that the proportional share of life insurance to total written premium increased in the monitoring period. The proportional share of life insurance to total written premium was 25,78 % in 1993, but 42,28 % in 2009. This development in the Czech Republic shows that Czech insurance market precedes the same tendency as advanced world insurance markets, still our insurance market has to continue in this trend because on the advanced world insurance market the proportional share of life insurance to total written premium is more than 50 %. Thanks to the economic and legislative changes and other factors, as for example increased demand for life insurance for coverage of diverse risk, Czech insurance market proceeds in the right direction.

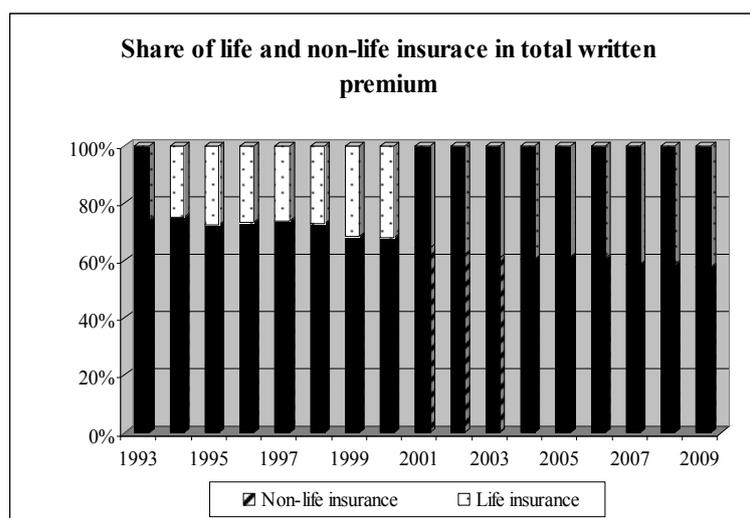


Fig. 5: Share of life and non-life insurance in total written premium (in %)

We can observe next developmental trend on insurance market by based on development of real annual increase of written premium. The values we can see in Tab. 3 and these are shown in Fig. 6.

Tab. 3: Development of real annual increase of written premium in period 1993 – 2009 (in %)

	Real annual increase of written premium in % in years							
	94/93	95/94	96/95	97/96	98/97	99/98	00/99	01/00
Total written premium	+30,17	+14,40	+21,17	+16,68	+15,95	+12,85	+12,43	+12,19
Non-life	+31,37	+10,69	+22,73	+16,91	+14,89	+6,02	+11,23	+6,47
Life	+26,71	+25,45	+17,07	+16,05	+18,89	+31,18	+15,04	+24,21

	Real annual increase of written premium in % in years							
	02/01	03/02	04/03	05/04	06/05	07/06	08/07	09/08
Total written premium	+14,99	+14,89	+6,64	+3,53	+4,23	+8,61	+4,43	+2,45
Non-life	+11,55	+11,82	+6,10	+4,79	+3,64	+4,76	+4,73	+0,59
Life	+21,19	+19,98	+7,48	+1,62	+5,15	+14,59	+4,00	+5,10

Source: (own calculations)

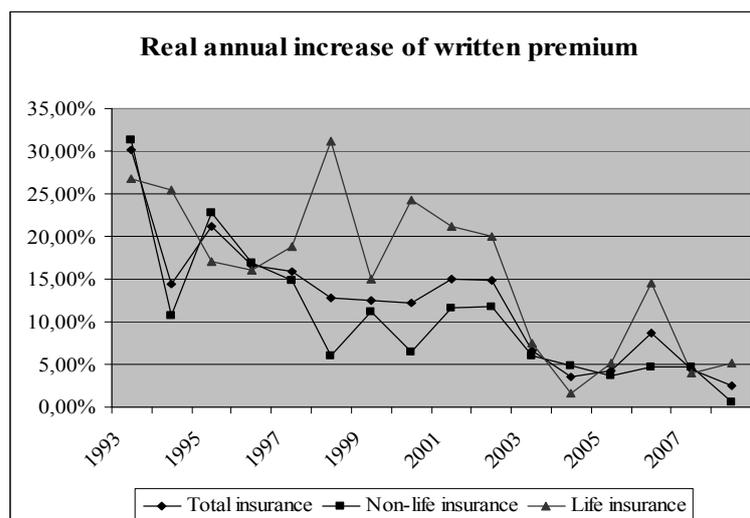


Fig. 6: Real annual increase of written premium in period 1993 – 2009 (in %)

How is shown in Tab. 3 and in Fig. 6, we can see only increase of written premium in life and non-life insurance, but not decrease, in all period. This development was influenced by economic development in Czech Republic. The economic development is the most important indicator affecting Czech insurance market.

The next indicator for monitoring all insurance is the volume of written premium per capita. The values of this indicator are shown in Tab. 4 and displayed in Fig. 7.

Tab. 4: The volume of written premium per capita in CZK

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total written premium per capita	289,02	286,49	319,31	325,52	350,92	378,26	475,85	520,05	600,88
Non-life written premium per capita	1637,37	2149,93	2381,04	2926,51	3425,29	3938,63	4180,87	4655,05	4979,86
Life written premium per capita	568,89	720,48	904,29	1060,26	1231,80	1465,67	1924,87	2216,60	2766,18

	2002	2003	2004	2005	2006	2007	2008	2009
Total written premium per capita	694,71	796,66	783,59	750,78	730,68	762,72	759,84	812,06
Non-life written premium per capita	5567,91	6225,66	6601,79	6899,39	7127,84	7426,26	7698,02	7697,76
Life written premium per capita	3360,04	4031,01	4330,49	4388,96	4600,53	5242,92	5396,61	5638,28

Source: (own calculations)

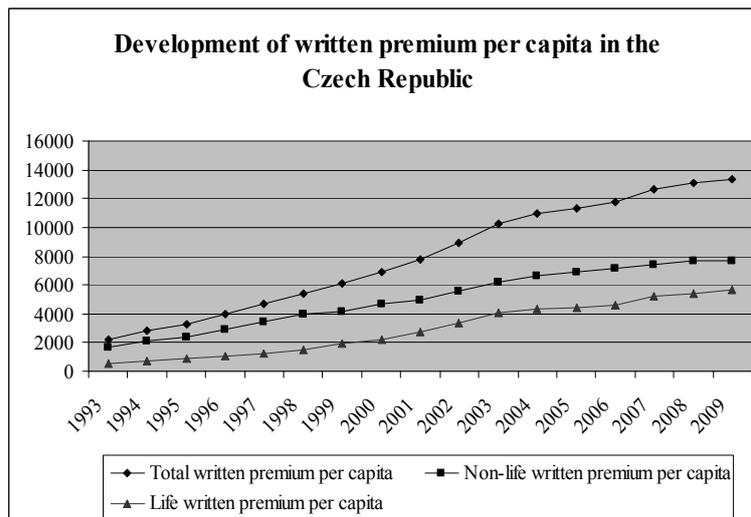


Fig. 7: Development of written premium per capita in the Czech Republic in CZK

As clearly visible from given and displayed data, during monitoring period we can see only fractional increase of total written premium per capita. On the other side, if we evaluate development insurance per capita, it is evident, that development of non-life and life insurance is increasing by the same rate. If we focus on the development of share of life and non-life insurance per capita, it is apparent that in this period the share of life insurance was increased, as shown in Fig. 8. For comparison purposes, in 1993th share of life insurance was 25,78 % compared to 42,27 % in 2009.

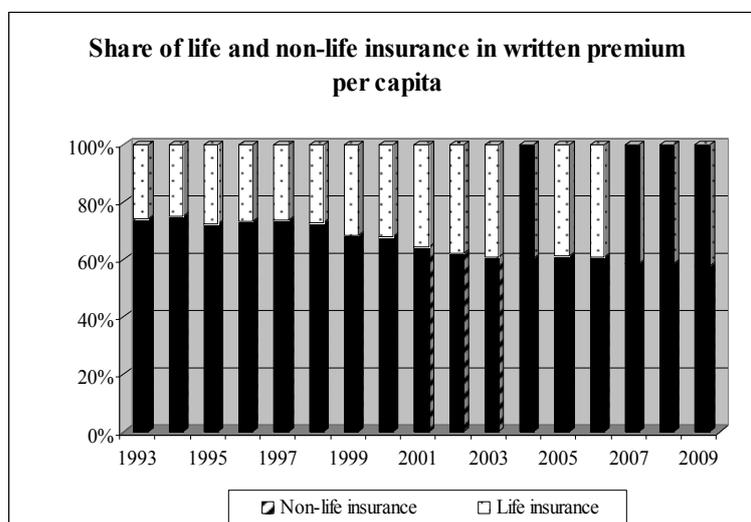


Fig. 8: Share of life and non-life insurance in written premium per capita (in %)

Last indicator in this article is volume of written premium per GDP. The values of this indicator are in the Tab. 5 and shown in Fig. 9.

Tab. 5: Volume of written premium per GDP in the Czech Republic (in %) in period 1993 – 2009

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total written premium per GDP	2,23	2,28	2,31	2,44	2,65	2,79	3,02	3,22	3,37
Non-life written premium per GDP	1,66	1,70	1,68	1,79	1,95	2,03	2,07	2,18	2,16
Life written premium per GDP	0,58	0,57	0,64	0,65	0,70	0,76	0,95	1,04	1,20

	2002	2003	2004	2005	2006	2007	2008	2009
Total written premium per GDP	3,70	4,06	3,96	3,87	3,74	3,70	3,70	3,86
Non-life written premium per GDP	2,30	2,46	2,39	2,37	2,27	2,17	2,18	2,23
Life written premium per GDP	1,39	1,60	1,57	1,51	1,47	1,53	1,53	1,63

Source: (own calculations)

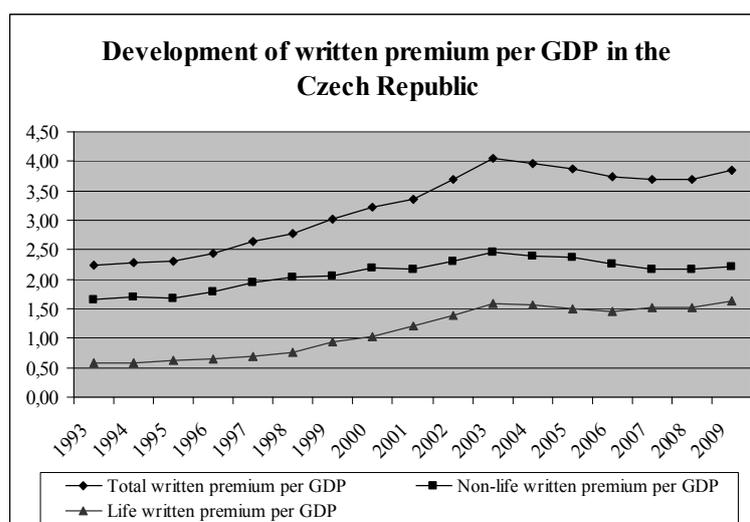


Fig. 9: Development of written premium per GDP in the Czech Republic (in %) in period 1993 - 2009

For the last of development indicators - the written premium per GDP by percentage – is visible increase with total insurance and with life and non-life insurance too. This increase is nearly one percentage by non-life insurance, but it is more than one percentage by life insurance. It is shown in Fig. 10. There is evident increase share of life insurance.

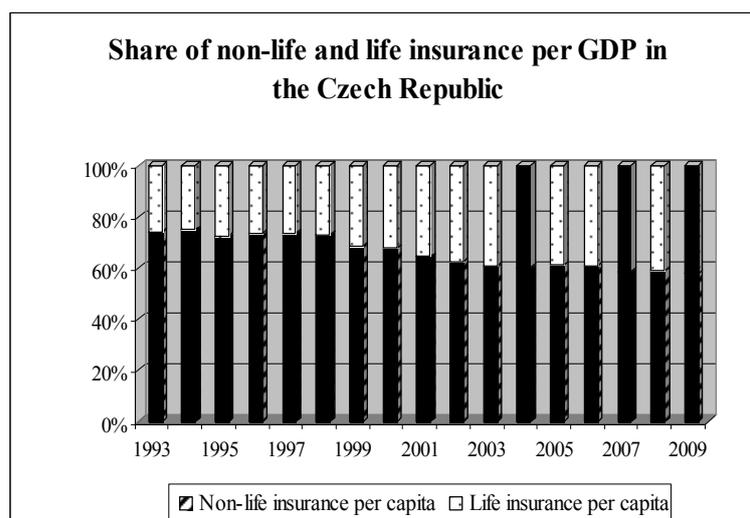


Fig. 10: Share of non-life and life insurance per GDP in the Czech Republic in period 1993 - 2009

4. Conclusion

Czech insurance market, after a pause from 1948 to 1989, is now in the period of intensive development. The global indicators of insurance are given in this article. These indicators express and display development of the Czech insurance market in period 1993 – 2009. By these indicators is shown there's increase trend. We can see, that at first the market environment has asserted itself in the insurance market. It is evident by increasing number of insurance companies with domestic and foreign offices. This competitive environment helped increase of numbers featured products on the market, which demand was significantly reduced before 1989.

Political changes in 1989 also brought big economic and legislative changes. It resulted in an above-average increase in written premium in this period (as one example). Total written premium increased from 1993 to 2009 more than six times, whereas it has grown five times in non-life insurance and even more than ten times in life insurance in monitoring period. These changes are related with the talking reasons but with other too, for example with people changes to insurance to themselves or there's a property. Development of life insurance is greater than non-life insurance.

During the period there were many natural disasters in the Czech Republic, especially floods, storms and hurricanes. The largest of them were floods in 1997, 2002, 2006, 2009 a 2010. The largest of storms was in 2007 and in 2008.

These natural disasters have brought great damage and loss of property and health too and some casualties too. The increases of written premium followed these disasters as for life insurance and for non-life insurance too. Thanks to good strategy and stability of almost insurance companies was not so much at risk. But some example of a defunct insurance company exists. It was insurance company Morava. This company finished after great floods in Moravian region in 1997. It was isolated incident. We can say that Czech insurance companies have a good basis and are safe. Natural disasters did not a major impact on Czech insurance market.

Development of all Czech insurance market is increase trend. The increase of written premium is higher than average due to Europe countries since 1989. This trend is confirmed by all global considered indicators of written premium. If the trend will continue, the Czech insurance market will be approaching the developed European countries.

Acknowledgement

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SOME SOCIAL ASPECT OF THE ROAD TRANSPORT

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Abstract: *The article studies the social aspects which can occur in the sector of road transport. The road transport is a sector with a fast progression and flexibility; however it does not have quite set up social conditions for workers in this domain. In the Czech Republic there were in the last ten years the important changes of mobility in passenger and freight transport. The mentioned changes concerns all the relevant transport fields and first of all road and railway transport. The development of individual passenger transportation and the preference of road transport within goods transportation remain also nowadays. The enlargement of European Union influenced significantly the changes of modal split in transportation work and the Czech Republic became a member state. The alone integration of the Czech Republic into European structures we must evaluate definite positive, but in the field of transportation this step brings a lot of connected problems.*

Keywords: *Transport, Social Aspect, EU, Social Policy.*

JEL Classification: *A14.*

1. Introduction

Each form of transport has its own particular strengths and weaknesses when used, for example the rail network has a lower polluting effect but it is less flexible than the road network. And social aspects exist in any kind of transport. There are many examples of strikes, including railmen, airline pilots, sailors, etc. Seriousness of this problem depends on many factors:

- financial situation in the sector,
- government social policy and help,
- severity of regulations,
- unemployment,
- structure in the sector (concentration of companies),
- competitive and work conditions.

It is hard to say if social aspects in road transport are worse than in other kinds of transport, nevertheless the number of workers connected with road transport calls appeal for analysis of this problem from the point of view of social policy.

2. The current transport

The transport as a sector of the national economy is still developing. If we take a look at the following table we can see that freight road transport is a dominant sector from the capacity indicators. It does not mean that it is more important than other kinds, but one has to solve thoroughly the social aspect of this human activity.

Tab. 1: Rail and road transport: Outputs in CR

	Years	Transport of goods		Passenger transport	
		Tonnage of goods carried (thous. t)	Goods transport outputs (mil ttkm)	Transport of passengers (mil. pass.)*	Passenger transport outputs (mil. passkm)*
Road transport	2005	461 144	43 447	383,3	8 607,3
	2006	444 574	50 369	387,7	9 501,2
	2007	453 537	48 141	375,0	9 518,8
	2008	431 855	50 877	376,9	9 369,1
	2009	370 115	44 955	367,9	9 463,6
Rail transport	2005	85 613	14 866	180,3	6 666,7
	2006	97 461	15 779	183,0	6 921,9
	2007	99 777	16 304	184,2	6 899,8
	2008	95 073	15 437	177,4	6 803,3
	2009	76 715	12 791	165,0	6 503,2

Source: (Statistical annual bulletin)

*without passenger car transport

The difference between performances in transport is clear from the following graphs. It concerns both goods and passenger transport. In the Czech Republic there were in the last ten years the important changes of mobility in passenger and freight transport. The mentioned changes concerns all the relevant transport fields and first of all road and railway transport. The development of individual passenger transportation and the preference of road transport within goods transportation remain also nowadays. The enlargement of European Union influenced significantly the changes of modal split in transportation work and the Czech Republic became a member state. The alone integration of the Czech Republic into European structures we must evaluate definite positive, but in the field of transportation this step brings a lot of connected problems.

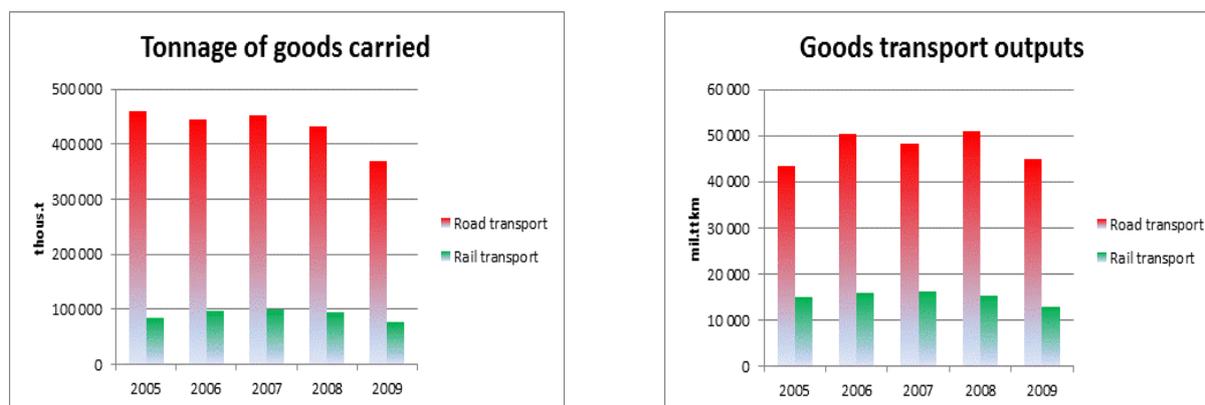


Fig. 1: Transport of goods

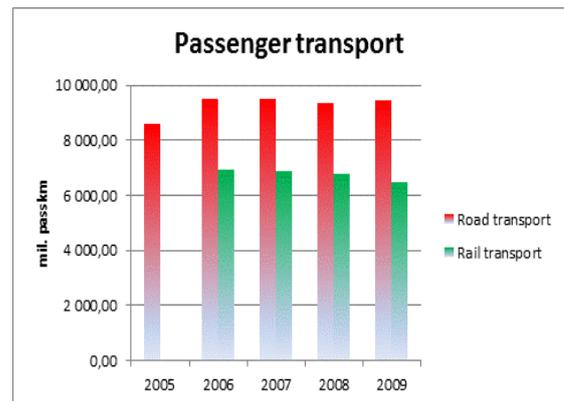
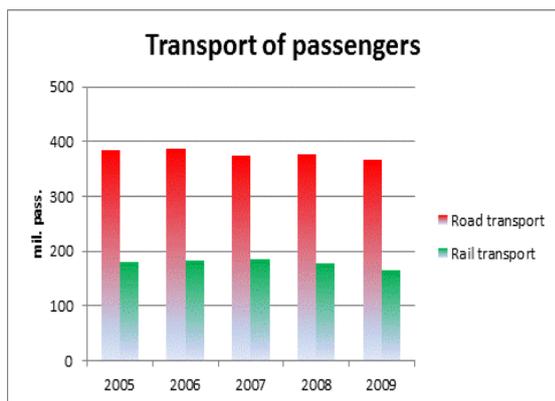


Fig. 2: Passenger transport

For every Czech subjects mean enlargement EU opportunities but many risks too. The problems that must be solved are quality of transport infrastructure, manage the growth of transport and transport policy realization. In all mentioned problem areas are eluded to charging in transport.

3. Social problems in road transport

The character of social problems in road transport depends indirectly on situation in this sector and its role in the economy, directly on specific characteristic features of organization and work conditions. After World War II the road transport became the booming sector for passenger and goods transport. It is difficult to imagine free market economy without the possibility to use roads in the productive and distributive operations. Small and medium companies cannot have its position in the economy if there is only the possibility to use rail or water ways. With respect to the possibilities of road transport (e.g. flexibility, low cost, etc.) the demand for road transport services is still high. This is the reason why there are new and new companies which go into this business which implies the splitting of the sector (for example specific kinds of transport) and cut-throat competition.

The specific organization of road transport can be seen from the point of existence of large numbers of small companies or also from the point of offered services, e.g. door-to-door. While a railman is responsible for some operation on the basis of rules defined by company management, a truck driver takes the responsibility for many different operations (driving, documentation, frontier formalities, etc.) and thus has a direct responsibility for result of these activities. However higher responsibility does not mean higher payment based on the market mechanism.

From the macroeconomic point of view the automated activity results in decreasing of job opportunity, rising of unemployment and social problems. There are many industrial branches where due to some technical discovery (automatization), it induces reduction of working station, on the other hand it implies reduction of cost. In the case

of tubular transport, which is highly automatic, the costs are minimal, while for road transport, at least one person is needed in order to deliver one article.

If we take into account a transportation output 1 mil. tkm in different kinds of transport, it was calculated in countries of EU in 1994, that output of road transport demands 2,63 employees, railway 4,58 employees and inland water transport 1,74 workers. Conclusion is surprising, as road transport is less dependent on technical resources it needs less people to forward a specific content. This is the contradiction with the previous formulation that an automatization implies lowering of needs for workers. Thus it turns out that road forwarders are obliged to respond to market pressure more than railway forwarders.

A creation of working place in road transport, and not only there, is based on a simple rule: "A production is a function of manpower". This rule is less strictly applied in the railway transport, where strong labour unions stay against the reorganization and thus do not take into account bad financial situation. It is unthinkable that the road transport has so many administrative employees as has the railway. One can find examples in road transport sector of a company with a proprietor who is also driver. European statistics show that 2/3 of companies having business in road transport have less than 5 people.

4. Social provisions

For Europe there are not unified social rules. The European Union expected that working condition would change in part as a result of the common market and also by harmonisation of the national economic policy. National systems of social insurance are different in individual countries of EU. Member countries of EU have an extensive autonomy with respect to their social policy. The Union social policy is based on wide extent of directions and rules. They are supplied by recommendations and action programmes, especially if connected with elimination of poverty and integration of disable persons.

For the road transport the European social rules concern only driving time and rest periods. The regulation 3820/85/EEC defines daily and weekly driving time and obligatory rest periods. This text mentions also minimal age of driver depending on a total weight of a vehicle and kind of transport (persons, goods).

5. Source and type of conflicts

The illusion that the output of road services will offer economic freedom and so also working comfort is one on the main reason of the dissatisfaction in this field. Despite of high demands and a large number of consumers the road transport is not the most lucrative activity. Marginal profit in countries of EU is on an average between 0 and 5 % from takings and a one third of companies has a passive balance of payment. In such a situation employers do not profit and the employees are not well paid. Both sides are not satisfied, at the beginning employees impute the owner, later government, competition and also the European community. However, in reality the reasons for unsatisfactory social situation in road transport are more interconnected. There are

many differences between economic and social interests of owners and workers, and also between big and small companies, owners of companies and government, government and employees, etc.

Companies are exposed to keen competition at the market of road transport which implies that owners must offer their services at low prices. The employees thus victimize technical and economic progress in the road sector. Road carriers with a small perspective for profit are further limited by authority with many regulations that are not present in other sectors. Farmers, tradesmen and other professions are less strictly governed by regulations than road companies: there are limitations for recruitments, driving and other times are inspected and some other conditions are demanded (e.g. special driving licence), etc.

Drivers of goods carrier have a small chance to obtain good social condition in discussions with owners or authority. The arguments that their salary should be increased with inflation or comparable with other sectors are very weak. And strike inside a company leads to a shutdown which cannot change the situation in the market. In order to achieve their aim the drivers should take steps outside of a company, which can impact the whole society (blockade of roads, channels of supplies, etc.). However, public cannot resolve the problem of drivers; this can do only owners and authorities, in many cases at the international level.

6. Social issues for transport policy

Subjects of road transport have the social problematic in their statute. Though the economic, technical and organization problems are effectively solved, a lot of things should be done is social field. The social problems are complicated and some specific solutions are needed.

The rules of free market economy are not compatible with the idea of justice. Those who work hard and contribute to development in this sector are powerless to get some benefit from their work. Competition in road transport is not equivalent with any other kind of forwarding. On one hand the lack of competition (railway) is not correct; on other hand the excessive competition does no good. The sector must be reorganized in order to offer low-cost services and at the same time good social conditions.

Last but not least, the controversial question of road transport policy: regulation of working conditions, which is not enough to regulate driving time and rest period. The time period assigned to all operations in road transport companies must be harmonized and united with the standards of other sectors. A transport vehicle and the design of a cabin must fulfil social demands and not economic efficiency.

New challenge in a social area is the exclusion of negative effects from the full liberal accession to transport market in Europe (including cabotage). The demands on transport safety and environment face with sector social dimension. The combined transport seems to be the best way how to solve these contradictory demands. This kind of transport enables drivers to spare time otherwise lost on crowded roads which can be used for repose (e.g. in a sleeping part). The support of combined transport is one way how to help solving the social problems in road transport branch.

7. Conclusion

The main source of social disorder is in salary problematic. Though inflation and salary trends in other sectors call for salary adaptation mechanism, in road transport such mechanisms do not exist. The source of conflict can be in the differences of salaries between road transport and other forwarders, including differences between international and regional level.

The improvement of transport safety which is connected with the lower accident frequency caused by drivers would be accompanied with some improvement in the driver working conditions. Without chance for higher salary it is difficult to get relaxing climate in the sector, however, at least there is evidence of long daily and weekly repose.

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POSSIBILITIES OF QUALITATIVE MODELING IN BANKRUPTCY PREDICTIONS

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***Abstract:** The issue of bankruptcy has long been paid a considerable interest at practical and theoretical levels using more sophisticated tools such as genetic algorithms, neural networks, statistical methods etc. This article describes application of less a used method of Qualitative models which can forecast changes in trends and thus contribute to solving the selected problem even without entirely accurate knowledge of the quantitative data. The model is based on three qualitative values only: increasing, constant, decreasing used to describe the corresponding trends. The result presents eleven possible scenarios and sixteen transitions among them.*

***Keywords:** Bankruptcy, Prediction, Qualitative Modeling, Scenario.*

***JEL Classification:** C65, G33.*

1. Introduction

Much attention is devoted to probability of bankruptcy of a company in literature. Most of the published models are based on available data, either for specific companies or on statistical data for the entire industry, nation states and economic communities. A substantial part of these models are time series in which future is often predicted. For data analysis and prediction there are many different ever more sophisticated tools applied. At present, the literature most often presents genetic algorithms, see e.g. (Ahn, Kim, 2008], neural networks, see e.g. (Pendharkar, 2005), support-vector machine, see e.g. (Chaudhuri, De 2010) or Bayesian networks, see e.g. (Sun, Prakash, 2007). All the methods are discussed in an article by (Tsai, 2009). Using the latest techniques, previously used bankruptcy models are tested too, one of the best known and most used is Altman's Z-score, see e.g. (Grieco, Ingram, 2001) or Zmijevski and Ohlson bankruptcy prediction models, see e.g. (Grieco, Gagan, 2003).

Qualitative modeling, unlike other quoted methods, provides possibilities, how to determine possible scenarios that may occur even at ignorance of the exact data. For general information about this topic, see e.g. (Hnise, Durig, 2000) and specifically for application in the economic field, see e.g. (Vicha, Dohnal, 2008). The main advantage of qualitative modeling is generating a trend, knowledge of which in many areas is an important condition for decision making.

2. Qualitative modeling methodology

2.1 Equationless relations

Modern computers provide a powerful basis for number manipulations but their contribution to problem solving based on common sense has been very small, see e.g. (Vicha, Dohnal, 2008). However a methodology of applied soft modelling (e.g. fuzzy logic, qualitative modelling, and rough sets) is gradually being built up and can be used to develop such complex models which incorporate some aspects of political risks / macroeconomics relations.

The Fig. 1 gives examples of six equationless relations. Each graph represents a certain shape and not numerical values. This is the reason why the given graphs in Fig. 1 are suitable to formalise such non-numerical information items which have no forms of traditional equations. For example the following heuristic is a suitable candidate:

If the panic on financial markets X is increasing then the share price is decreasing and there is a lower limit Y. (1)

The shape 24, Fig. 1 can be used to formalise the heuristic (1). Models based on such equationless relations are studied in this paper.

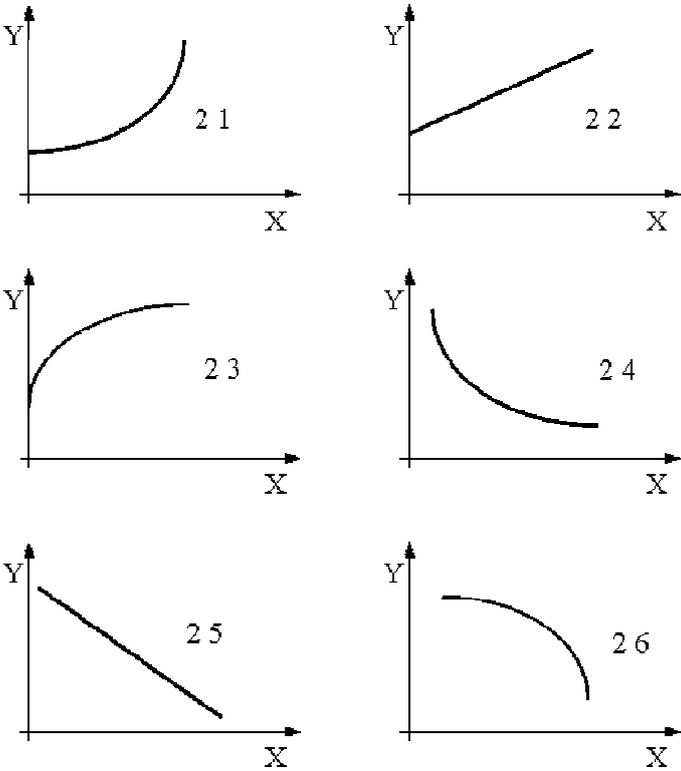


Fig. 1: Equationless relations between X and Y

Source: (Vicha, Dohnal, 2008 + Authors)

All pairwise relations X, Y , see Fig. 1, are qualitative relations. It means that nothing is qualitatively known. For example the relation 22 indicates that:

- the relation is increasing
- there is a linear relationship between Y and X
- If $X = 0$ then Y is positive.

No numbers are required to describe qualitative relations.

2.2 Algebra of qualitative modeling

There are just four qualitative quantifiers, see e.g. (Vicha, Dohnal, 2008):

Values:	Positive	Zero	Negative	Anything
Derivatives:	Increasing	Constant	Decreasing	Any direction

A set of m qualitative n -dimensional scenarios is described by the following set of triplets:

$$[(X_1, DX_1, DDX_1), (X_2, DX_2, DDX_2), \dots, (X_n, DX_n, DDX_n)]_j \quad (2)$$

$$j = 1, 2, \dots, m.$$

where X_i is the i -th variable and DX_i and DDX_i are the first qualitative and second qualitative derivations with respect to time t .

Any set of scenarios (2) is a finite set. Let set $S(m, n)$ of m qualitative n -dimensional scenarios (2)

$$S(m, n) \quad (3)$$

$$j = 1, 2, \dots, m.$$

be a solution of a qualitative n dimensional model M

$$M(r, n) \quad (4)$$

where r is the number of its equationless relations.

The set of scenarios (3) is not the only result of the qualitative modeling. It is possible to identify all possible time transitiv among them. This is a very useful additional information. For example, if a scenario No. 1 is a desirable scenario and the scenario No. 10 is the current scenario, then it is clear how reach the scenario No. 1 starting from the scenario No. 10. All possible paths are identified.

A complete set of all possible one dimensional transitions is given in the following table:

Tab. 1: A list of all one dimensional transitions

	From	→	To	Or	Or	Or	Or	Or	Or
1	+++	→	++0						
2	++0	→	+++	++-					
3	+-	→	++0	+0-	+00				
4	+0+	→	+++						
5	+00	→	+++	+-					
6	+0-	→	+-						
7	+ - +	→	+ - 0	+ 0 +	+ 0 0	0 - +	0 0 +	0 0 0	0 - 0
8	+ - 0	→	+ - +	+ - -	0 - 0				
9	+ - -	→	+ - 0	0 - -	0 - 0				
10	0 ++	→	++ 0	++ -	+++				
11	0 + 0	→	++ 0	++ -	+++				
12	0 + -	→	++ -						
13	0 0 +	→	+++						
14	0 0 0	→	+++	- - -					
15	0 0 -	→	- - -						
16	0 - +	→	- - +						
17	0 - 0	→	- - 0	- - +	- - -				
18	0 - -	→	- - 0	- - +	- - -				
19	- ++	→	- + 0	0 ++	0 + 0				
20	- + 0	→	- + -	- ++	0 + 0				
21	- + -	→	- + 0	- 0 -	- 0 0	0 + -	0 0 -	0 0 0	0 + 0
22	- 0 +	→	- + +						
23	- 0 0	→	- + +	- - -					
24	- 0 -	→	- - -						
25	- - +	→	- - 0	- 0 +	- 0 0				
26	- - 0	→	- - -	- - +					
27	- - -	→	- - 0						

Source: (Vicha, Dohnal, 2008)

The third line of Tab. 1 indicates that it is possible to transfer the triplet (+ + -) into the triplet (+ 0 -), see the transitiv 3b, Fig. 2.

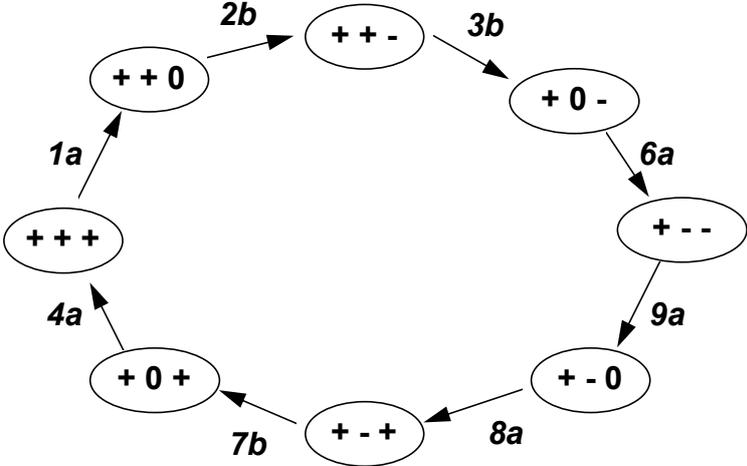


Fig. 2 One dimensional qualitative time record

Source: (Vicha, Dohnal, 2008 + Authors)

This transition is not the only possible. There are two more. Fig.2 gives a qualitative description of an oscillation using the one dimensional triplets $n = 1$ (2).

There are several one dimensional transitions presented in the graphical form, see Fig. 2. For example the following transition (+ 0 -) \rightarrow (+ - -) represents the transition from the peak, see the transitiv 6a, Fig.2. All these transitions correspond to the Tab. 1.

Tab. 1 is not a dogma. It could be modified on ad hoc basis. The only requirement is that the transitions must satisfy the common sense reasoning of a user.

A transitional graph G is an oriented graph. Its nodes are the set of scenarios S (3) and oriented arcs are the transitions T . However, the set of transitions T can be easily generated by the corresponding set of scenarios S using Tab. 1:

$$G(S, T(S)) \tag{5}$$

An example of a simple oriented graph is given in Fig. 2.

3. Specific Use of Qualitative Models (Case study)

3.1 Possibilities of Qualitative Models in Forecasting Bankruptcy

Areas of bankruptcy forecast, as already mentioned in the introduction, are devoted a significant attention. The aim of theoretical studies is to find a model that would most likely forecast bankruptcy of a company or a bank and more recently of a nation state. The biggest problem in most of these models is relatively high demands on precise information without which the models are not fully applicable. This disadvantage largely disappear in qualitative models that are capable, even at a limited

knowledge of the data or a very vague information, to generate scenarios and links between them. These scenarios and links and their subsequent analysis and interpretation are able to provide relevant and valuable information. The result of qualitative modeling is the ability to at least discern a trend in the researched field. This trend can often be a final critical parameter in complex decision making in terms of ever-changing contemporary economic realities.

3.1.1 Determination and Definition of Variables Used

For needs of a particular qualitative model it is necessary to determine the variables to be analyzed. In the selected model, the X-axis includes variables, whose influencing by both the companies and national or supranational authorities is very difficult to impossible, at most it is indirect or using non-standard tools. The Y-axis than includes variables that are dependent on the behavior of the X-axis variables and their development is influenced decisively by them.

Variables used in the next part of the part of the case study were identified by a team of experts based on the works described below. Summary of variables used in the model and the coding is as follows:

a) Variables directly non-influencable by the government or the company

OS – Cyclical Fluctuation

SG – Panic in Financial Markets

BM – Bank Mistrust

PM – Turbulence of Property Market

TS – Turbulence of Stock Market

CD – Consumer Demand

b) Variables dependent on directly non-influencable variables:

FI – Financial Costs (6)

PS – Stock Price

BE – Bond Upgrades

FR – Financial Ratios

MS – Market Share

BA – Probability of Bankruptcy

UP – Pressure for Premature Debt Repayment

RO – Return of Investment

Characteristics of individual variables and the relationship between them are derived from scientific articles dealing with bankruptcy. These are works dealing more broadly with the methodology, see e.g. (Crouchy, Galay, Mark, 2001), or legal issues, see e.g. (Gutiérrez, Olalla, Olmo, 2009). Further, works for specific phenomena such as bond rating, see e.g. (Kim, Nabar, 2007), evaluation of prediction models and methodologies, see e.g. (Griece, Dugan, 2003), (Griece, Ingram, 2001), (Tsai, 2009),

or aspects of the bankruptcy in Czech economy during the last cyclical downturn, see e.g. (Kraftová, Šustrová, 2010).

With the use of these resources, applied variables can be characterized as follows:

Cyclical fluctuation – the impact of the economic cycle phase according to current definition, thus what stage of the economic cycle there is depending on the growth or decline in GDP

Panic in financial markets – in financial markets there is a rise in interest rates, a drop in investor confidence

Bank mistrust – reduction of willingness of banks to lend funds in both interbank and commercial markets

Turbulence of property market – there is a decrease in property prices, fall in the demand for real estates, longer projects' return, a stop in investing activities

Turbulence of stock market – there is a decrease in stock prices, falling stock market indices, excess of supply over demand, decrease of the volume of transactions

Consumer Demand – the final consumer demand is weakening, confidence in the economic system declines, volume of consumer loans is decreasing

Financial costs – the cost of finance depending on other variables decrease or increase, the interest rate varies mainly according to the situation in financial markets and bank mistrust

Price stock – stock price is based mainly on the (in-)stability of financial and equity markets, but also on the stage of economic cycle

Bond Upgrades – yield of bonds for the issuer similar to the stock price mainly depends on the stability of financial and equity markets

Financial ratios – financial indicators widely used in forecasting bankruptcies, there is generally included either improvement or deterioration in these indicators that to a certain extent depends on all the directly non-influencable variables

Market Share – an indicator of describing the market share, which is derived primarily from the phase of economic cycle, the unwillingness of banks to lend and consumer confidence

Probability of Bankruptcy – probability of insolvency, thus the bankruptcy, is derived from all four: the phase of the economic cycle and the unwillingness of banks to lend money, stock market turbulence (in the Czech economy this dependence is more difficult to prove) and consumer confidence

Pressure for Premature Debt Repayment – in case of deterioration of the economic results and banks mistrust it leads to demands for early debt repayment and enhancing business problems

Return of Investment – while worsening economic environment the return of investment projects becomes longer.

3.1.2 Model Compilation

In compiling a model, individual variables are given to mutual dependence and they are assigned a numerical identifier (see Fig. 1) which determines their specific interdependence. In the selected model there are the following dependences:

See Fig. 1	X (horizontal axis)	Y (vertical axis)	
1	21	OS	FI
2	24	OS	PS
3	25	OS	BE
4	24	OS	FR
5	25	OS	MS
6	23	OS	BA
7	22	OS	UP
8	26	OS	RO
9	21	SG	FI
10	24	SG	PS
11	26	SG	BE
12	24	SG	FR
13	23	SG	UP
14	22	BM	FI
15	25	BM	FR
16	24	BM	MS
17	21	BM	BA
18	22	BM	UP
19	23	PM	FI
20	24	PM	PS
21	24	PM	BE
22	24	PM	FR
23	23	TS	FI
24	25	TS	PS
25	24	TS	FR
26	21	TS	BA
27	21	TS	UP
28	24	TS	RO
29	25	CD	FR
30	24	CD	MS

(7)

31	21	CD	BA
32	26	CD	RO

3.1.3 Result of the Model

Model (7) generates a total of eleven scenarios, see Tab. 2.

Tab. 2: Resulting scenarios of model

	OS	BM	FI	FR	MS	BA	UP	RO
1	+++	+++	+++	+--	+--+	+++	+++	+--
2	+++	+++	+++	+--	+0	+++	+++	+--
3	+++	+++	+++	+--	+--	+++	+++	+--
4	++-	++-	++-	+--+	+--+	++-	++-	+--+
5	+0+	+0+	+0+	+0-	+0-	+0+	+0+	+0-
6	+00	+00	+00	+00	+00	+00	+00	+00
7	+0-	+0-	+0-	+0+	+0+	+0-	+0-	+0+
8	+--+	+--+	+--+	++-	+++	+--+	+--+	++-
9	+--+	+--+	+--+	++-	++0	+--+	+--+	++-
10	+--+	+--+	+--+	++-	++-	+--+	+--+	++-
11	+--	+--	+--	+++	+++	+--	+--	+++

Source: (Authors)

Among these scenarios exists sixteen possible transitions among them, see Tab. 3. In the Tab. 2 there are listed different scenarios, in the Tab. 3 there are relations among individual scenarios and in the Fig. 3 there is graphical interpretation of all transitions among the scenarios.

Tab. 3: Transitions among scenarios of Tab. 2

From	To
1	2
2	1
2	3
3	2
4	6
4	7
5	3
6	3
6	11
7	11
8	9
9	8
9	10
10	5
10	6
10	9

Source: (Authors)

Tab. 3 is converted into a oriented graph, see (5). For example, this chart immediately indicates that the scenario number eleven (see Tab. 2) is so called Chernobyl scenario. It means there is no escape from the scenario.

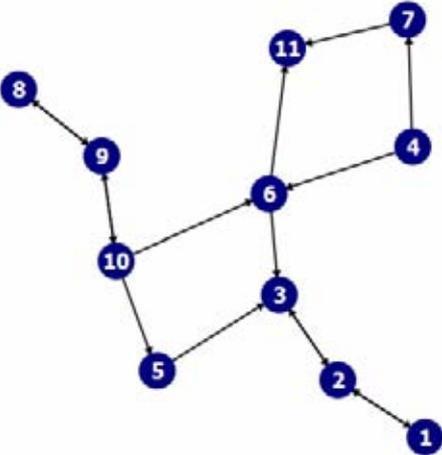


Fig. 3: Oriented graph transitions among scenarios

Source: (Authors)

3.1.4 Interpretation of Results of the Model

It follows from the nature of qualitative modeling it is possible to rely on the fact that all possible scenarios are identified. All variables (6) are taken into account. The results given by the query formulated in the model on the impact of cyclical fluctuations and the unwillingness of banks to lend funds indicate that these entered queries about variables have the same impact on the cost of finance, financial ratios, market position, probability of insolvency proceedings, pressure for premature debt repayment and return of projects. Similar impact on the variables is generated by panic in financial markets and consumer confidence.

If we analyze individual scenarios and in particular the links between them, we find that the first three scenarios, in this case the worst ones, indicate accelerating recession, banks' reluctance to credit operations and a fall in all financial indicators. For these scenarios one cannot get better options, because the economy is in a deepening recession and seeks only to its bottom given by the cyclical developments. see Tab. 3 or Fig. 3.

$$4 \rightarrow 7 \rightarrow 11 \tag{8}$$

The links between individual scenarios, and thus the possibility to influence the transition to the growth stage of the economic cycle and the associated lower probability of bankruptcy, can be seen from scenario No. 4 through scenario No. 11 (8). This scenario shows a stop of deterioration of all parameters and return to the stagnation phase. Transition from this scenario is possible to the best scenario No. 11 already through the scenario number 7, thus in case of return to improving indicators of the variables of financial indicators, company market position and return of

projects. Similarly, there are improvements, i.e. decrease in variables of cost of finance, probability of bankruptcy and pressure for premature debt repayment.

The resulting scenarios and links generated between them apparently show the dependence of company status and the likelihood of bankruptcy on the phase of the cycle of economic development on one hand, and on the unwillingness of banks to lend on the other. It can be stated that in case of the selected model, approximating to the reality of the selected variables, one cannot only respond to the cyclical fluctuations of the economy, but regulatory authorities should also consider whether it is practical and appropriate to respond to changes in attitude and behavior especially in banking institutions while in stable economic situation.

You cannot ignore, however, that the directly non-influencable variables used in this model can be influenced very hard or not at all by regulators with the tools currently used in control. In the case of efforts to achieve improvements in these variables, therefore, the regulatory authority has to proceed to non-standard steps, which may to some extent, reduce market-based economy. There is a big unknown to what extent, in the event of a non-standard regulation, will bankruptcy be possibly limited to a long or a short-term period.

For this issue it is possible to create a qualitative model using other variables, possibly supplemented by variables already used in the presented model with other links between them. The results show that the output of this model cannot be generalized and take as a decisive one, though many suggest and at least give hints for answers to the most pressing questions about the functioning of the contemporary economy.

4. Conclusion

The very nature of such object of models as bankruptcy and political risks makes their study difficult. Models of complex, highly non linear and multidimensional systems of interdisciplinary nature have many setbacks. They are rather heterogeneous collections of items of different credibility. The concept of qualitative models is a simple formal tool which can integrate all such items. A meaningful interpretation of the resulting sets of scenarios is an ad hoc task.

The key advantages of qualitative models are that forecasts or decisions are based on provably complete set of scenarios. No scenario can be overlooked. The key disadvantage is that the results are qualitative; it means that just qualitative answers are offered.

The qualitative modeling itself is very flexible. It is possible to perform any union or intersection of different models. The sub models can be either equationless or based on sets of quantitative equations. This is a very useful feature for verification of macroeconomic models and their simplifications. There are usually not sufficiently rich data sets to use statistical methods. It is therefore very useful to learn all possible consequences if some variables or equations are ignored. This aspect is important for development of classical quantitative models.

In this particular application, qualitative modeling techniques were used in modeling the impact of the economic cycle phase and bank unwillingness to lend free funds on critical business indicators, including the likelihood of bankruptcy. The result present eleven scenarios and sixteen transitions between them. Both of these variables have a similar effect on the company. In the real economic situation using standard methods by regulatory authorities, their development is very difficult to influence directly. When using non-standard methods, this model cannot estimate trends in the economic behavior of individual entities in the economic environment in the future. At least the possibility to model these trends provides an opportunity to further expansion or modification of the presented model.

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MODELLING OF SUSTAINABLE SYSTEMS

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Abstract: *This paper focuses on the issue of utilization of system approach in sustainability systems modelling. Into systems that deal with sustainability are included systems that research into regional quality of life. The proposed quality of life models work with real data for regions and districts in the Czech Republic. The models use decision trees and factor analysis methods.*

Keywords: *Sustainability, System Approach, Quality of Life, Modelling, Decision Tree, Multidimensional Statistics Methods.*

JEL Classification: *C44, C63, L38.*

1. Introduction

“Sustainability“ (Olej, 2009) issues are currently very attractive and trendy. They cover a wide range of areas: e.g. sustainable architecture, sustainable building, sustainable business, sustainable development, sustainable engineering, sustainable environment, sustainable materials and similar. These issues thus have found their way also into regional management issues debates (Křupka, 2010b).

The solving of sustainability, as well as solving basic science issues of the current period (Capra, 2004), must be approached in an interdisciplinary way. The issue of sustainability, on the regional level, for the environment, economic and social areas is the content of the following projects: Indicators for valuation and modelling interactions between the environment, the economy and social correlations (No. SP/4i2/60/07, the grant is awarded by the Ministry of Environment of the Czech Republic (CR), project resolver is Obršálová I., the project runs from 2007 to 2011) and The Model for Stimulating Regional Growth Management (No. 402/08/0849, grant is awarded by the Grant Agency of the CR, project resolver is Křupka J., the project runs from 2008 to 2010). Partial findings and conclusions of the above-mentioned science projects are published also in monographies (Olej, 2009; Olej, 2011). Modelling of Selected Areas of Sustainable Development by Artificial Intelligence and Soft Computing (Olej, 2009), and Environmental Modelling for Sustainable Regional Development: System Approaches and Advanced Methods (Olej, 2011).

System theories adequately illustrate existing society and the existing world. Science theories, as organized knowledge systems, reflect and illustrate relations between processes and elements that are organized in a systematic way (Mucha, 2008). The more a society is advanced, from the point of view of the general evolutionist theories, the more it is differentiated and complex. The nature of its development is determined by system rationality and its specific requirements. Theoretic approaches

fade over with the consequences of the real assertion of more and more sophisticated organized life forms in the processes of rationalization and modernization which, by using the acquired knowledge from science and technology, set up the system character of life in the current society. An advanced society, highly differentiated and complex, enforces not only real changes in the relationship structure, but it also significantly attacks concepts and ideas that once played a significant role in the society development and deeply influences life orientation of the modern age people (Mucha, 2008). This concerns in the first place metaphysical questions, ideas about the purpose of human existence and of the world itself. The strongest demonstration of “human world” building, in which science and technology should had played a major role, was the realization of humanity ideals in its various alternatives.

Humanity and sustainability are reflected also in the Quality of Life (QL) modelling. A problem of modelling of QL can be specified like this type of system (Jirava, 2010; Křupka, 2010; Mederly, 2004). We have to use system engineering, system approach (Blanchard, 1998; Blanchard, 2004) for a solution of comprehensive, complicated, and complex systems. System engineering according to Z. Dráb can be defined as: „... aggregation of means, processes and methods for solving (that means research into, designing, creation and operation) complex technical and mixed (technical-social) systems (including the issues of their management)“ (Vítek, 2003: 6). System approach is then understood to be a purposeful way of thinking or of solving problems while the researched into phenomena and processes are viewed in a complex way taking into consideration their internal and external relations (Rosický, 1995; Křupka, 2010a).

2. Problem formulation

We can talk about QL in both the static and the dynamic meanings, the static meaning provides reports on peoples’ life as of a set time, while the dynamic meaning compares and evaluates the QL in a longer period of time (Křivohlavý, 2004). Generally it is possible to say that the QL is influenced by the physical and mental health of an individual, by the level of independence, by social attitude towards the environment and by other factors (Balegová, 2002; Halečka, 2002; Blažej, 2005; Svobodová, 2007). It may be defined as an individual’s life satisfaction with the life the individual person lives compared to an ideal life. The evaluation of the QL depends in this case on the value system of each individual (Akranavičiūtė, 2007; Vaďurová, 2005). If we needed to make a complicated inquiry with each individual about the individual aspects of his/her life, such approach would be very time consuming and it would not be possible to execute research into the QL on an unlimited number of respondents. For this reason we are looking for methods that would allow us to draw data from publicly available databases and reach relevant results. There a universal delimitation of the QL does not exist. The QL depends also on external factors (Akranavičiūtė, 2007), good living conditions or other conditions define a high QL, but if such conditions vary, the satisfaction with the QL then also varies.

The QL (Křupka, 2009a) is influenced by: material state of affairs (goods, services, home, economic level, by conditions for work and recreation, average income, purchasing power, and so); by the quality of the environment (the level of the utilization of natural resources, sustainable development, water quality, weather, soil, and other); by the individual's quality of health (the health of the society); by the quality of education, by moral and psychological climate (inside the family, organizations, culture, states), individual feeling of safety (physical, legal, societal) and by the possibility for self-expression.

According to (Křivohlavý; 2009) QL is defined as satisfaction of a concrete individual with achieving goals defining the orientation of his/her life. This orientation is further influenced by each individual's value orientation (as a hierarchy of values in the spiritual meaning).

QL can be expressed by means of its areas and components as is showed in Fig. 1 (Akranavičiūtė, 2007).

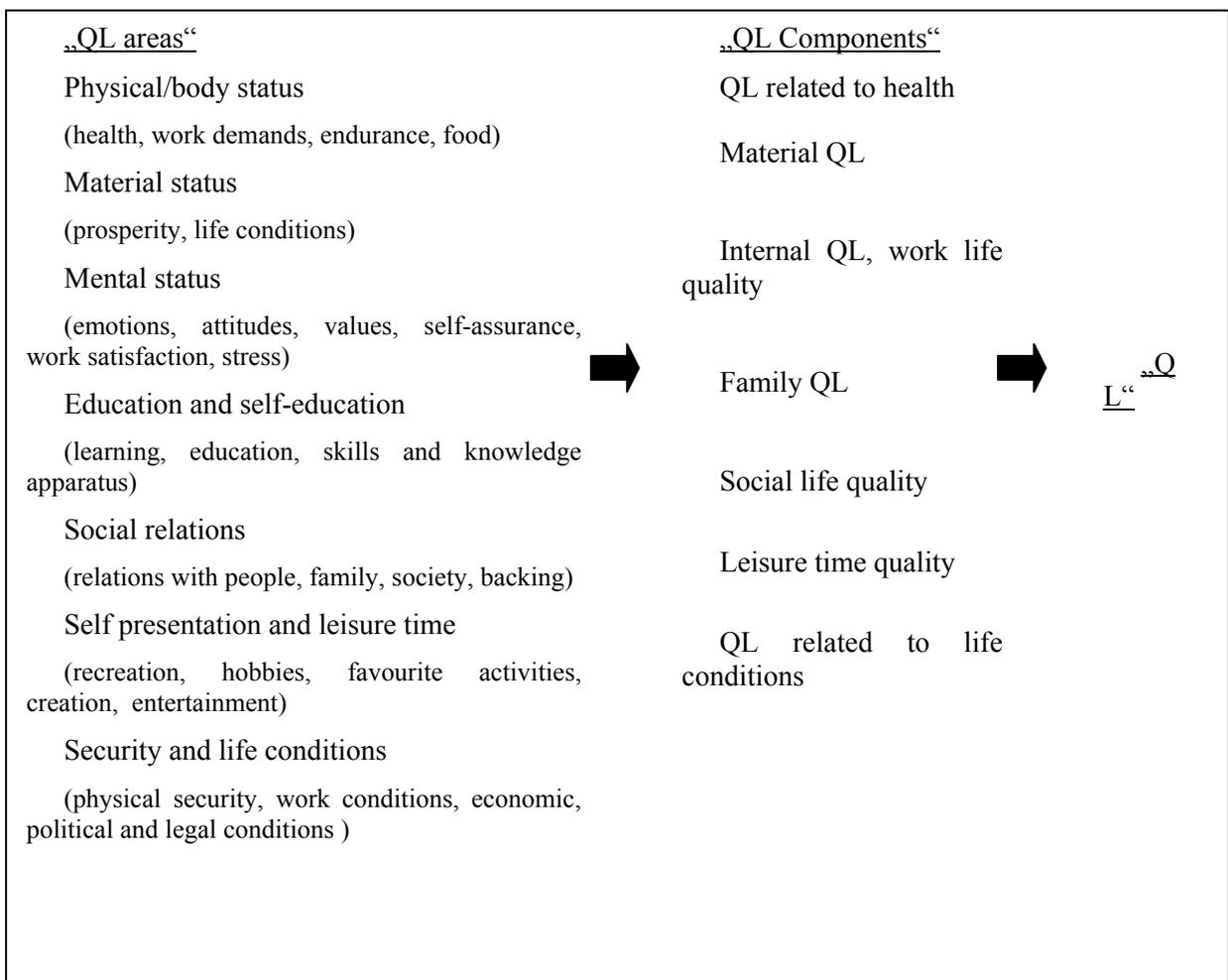


Fig. 1: Model of QL

Source: (Akranavičiūtė, 2007)

The term QL is discussed in many fields of science and each field of science approaches the term mainly from the view of its own science terminology. The value system of each individual has a major role in the definition of the individual's QL.

“Values represent a system of acquired dispositions of an individual to act towards or to strive to move towards a goal in accord with the desires determining the conditions of the existence.” (Cakirpaloglu, 2004: 385). According to (Šebek, 1973) values represent an individual’s life purpose, they are a means for the adaptation to society and they are a means for conflict resolution inside a personality’s system (that is in particular a conflict born in decision making). Values influence behaviour; they integrate a personality in the context of important life goals and prevent chaotic behaviour. At the same time they are also one of the sources of conflicts.

Schwarz’s value system can be taken as the generally accepted value model. This model describes ten types of values. Schwarz has derived these value types by analyzing individual social needs. He considers these values to be essential for the functioning and the survival of all systems (Kavalíř, 2005). The model is based on the assumption that each individual is influenced by the following basic needs (Hnilica, 2005):

- The necessity to fulfil his/her biological needs
- Participation in social interactions (coordinated interactions)
- To meet institutionalized requirements that are related to group survival possibilities.

Schwarz’s model can be interpreted as a structure (Fig. 2) that consists of four areas (Hnilica, 2005):

- Transcendence: it includes the values of universalism and benevolence
- Conservatism: it includes the values of conformity and related traditions and the value safety
- Orientation on self of an individual: it includes power, success and partially the value of hedonism, however, this value is included also in the following area
- Openness to change: it includes the already partially mentioned value of hedonism, but also the value of stimulation and self-determination.

It is essential to realize, in particular, the importance of cultural and social factors for the preservation of values that we recognize. The culture norms of a given society system give us clear guidance to what rules we must obey. It shows us the values and norms accepted by the majority society and it applies to all members of the given society (Cakirpaloglu, 2004).

Health represents a component of the overall QL that is generally valued and accepted in all societies. In (Vašina, 1999) the author, on a general level, defines health as an abstract representing intact body and well functioning and good condition of all body organs and the entire body. Health is thus a normal function and illness means abnormal function, or suppressed function or an atypical function. Further, the author brings attention to the meaning of the definition of health as it is represented by the World Health Organization. The organization understands health to be the state of absolute body, mind and social well-being. Health understood in this way is not anymore the solely biological-medical problem, but is overlaps to social sciences.

The multidimensional notion of health is clearly demonstrated in (Křivohlavý, 2009). It is stated there that physicians understand the meaning of health to be the absence of any illness or injury. Sociologists see the notion of health as the ability to function well in all social roles. Idealists describe a healthy individual as an individual that feels well physically, mentally, spiritually and socially. Humanists consider an individual to be healthy when the individual bears positively the burden of all daily life requirements and tasks to be fulfilled by the individual.

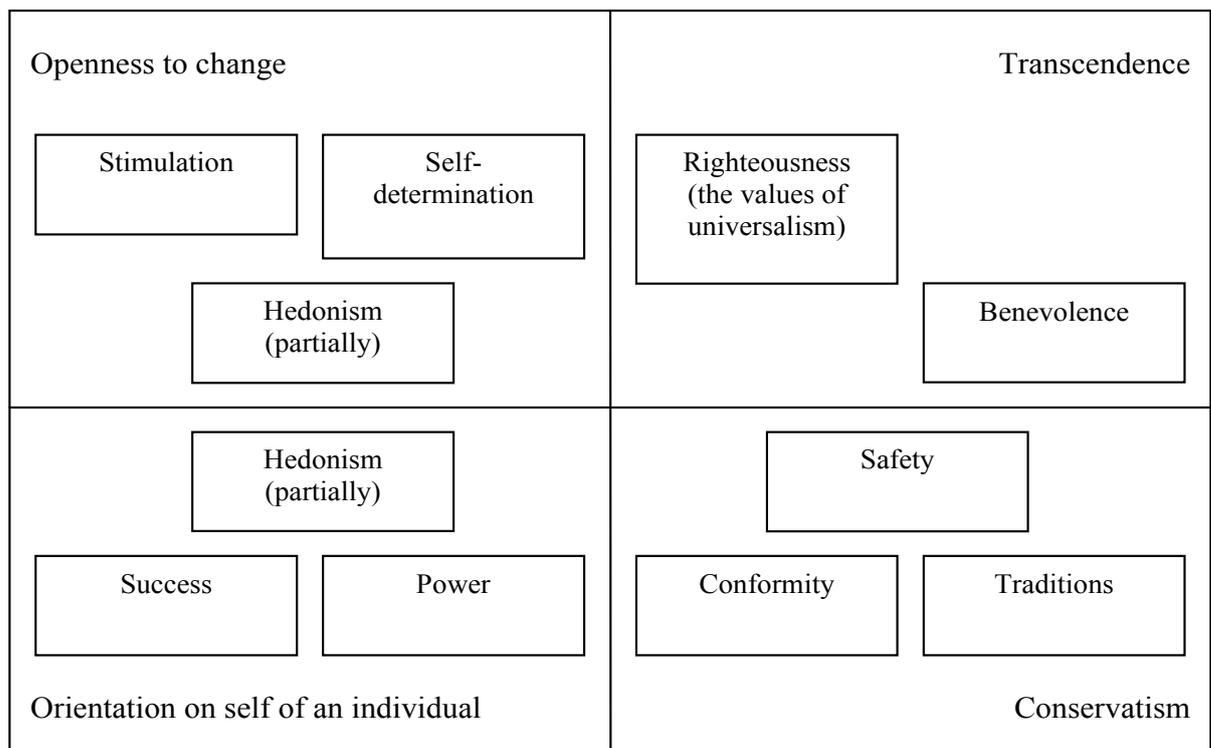


Fig. 2: Organization of values

Source: Redraw on the basis of (Hnilica, 2005: 375)

Health theories can be divided, according to whether health is understood as the goal (ultimate status) or whether health is a means to reach goals (Křivohlavý, 2009), to: health as a source of physical and mental health, health as a metaphysical power, salutogenesis – individual source of health, health as the ability to adopt, health as the ability of well functioning, health as a good and health as an ideal. This approach to researching into health is demonstrated in Fig. 3.

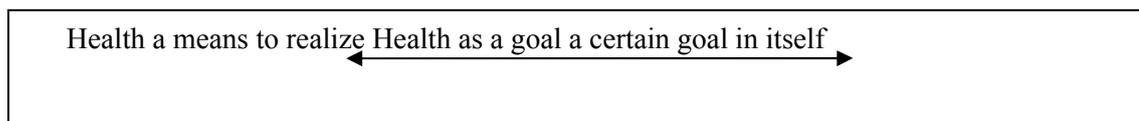


Fig. 3: Health theories dimensions

Source: (Křivohlavý, 2009: 33)

Concrete view of how people understand health can be found in (Vašina, 1999). They are empiric study results. The study included two basic questions that were given to the respondents:

- Do you think you know someone who is in perfect health? Who is that person? What is his/her age? What can you say about his/her health?
- Sometime a person is more healthy than other time. What does it mean to be healthier?

Based on the acquired data we can identify eight concepts of health – health as: no-illness; subjective state of illness/ health despite illness; health reserve, backup and capacity; physical condition (fitness); energy and vitality; social relations; functions; mental-social wellbeing.

3. Model design

There are various ways how to measure the QL. Generally these methods of measurement can be divided into three groups (Křivohlavý, 2001) where:

- The evaluator is a third person (the shortcoming is that this evaluation is in many cases different from the evaluation of the individual done by himself/herself, one of the methods is Karnof index – e.g. a physician expresses his/her opinion on the total health status of the patient as of a certain date)
- The individual himself/herself is the evaluator – the QL is measured as it is subjectively felt and defined by the person who is himself/herself the subject of the inquiry. Here various methods are used, e.g. the evaluation of the individual quality method program (Schedule for the Evaluation of Individual QL) – the respondent fills into a questionnaire his/her personal life goals, evaluates the fulfilment of these goals and defines their importance, another method is the health method related to the QL (Health Related QL)
- The evaluation arrived at by the combination of the above-mentioned methods is used – here the method of the short way of assessment of the QL can be utilized (Manchester's Short Assessment of QL) - with this method we evaluate not only the complete life satisfaction, but also the satisfaction with a number of pre-defined life dimensions, or the Life Satisfaction Scale method can be used.

When we concentrate on the individual person's satisfaction as one of the basic conditions determining the quality of his/her life then his/her "satisfaction" is influenced by a range of various approaches. These are an economy, health, environmental, psychological, religious, sociological and philosophic approaches. More detailed information is in (Křivohlavý, 2001; Philips, 2006; Rapley, 2003; Systém, 2009; Vliv, 2003). If we focus on (Systém, 2009; Vliv, 2003):

- Economy approach, where the economic situation of an individual (the society) has more and more influence on his/her QL. The economic situation

of a certain society can be expressed, among other indicators, by the well known gross domestic product (GDP) indicator. The higher the GDP indicator level, the better economic situation in a given country. Some critics of the expansive economy and of an unlimited economic growth however point at negative impacts of this on the future human beings life

- Health approach, where health can be defined as the state of complete physical, psychological and social well-being, not only as the absence of any disease or defect. Health is influenced by internal (impossible to influence) and external (possible to influence) influences
- Environmental approach where in most cases this approach is observed in relation with the health status of the population. Here we observe the quality of the air, potable water, noise level or the effect of foreign matter substances on the human body, e.g. from food chains and similar then it is possible to define the sets of input variables (indicators) of the mentioned approaches that influence the QL.

According to selected approaches it is possible to define sets of input variables (indicators) that influence QL.

When processing the QL indicators a number of mathematical methods can be used from one dimensional to multidimensional statistical methods, artificial and computational intelligence methods, decision trees, rough sets and the method of case based reasoning.

We can define QL system S_{QL} for design of QL model based on system approach by the following way:

$$S_{QL} = \{ A_i, M_j, I_{ki}, Ap_m, Da_n \} \quad (1)$$

where: A_i is i -th approach for description (specification) of QL, M_j is j -th method for QL modelling, I_{ki} je k -th indicator (attribute) for i -th approach, Ap_m je m -th appendix attribute and Da_n je n -th demographic attribute.

Among the approaches we can include for instance solving of the following issues:

- Quality of air in selected localities based on the chemical composition of atmospheric rainfall (Křupka, 2009)
- Region QL determinants (Křupka, 2010b; Křupka, 2010e)
- Data analysis and modelling of dependencies between selected environment attributes and health in the region (Křupka, 2010c; Křupka, 2010d).

Among the methods used we can include decision trees algorithms, neural networks, rough sets and similar.

The attributes are selected based on professional consultations and technical literature. The original, real metadata come from the Public Opinion Research Centre Institute of Sociology, Academy of Sciences of CR, from “Team initiative for regional sustainable development”, from the Czech Statistical Office, from the Health Institute and similar institutions.

For the purpose of the creation of the here proposed QL models there have been used data for the period 1998 - 2007 acquired from the Regional Information Service portal, Pardubice region Czech Statistical Office, Public database of the Czech Statistical Office, Institute of the Health Information and Statistics of CR and the Czech Hydrometeorological Institute.

There were two matrices constructed - Matrix A_1 (for 29 indicators/attributes describing CR regions in the given time period) and matrix A_2 (for 42 indicators/attributes characterizing CR districts in the given time period).

Matrix A_1 (Svobodová, 2010) includes health, environmental, economy, complementary and demographic data. Among the health indicators are: life expectancy (male/female); death caused by neoplasm, live birth, death birth, deceased; deceased persons due to disease of the circulatory system; deceased persons due to disease of the respiratory system, deceased person due to disease of the gastrointestinal system; deceased persons due to external factor-e.g. suicide and similar; number of hospitals, number of physicians. Environmental indicators include: acquired investments to environment protection; emissions of basic polluting substances. Economy indicators: GDP, gross earnings; net disposable household income, rate of registered unemployment. Among the complementary indicators are marriages, divorces and criminality; the demographic factors are the region; state of the inhabitants, area and the total increment in the number of inhabitants.

Matrix A_2 (Augustinová, 2010) is composed from the following indicators: total district area; population density; inhabitants' average age; share of selected types of parcels – agriculture land share in the total district area; completed apartments, room or a set of rooms, that can serve as independent apartments, and that have got effective certificates of practical completion in the observed period; mass accommodation facilities; acquired investments for the environment protection by the investor seat by district; independent buildings and other investment measures leading to improvement of the existing state of the environment; ...; swimming basins and swimming pools, swimming basins are objects next to water flows that are operated by an operator. When there is more than one swimming basins in one area then each swimming basin is taken as an individual facility; gymnasiums; stadiums included sheltered stadiums; winter stadiums including sheltered stadiums (see more detailed information in (Augustinová, 2010).

The given matrixes (A_1 , A_2) represent the inputs into models M_1 and M_2 . The first one utilizes decision trees for the proposal of QL qualification models (Křupka, 2009; Křupka, 20010b). Its output is five QL levels for health and economy indicators and three QL levels for “general” QL including environment and complementary indicators. The second model uses factor analysis (Blahuš, 1985; Hebák, 2007; Kubanová, 2004; Labudová, 2010; Meloun, 2002). Its output is only seven so called “latent” or derived variables on which depends the QL level in the given district. We can with “confidence” allocate a group of relevant indicators to every derived variable.

4. Conclusion

Based on the analysis of the M_1 model outputs we can say that the following regions are the regions with high QL. These regions are Plzen region, Hradec Králové region, Pardubice region, and Zlín regions (“Plzeňský, Královéhradecký, Pardubický a Zlínský”). Among the regions with above-average QL are South Bohemia region, Karlovy Vary region, Liberec region, Vysočina region and Olomouc region (“Jihočeský, Karlovarský, Liberecký, Vysočina and Olomoucký”). The average QL is in Central Bohemia region and South Moravia Region (“Středočeský, Jihomoravský”), that are on the breaking point between average and below average. The worst QL is in Ústecký region and Moravskoslezský region (“Ústecký and Moravskoslezský”). This fact can be caused by, for instance, the reduction of heavy industry, high unemployment rate and problems with bad quality of the environment.

The results of the second M_2 model showed the possibility of using one of the multidimensional statistics methods for the “reduction” of a large amount of real attributes, indicators.

The achieved results can be used as a supporting knowledge for the regional management for the reinforcement/support of the selected indicators with the objective to increase the QL in the given region.

The model input data can be used for further processing, e.g. the model M_1 data have been modified, extended and used for the specification of Quality of Health State in CR regions (Křupka, 2010c; Křupka, 2010d).

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CSR CONCEPT FROM THE MARKETING POINT OF VIEW

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Abstract: *This article deals with concept of corporate social responsibility (CSR) and compares it with standard marketing conception and later social marketing conception. This article presents new information about business to business (B2B) customer requirements but these requirements are also the indicators of CSR concept compliance. There is asked a question where is the border between corporate social responsibility concept and the social marketing concept.*

Keywords: *Corporate Social Responsibility, Marketing Concept, Social Marketing Concept, CSR Indicators.*

JEL Classification: *M14, M31.*

1. Introduction

The term *corporate social responsibility* began rise up in conjunction with violations of laws, ethics, employee safety, bad behavior toward customers and the environment and more. This increase started above all in relation to large and multinational companies early 20th century in the USA.

The aim of this paper is to briefly describe the current perception of CSR and present the position of CSR in marketing also by comparison with the latest social marketing concept. At first view it may seem that the concept of CSR and marketing concept is totally different, but the truth is that, there can be discovered an opposite conclusion through close examination.

2. Corporate social responsibility

The concept CSR is defined either in terms of what areas should include, or in terms of whose opinions, needs and interests should be integrated in its decisions and actions.

For example, Bloom and Gundlach (2001: 42) come out in their definition of CSR from the theory of stakeholder groups (the stakeholders) and they define CSR as "*a firm commitment to its stakeholders - people and groups who are affect or are affected by corporate policies and practices. These requirements are more than the legal requirements and corporate responsibilities to shareholders. Fulfillment of these requirements can minimize damage and maximize the long - term positive impact on the company business.*"

Kenneth R. A. (in Hartman, 1998: 243) definition is based on the idea of sustainable development. He defines CSR as targeted care for the welfare of society which prevents the destructive activities in individual or corporate behavior and regardless of immediate profitability it leads to a positive contribution of improvement of man.

The organization Business Leaders Forum is aimed at promoting this CSR concept. It describes CSR as follows: "*Corporate social responsibility is a voluntary commitment by business to behave in their operations responsibly towards the environment and the society in which they operate.*" (Business Leaders Forum, 2007).

The CSR concept is mostly defined on the stakeholder theory that is based on the recommendation that the company should have realize which groups and entities influence the existence of the company. In some way to the company existence related subject were called "stakeholder" by R. E. Freeman already in 1984. Present authors Post, Preston, Sachs (2002:19) have the same approach towards stakeholders and their importance for the company in their definition:

"Stakeholders are individuals and business entities that contribute, intentionally or unintentionally, to the corporate activity and the ability to create wealth, and who are therefore potential benefits or risks."

Tab. 1: Examples of stakeholder issues and associated measures of corporate impact

Some stakeholder groups and issues	Potential indicators of corporate impact on these issues
<i>Employees</i>	
1. Compensation and benefits	1. Ratio of lowest wage to national legal minimum or to local cost of living
2. Training and development	2. Changes in average years of training of employees
3. Employee diversity	3. Percentages of employees from different gender and race
4. Occupational health and safety	4. Standard injury rates and absentee rates
5. Communications with management	5. Availability of open-door policies or ombudsmen
<i>Customers</i>	
1. Product safety and quality	1. Number of product recalls over time
2. Management of customer complaints	2. Number of customer complaints and availability of procedures to answer them
3. Services to disabled customers	3. Availability and nature of the measures taken to insure service to disabled customers
<i>Investors</i>	
1. Transparency of shareholder communications	1. Availability of the procedures to keep shareholders informed about corporate activities
2. Shareholder rights	2. Litigation involving the violation of shareholder rights (frequency and type)
<i>Suppliers</i>	
1. Encouraging suppliers in developing countries	1. Fair trade prices offered to suppliers in developed countries
2. Encouraging minority suppliers	2. Percentage of minority suppliers
<i>Community</i>	
1. Public health and safety protection	1. Availability of an emergency response plan
2. Conservation of energy and materials	2. Data on reduction of waste produced and comparison to industry
3. Donations and support of local organizations	3. Annual employee time spent in community service
<i>Environmental groups</i>	
1. Minimizing the use of energy	1. Amount of electricity purchased; percentage of green electricity
2. Minimizing emissions and waste	2. Type, amount, and destination of the waste generated
3. Minimizing the adverse environmental impacts of products and services	3. Percentage of product weight reclaimed after use

Source: (Maignan, I. at all, 2005: 961)

Many companies present themselves as a socially responsible and keep very good relations with their stakeholders or selected groups. In this way they build the image and use CSR as a marketing tool.

Some studies have shown that in developed markets some customers choose products according to some aspects of CSR. Either the customers can prefer the products of socially responsible companies or they can boycott the products from socially irresponsible companies.

3. Social marketing conception

Marketing has developed like any other scientific disciplines. The development was a reflection of the market. After the world we can still meet all the business concepts -

manufacturing, product, sales, marketing and social marketing. Social marketing approach, which developed last, it is usually tied to the developed markets.

Usually the marketing definitions hold the classical marketing concept. For instance Palmer A. (2004: 3) describes marketing in this way: *„Customers’ needs are the starting point for marketing activity. Marketing managers try to identify these needs and develop products that will satisfy customers’ needs through an exchange process“*.

Kotler, P., Armstrong, G. et.al (1999: 5) see marketing as *„a social and managerial process by which individuals and groups obtain what the need and want through creating and exchanging products and value with others“*.

Jobber, D. (2004: 5) expresses the marketing concept as: *„The achievement of corporate goals through meeting and exceeding customer needs better than the competition“*.

Social marketing concept is usually not described sufficiently in the publications. It looks like it is a marginal matter of marketing science.

Palmer, A. (2004: 26) to the topic social marketing states: *„Traditional definitions of marketing have stressed the supremacy of customers, but this is increasingly being challenged by the requirement to satisfy the needs of a wider range of stakeholders in society. There have been many recent cases where companies have neglected the interests of this wider group with disastrous consequences.*

Scenes of protesters outsider a company’s premises and newspaper coverage of anti-social behavior by firms can take away from the company something that its marketing department had spent years developing – its image.“

On the other hand some researches showed that there are some consumer segments which prefer social responsible producers. Even some of them are willing pay more for so product.

The following table illustrates the differences between traditional marketing concepts and social marketing from the perspective of marketers.

Tab. 2: Differences between social and commercial marketers

Social marketers	Commercial marketers
Want to do good	Want to make money
Funded by taxes, donations	Funded by investments
Publicly accountable	Privately accountable
Performance hard to measure	Performance measured in profits, market share
Behavioural goals long term	Behavioural goals short term
Often target controversial behaviours	Typically provide non-controversial products/services
Often choose high-risk targets	Choose accessible targets
Risk-averse managers	Risk-taking managers
Participative decision making	Hierarchical decision making
Relationships based upon trust	Relationships often competitive

Source: (Andreason, A. R., 2000)

From the point of view of business concepts is the CSR closest the social marketing conception. That is why the social marketing concept takes into account both customer

satisfaction and generally human welfare in conditions of company profitability. Including the customer are the other groups of interest usually the employees, community and environmental groups. It is usually through the tool of marketing mix called PR (public relations).

4. Common elements of CSR concept and social marketing concept

In practice there are not many differences between the result of CSR and social marketing. The goal is the same. It is satisfied customer and social welfare.

A little difference is that CSR concept is concerned more on mutual communication with shareholders while the communication of (social) marketing concept is much more unilateral.

Other difference is that CSR concept usually states the customer preferences as one of many benefits of CSR application while (social) marketing approach has officially basic goal to gain other customers segments. Anyway generally everything what has positive effect to gain new customers or what is a precondition for growth in sales (or prevent the decrease of sales) can be called as marketing.

The whole profit of firms depends on many elements of company. We can call them as marketing micro and macro environment (marketing point of view) or we can call them as an influence of stakeholders (CSR concept point of view). The firm success depends on the level of agreement to these elements and their required norms and values. Maignan, I. et.al states interactions between organizational and stakeholders values and norms in the next figure.

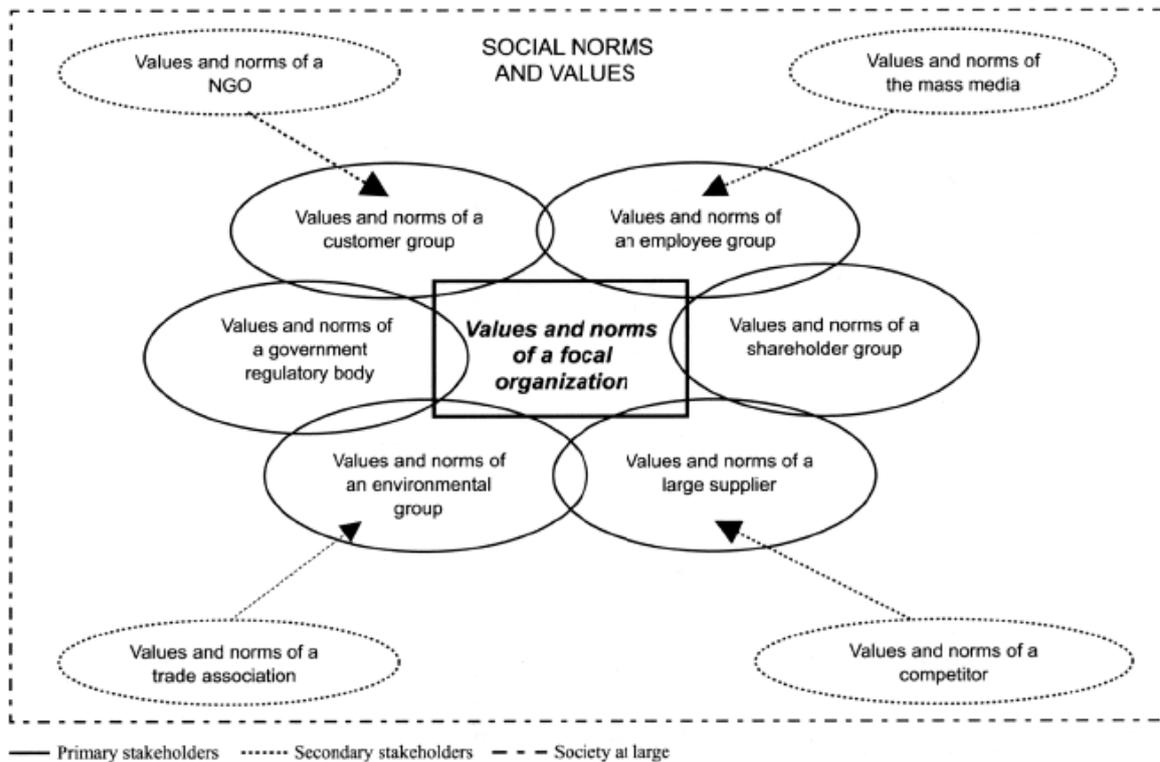


Fig. 1: Interactions between organizational and stakeholders values and norms.

Source: (Maignan, I. et al, 2005: 962)

There are many ways for company CSR evaluation. There is number of indicators for CSR. For example Tomancová, L. (2009:157) states the following:

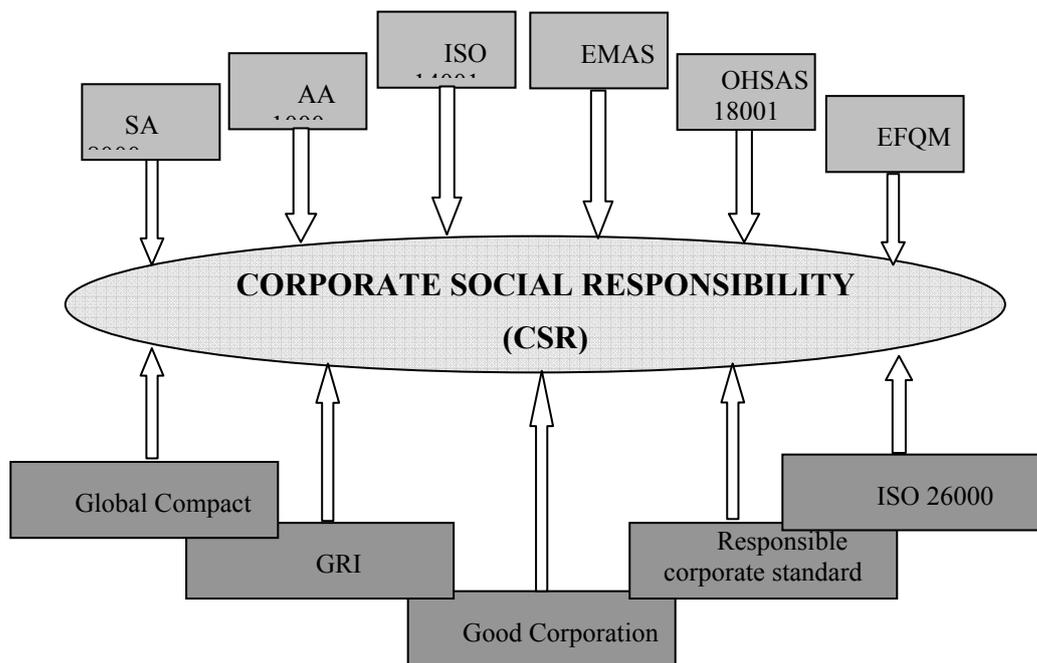


Fig. 2: CSR tools and norms

Source: (Tomancová, L., 2009: 157)

These indicators are the most used in the Czech Republic:

- ISO 14000 series of standards are aimed at environmental management. These standards are used to create appropriate procedures to manage the company's activities with a significant impact on the environment.
- EMAS is also environmental management system. It would help to improve environmental performance even beyond legal requirements.
- OHSAS 18001 (Occupational Health and Safety) is a standard helping organizations with assistance in managing their programs of health and safety and ensure the employee care and achieving sustained improvement.
- SA 8000 (Social Accountability 8000) includes standards dealing with the particular working conditions of employees. SA 8000 provides transparent, measurable and verifiable indicators for the certification of the business in the area of child labor, forced labor, health and safety, freedom of association, discrimination, discipline, working hours, remuneration and management
- AA 1000 (Account Ability 1000) - this British standard covers the same areas as SA8000. Moreover it includes the requirements for reporting and auditing activities of socially responsible companies.

In 2008 was performed a survey concerned at CSR on B2B market (Kuběnka, 2009). The following are data yet unpublished. There was obtained 133 completed

questionnaires from the companies with more than 500 employees, turnover more than 100 million CZK and from production sector. The companies were asked: *Which standards do the key customers require from you?*

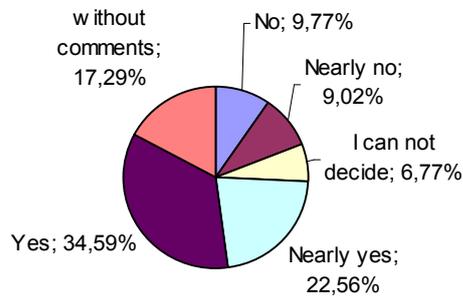


Fig. 3: Does the B2B customer require ISO 14000? (Source: own)

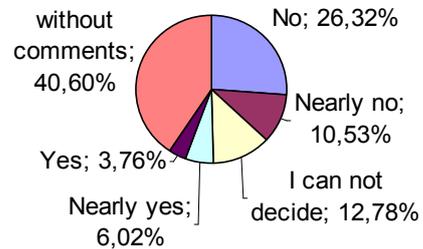


Fig. 4: Does the B2B customer require EMAS? (Source: own)

The results show that ISO 14000 is the most asked standard. Category “Yes” and “Nearly yes” is together 47 %. It means that ISO 14000 is not only a voluntary activity of CSR but it is a required standard from customers. In case of EMAS it is only near 10 % maybe because this standard is not so well-know in the Czech Republic and other reason can be the duplicity between ISO 14000 and EMAS.

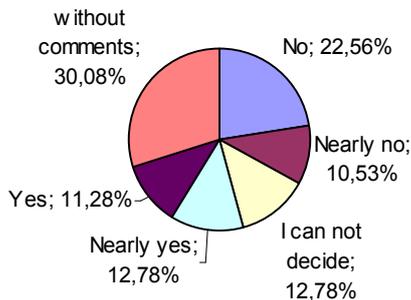


Fig. 5: Does the B2B customer require OHSAS 18001? (Source: own)

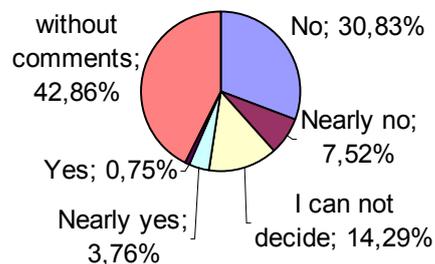


Fig. 6: Does the B2B customer require SA 8000? (Source: own)

Customer request of OHSAS 18001 was strictly in 11 % of companies and nearly yes in 13 % of cases. Together 24 % is quite enough. SA 8000 is asked together in 4,5 % of cases. Above that including the requirements for auditing and reporting AA 1000 reached the value near 6,8 %. It is more than SA 8000, it is interesting.

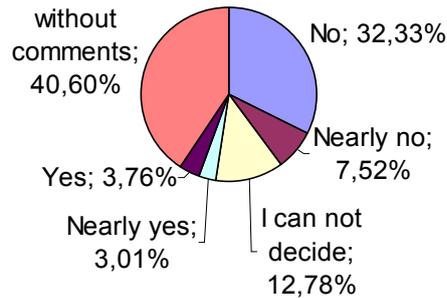


Fig. 7: Does the B2B customer require AA 1000? (Source: own)

There is seen at the graphs, that some of respondents did not answer the question. It can be caused by many reasons. Important is that the numbers of positive answers („Yes“ and „Nearly yes“) are not negligible values. Especially, if these are key customer requirements.

5. Conclusion

There was a series of researches aimed at identifying and demonstrating the benefits arising from CSR applications. Customer demand for corporate social responsibility can be reflected in customers' shopping preferences. E.g. in the Czech Republic the investigation (in the consumer market) showed that: "the willingness to pay a higher price for goods and services from a company that behaves as environmentally and socially responsible, has confirmed half of respondents (49 %), while a fifth of them expressed their categorical agreement." (Pavlů, D., Kalnická, V, 2002).

“Companies working strategically with CSR activities aimed at customers typically experience that:

- their major local or foreign corporate customers require or demand CSR,
- their public customers require or demand CSR,
- their end users choose products/services with a responsible profile,
- they can access new customer groups by having a responsible profile on products/services,
- they can access new customer groups by developing new products/services based on social responsibility.” (Ramboll Management & Companies Agency, 2006)

It is clear that the customer preferences are transferred from the consumer markets to B2B markets. “Many large businesses have visible CSR policies and make CSR demands of their suppliers. At the same time, small companies make demands of their suppliers to an increasing extent.”(Ramboll Management & Companies Agency, 2006)

It can be stated that as a result of an exemplary implementation of CSR into company can the company obtain a competitive advantage.

Thus, CSR can be considered as a separate concept, but it must be also seen as part of marketing or social marketing concept. That is why in certain market segments the CSR concept has a role of other marketing tool. Whatever the theory, the essential is

that the implementation of the CSR concept and social marketing approach leads to customer satisfaction and human society in general.

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THE HUMAN CAPITAL AS THE PRODUCTION FACTOR

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Abstract: *Economic growth is the objective of economic policies in many countries. View of what constitutes major production factors and sources of economic growth, historically evolved. In the past, there existed the combined production of various production inputs in different types of human society. The article discusses the importance of human capital and learning as a form of investment in human capital in the formation of production functions and the achievement of extensive and intensive economic growth.*

Keywords: *Human Capital, Economic Growth, Production Factors, Education.*

JEL Classification: *E22, E23, E24.*

1. Introduction

Growth of the total output of the economy - economic growth - is one of the main objectives of the economic policies of current governments. Economic growth is achieved by extensive or intensive use of production factors. *Extensive growth* is the result of increasing the quantity of used production factors. Basic factors of production are land, labour and capital. *Intensive economic growth* is caused by the increase in production per unit of input. This type of economic growth is influenced by the quality, efficiency and manner of combining production factors. There are extensive and intensive growth resources. Human capital is an important source of extensive and intensive growth, too. There are different opinions and different economic schools about importance of the human capital as economic input. Opinions on it are different in different economic schools depending on the conditions in which the economy worked, depending on the extent and level of processing available knowledge.

The article's aim is to summarize the evolution of views of the role of human capital as source of economic growth and to show the possibility of increasing its value in current economic conditions.

2. The Human Capital as Source of Economic Growth

Extensive economic growth is achieved by increasing the number of production factors. **The land** as production factor includes all components of the natural environment. This source is often used for marking natural sources, but some economists connected this factor with capital. It was the decisive factor of production to achieve growth, in the period before the Industrial Revolution. The most of the workforce is employed in agriculture in many developing countries, currently. If economic growth rate is too high, then there is the depletion of natural sources. For this reason, we are talking about sustainable growth not leading to their depletion.

The labour is another source of economic growth, which is achieved through the increase of labour force. It is influenced by demographic trends, amount of labour force, scientific and technical progress level, the social division of labour and labour productivity in various sectors. Present modern technologies require fully skilled workers for the operation and maintenance. Therefore it is necessary to increase the labour force qualification.

The capital is a rare resource. The term capital is very wide and capital as a source of economic growth includes buildings, machinery, equipment, technology. A prerequisite of capital accumulation is the creation of savings. Capital accumulation changes the ratio between production factors. At present, capital accumulation is increasingly directed to education and research. The economists demerged capital on physical and human capital in the 80-ies of the 20th century.

The human capital includes the natural ability, innate and acquired skills, knowledge, experience, talent, inventiveness. All these characteristics are components of the human capital. The essence of creation, increasing the value and effectiveness of human capital, is spending money now but expected benefits will flow in future. Forms of increasing the value of human capital are expenditure oriented for example to health, safety, science, research and education.

Intensive economic growth is reflected in the product increase in conjunct with unchanged inputs. The intensive growth factors include the technical progress and enhancement of the total factors productivity.

Technological progress is reflected by developing new and better capital goods and technologies. It is supported by large innovations. The application of technical progress requires the introduction of more modern and better management methods, work organization, career development, increasing education level of managers and workers who work with new technologies. Technological progress requires a rising level of education and research. But particularly highly skilled and educated people contribute to technical progress, through innovations. In this way, technological progress leads to increasing productivity and efficiency of all production factors.

Aggregate productivity growth occurs, when the product increases by effective use of inputs, with the same quantity of production factors. This is reflected in:

- labour productivity – increase in volume of the real product that created a employee,
- efficiency of capital growth – it is reflected in a higher volume of real product, which falls on the capital unit employed,
- decline in material and energy intensity of production - reducing the quantity of material and energy needed to produce a unit of product.

Determinants of aggregate productivity factors are: the level of work organization, technology, technical support, the level of education, motivation of employees to increase their performance, and also the natural and soil conditions. In the current period, which is characterized by rapid and extensive introduction of technical

innovations, education is the most important factor. It contributes to the technological progress, factors productivity growth, increasing value of the human capital and overall economic growth. New knowledge and skills must be adapted to current needs and possibilities of concrete firms and economies in an innovative and creative way. Economists Th. Schultz and E. Denison emphasized investments in education contribute to economic growth and its accelerating, already in the 50-ies and 60-ies of the 20th century.

3. The Human Capital in Production Functions

The views about which are the key factors of production, are not uniform and historically have gradually changed. This caused the forming of the same production functions, which included various combinations of production factors to achieve the desired output of the economy.

Neoclassical theories of economic growth (from 50-ies of the 20th century) examined economic increase in term of supply of production factors. They considered the capital and labour as the basic production factors. Theories accepted substitution of these factors and natural resources included into the capital. Those theories were based on the *general production function*:

$$Y = f(L, K),$$

and its advanced form, called *Cobb-Douglas production function*:

$$Y = A \cdot L^\alpha \cdot K^\beta$$

where:

- Y real product (Gross Domestic Product),
- L quantity of consumed workload,
- K quantity of consumed capital,
- A the influence of other, immeasurable factors,
- α, β labour and capital elasticity coefficient ($\alpha + \beta = 1$).

This production function was extended by American economist R. Solow by another growth factor - technological progress. He saw the technology as an autonomous ongoing at the time, thus as an exponential function in the time. Solow said the economy continuously increasing its savings rate, will have a higher level of production, but this economy will not achieve a consistently higher rate of economic growth. Permanent growth rate of production per unit of labour input depends on the rate of technological progress and not the savings rate. [7]

The recognition of technological progress as a new factor of economic growth means a qualitative change in the development of growth theories. Solow edited general shape of the production function as follows:

$$Y = f(L, K, t)$$

where:

- t technical changes as a function of time.

Following the introduction of neutral technical progress the form of production function can be developed - Cobb-Douglas function - modified:

$$Y = A \cdot L^\alpha \cdot K^\beta \cdot e^{rt}$$

where:

e^{rt} time factor, which reflects the influence of qualitative changes in production, including technological progress.

New theories of economic growth – theories of endogenous growth (80-ies and 90-ies of 20th century) brought further change. They divided the capital as a production factor and source of economic growth into physical and human capital. Physical capital is created by machinery and technical equipment. The human capital is characterized as the sum of the individual congenital and acquired skills, knowledge, experience of individuals. Endogenous growth theories can be divided into two basic groups.

The first group considers the most important factor of economic growth as a result of innovation, scientific research and development. The leaders of this group are P. Romer, G. Grossman.

According to the second group including R. Lucas, P. Romero, S. Rebelo, technical progress is related to investment in the human capital. Production function in endogenous theories of economic growth takes the form:

$$Y = A \cdot K$$

where:

Y real product (output) economy,

A coefficient reflecting the level of technique and technology,

K capital - including physical and human capital.

New growth theories also explain the paradoxical situation, where investment in physical capital without increasing the level of education of the population does not lead to economic growth. By contrast, investment in education and science, are ineffective if they exceed the absorptive capacity of the other production factors. [3]

N. G. Mankiw, D. Romer and D. R. Weil included in the original Solow model a new factor, human capital, in 90-ies of the 20th century, as follows:

$$Y = A \cdot L^\alpha \cdot K^{(1-\alpha-\beta)} \cdot H^\beta$$

where:

H human capital stock.

The importance of human capital for economic increase can be characterized in relation to the implementation of structural changes that contribute not only to quantitative, but mainly to qualitative changes in the development of society and its output.

4. The Combination of Production Factors from the Aspect of Society Historical Development

Structural changes caused, that at various stages of society development the importance and the combination of key production factors varied. If we look at the use of production factors in terms of historical development of society, then in the long term **agrarian society** considered the land as a key factor in combination with *heavy physical labour*.

Several millennia-long primacy of land was terminated by the industrial revolution in England in 1760 and this was the start of an **industrial society**. The *capital* - again in combination with the *physical labour* - was the most important production factor in this type of society. Industrial society included the development of mechanization, automation, introduction of new technologies and techniques leading to higher labour productivity and to economization the labour force.

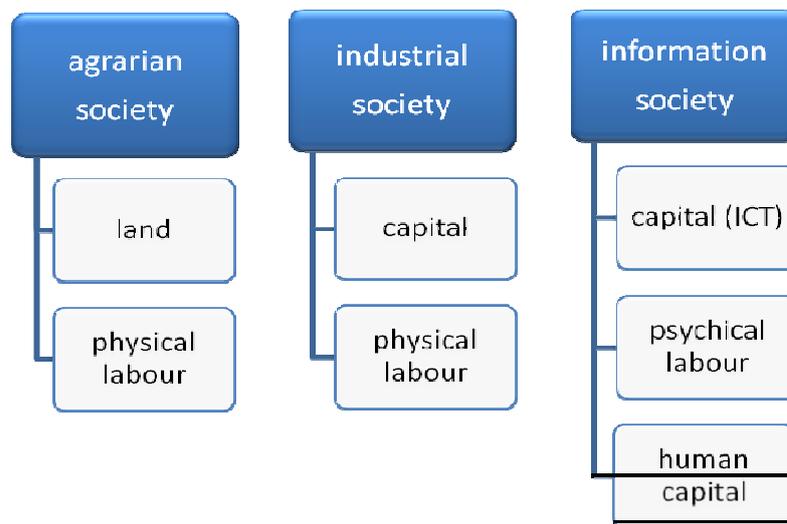


Fig. 1: The combination of key production factors from the aspect of historical development of human society

Source: (own design)

Industrial society was replaced by the **information society** (or post-industrial, knowledge society) in the U.S.A. in the 50-ies years of the 20th century. As a result of globalization and strong competition fight, important innovations, massive use of information and communication technologies (ICT) are very important in this type of human society.

Introduction of robotics increases the importance of *psychical labour* to the detriment of physical labour. The *human capital* began to be regarded as an important source of economic growth.

The basic prerequisite for the successful building an information society is a high level of education in economic subjects. Education is therefore crucial and from the perspective of ICT it has two levels. It is education in computer science. Here the education is the subject and object of science, too and the education is designed to prepare professionals in the field of informatics. The second plane is about education in other areas using the methods and means of informatics, when we talk about informatization of education.

5. Importance of Education for Economic Growth and for Increasing the Value of Human Capital

Education is the process of purposeful mediation, active creating and acquisition of knowledge, practical experience, creating of interest and attitudes. Education and training is currently considered as one of the major factors for recovery of economic growth and development, growth of welfare of individuals and international competitiveness.

Intensive technical development brings new discoveries, new and rapidly changing technology, a new focus on the technical level, quality of services based primarily on the customer and his needs.

New and dynamically changing market environment forces companies to maintain its competitiveness in order to constantly provide customers with exceptional value and creative search for ever new ways to create this value, how about it and how to inform their target market to provide. [1]

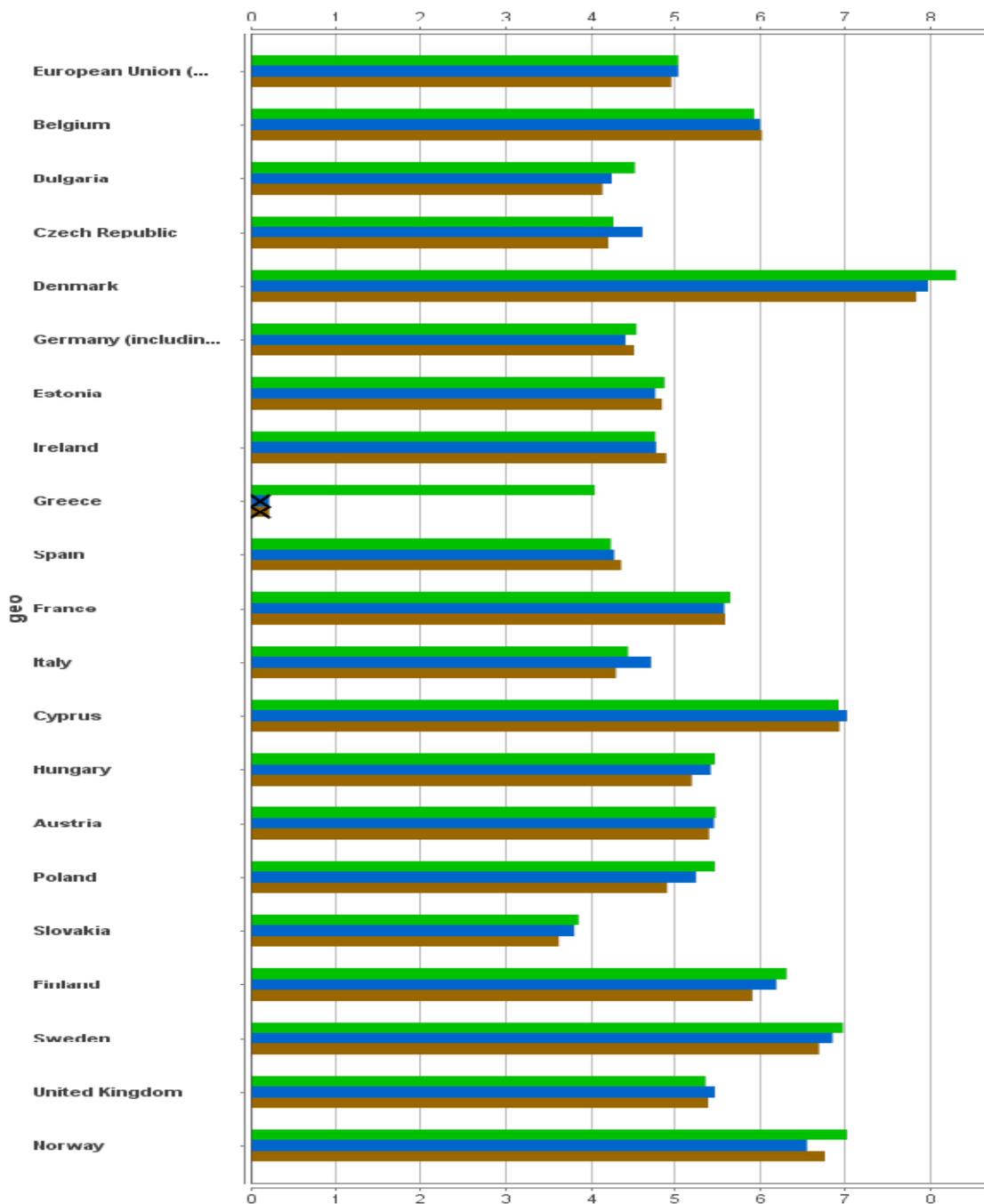
All this requires constant improvement and expansion of knowledge, skills, formation of professional skills of employees.

We know different **types of education**. *Formal education* is obtained, when the individual is not employed. It provides primary, secondary and higher education. *Informal education* acquire during employment. This may be general (exchangeable) or special (unalterable) education. General education is focused on the ability to obtain information, to understand and analyze it. Special training is aimed at creating a special qualification for a special type of work. Informal learning is considered a natural part of everyday life. It is not made deliberately.

Expenditure on education oriented to achieve, sustain and enhance the range of skills and abilities of people are considered to be **investments**, because they contribute to output growth in the future. Investments represent a form of increasing the value of human capital as one of the production factors. Investments allowing the creation of a strong and flexible labour force being able to respond flexibly and rapidly to changes are associated with the globalization process and the transition to an information society.

These conclusions are effectively applied in their economic policies, especially northern European countries, where public expenditure on education relative to GDP ranks among the highest in the world in the long term (Fig.2). Indicator (public expenditure/GDP * 100) value depends on the size of GDP. Fluctuation in GDP relativises the results obtained and also cause changes in the value of this indicator.

Level of public expenditure on education in Slovakia is low and it is below the average level of countries in European Union in the long run. Data in the graph do not include development in 2008-2009, but results will be likely substantially worse than in 2007 for most countries due to global economic crisis.



Greece published data only for 2005

Fig.2: Total public expenditure on education (percent of GDP) 2005-2007 in selected European countries

Source: (www.epp.eurostat.ec.europa.eu)

6. Conclusion

Knowledge-based society requires more and more expertise, and therefore it promotes lifelong education, improvement of scientific and research activities for continuous self-education and improving the quality of work skills and habits that bring a positive effect on economic performance. [5]

Changes in economic development today and in future will require increased investment in human capital, especially in education at all its levels. Therefore it is important to pay attention to education and lifelong learning of citizens. It is the best investment that activates the human and the whole nation. Economists of past and present economic schools emphasize just that.

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USABILITY AND FUNCTIONS OF THE PUBLIC ADMINISTRATION PORTALS IN THE EUROPEAN UNION COUNTRIES

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Abstract: *The following article is about the lives of the citizens in the European Union. The structure and functions of the current public administration portals in the European Union countries is described as a brief definition of the European public administration. Selected portals have undergone usability testing, which allowed gaining more detailed information about using the portals by their users.*

Keywords: *European Union, Public Administration, Portals of the Public Administration, Accessibility, Usability Testing, eGovernment.*

JEL Classification: *H11.*

1. Introduction

Portals of the public administration usually have a function of the information centre of the public administration or in the last years are also used as a communication point among the bodies of the public administration and the users of the services provided via the Internet. Thanks to 27 different members of the EU there are also many different portals. There is not only difference in kind and type of offered information and services, but also the structure of the whole portal varies. Besides official portals, which are administrated by the specialized bodies of the public administration of their own countries there are also unofficial portals, which deal with the problematic of the public administration or counselling and mediation of their services. Due to that some countries provide more than one official portal of the public administration, in respect of law, culture and political environment which are defined in the specific country.

The group of the users is wider and wider because of the free move of the people (of labour force), goods and services and also the capital within the EU. Therefore new requirements are needed for every portal. This article is about meaning, functions and structures of the public administration portals. In some selected portals their usability is also evaluated.

2. The public administration in the EU countries

Each public administration in each EU country has its own specifics, but the aim must be the same. This is mainly improvement in the quality of life of the citizens. The specifics must respect the rules of the permanent sustainable development and at the same time it must improve efficiency and quality of provided public services. On the basis of subsidiary principle there is a respect of each member state which has a possibility to improve its own system according to the particular needs of its citizens.

Moreover it is required to supply its own system effectively and reliably as the EU agreed in the relevant regulations. [1]

The main way leading towards improvement in competition of the integrated Europe in relationship towards other partners and also towards other competitors around the global planet is thought to be quality and efficient performance of the public administration. For this reason the current public administration must readjust requirements of newly created information society and use modern information and communication technologies. In the member states of the EU can be seen tendencies towards using information technologies in all parts of the administration, automation of the administrative operations and processes and improvement in communication and exchanging information between the state and its citizens. [2]

The big amount of the member states of the EU must have gone through most of the reforms of the public administration during the last years. Those are mainly states belonging to the former eastern block and the states with continental system of the public administration, where the central administration had much bigger power than the regional authority. Nevertheless, in all states democracy, decentralization and delegation of authority of the public activities have been transferred to lower regional or municipality administrations. These changes are also seen in the structures of the portals of the public administration when most of the information and services including their retrieval is carried out by segmentation to the lower regional public administrations. [3]

Moreover, the access towards the realization and operation of the public administration must have been reassessed because of the new problems which appeared. This is mainly connected to members of the national and ethnic groups who come to the EU from Turkey, north Africa, southeast Asia, but also from the states of former Soviet Union and some member EU states, such as Bulgaria and Romania. Therefore, the information must be accessible in many languages and there is the necessity to invest money into interpreters and set up specialized departments. The portals of the public administration must operate in multilingual mutations including documents for downloading. Some portals consists of specialized sections which are made for 'foreigners/immigrants'. Among other problems, which we have to take for granted, are problems about the environment, fight against spreading drugs, ensuring coequality between men and women, respect rights of disabled people etc. These problems are mainly solved by specialized sections, very often with cooperation in other portals and information resources. [1], [3]

3. Portals of the public administration, their importance and functions

The name of the portal is usually used for web presentation, which enables quick access to big amount of sorted and related information in one place. Other signs of these portals are regularly updated news, advice, documents for downloading, notices or archive messages and also different forms of information retrieval, which help to find the required information. Most of the portals today offer possibility to sign in and log in. Users are then allowed to access more information and additional services, such as sending news to the mobile phones or to emails etc. [3]

Portal could be defined as a gate or entrance point into the specific problematic. In case of the public administration portal, it is a gate leading towards information about the public administration and the life in the specific country.

Each country in the EU has a different attitude towards creating and carrying out their portals. Some countries are satisfied with a brief listing of basic information about the public administration, which are realized in the forms of references to the web presentations covering this problematic. Other countries offer regularly up dated information, contacts to the bodies of the public administration, advice, documents for downloading and electronic services. Differences could be also found in the names of the portals, where are also eGovernment portals, civic portals or governmental portals etc., not only portals of the public administration. We can often find portals which are only for the citizens and the businesses or strictly only for the bodies of the public administration. Unity can be found in the relation to the EU, its organs and their published information and portals of every member state. In the last years a trend has been to create portals of the public administration, which runs as an intersection of the existing portals of the public administration. This portal is usually in the centre of attention because it is more advantageous to promote one complex intersection than the network of the thematic portals, e.g. when entering via web browsers. [3]

Portals of every member state of the EU do not usually have unified structure and range of offered information and services. The similarities could be found in the portals of the countries with similar historical development and cultural tradition. As an example there are comparable portals of the Czech Republic and Slovakia or portals of Denmark and Sweden.

Portal with the name EUROPA has the EU. This portal is oriented on publishing basic information, news and different regulations, which are under the authority of the EU. In the browser environment Internet Explorer 8, it could be found on <http://europa.eu/> and is accessible in 23 language mutations. References to other portals of the public administration in each EU state, which are in forms Uniform Resource Locator (URL) mentioned in Appendix 1, were gained from the Portal of the public administration of the Czech Republic, in section 'Information about the EU', or were possibly added from the portal EU – EUROPA portal. Basic information about each state including references to the web presentation having function of the public administration portal could be found on this portal in the section about each member state of the EU.

The aim of these portals is mainly running of the public administration in every member state and also makes it easier to retrieve the offered services, duties and possibilities of communication with specific bodies of the public administration. Among the users of the portals are of course the citizens and the businesses of the state, then the citizens and the businesses of other member states of the EU and last but not least foreigners living in the specific state or those who want to visit it. Therefore, it is necessary to concern in their suggestions and offer the information accessed on these portals. [3]

Portals are integral parts of the eGovernment or the electronic public administration in each country and serve mainly as an information tool and intersection which has the

aim to increase knowledge about advantages of the electronic public administration, its offers and services.

4. Requirements for the portals of the public administration

To satisfy the users' requirements they must be thought in advance and the creators of the web presentations and the services must oblige it. The portals should be user-friendly; they should have logical structure of the website navigation and organization of the basic elements such as the name of the portal, main menu, switching into different language mutations, making the letters bigger or smaller, signing in to the specific services and help and search for information needed. Then they should be graphically interesting and should include connections via references. There should not be missed a description of the work with the page and feedback to the provider. To reach this the users should be invited to join this proposal. The users should participate actively at the beginning and during the development of the project mainly when it is connected to the user interface and the definition of the range of the offered services and information. [3], [5]

Web presentations are made and provided to the users. Therefore, it is necessary to make them easily accessible and user-friendly. Accessibility shows us the amount of the users with different knowledge and experience. The main aim is to ensure that the users will not be distracted by any problems and troubles while going through the presentation. There are many methodologies which specify principles of how to create the user-friendly web presentations. [5]

However, the portals of the public administration and other web presentations of the bodies of the public administration need different requirements than e.g. media portals and other thematic portals. The users expect better information value from the portals of the public administrations. There should not appear any advertisements which are not in any connections with carrying out the public administration. Graphics should be chosen suitably (very often the combination of national colours are used) and should not disturb the reader. Too many animations and advertisements make the work with the web presentation much slower and more confused. The first thing today is also the requirement for an interconnection among all the bodies of the web presentations which means that the references to other web sites should be highlighted. [3]

These requirements, when web presentations making, are preferred also by supra-national level (organs of the EU) as well as by every member state [3]:

- creating portals as intersections to other services and also as a complex centre for electronic services and communications among the bodies of the public administration,
- cross-border cooperation at regional level,
- multinational language mutations on the portals in respect of minorities living in the specific country,
- spreading offers of the electronic services and their interconnection,
- personalized services for the businesses as well as for the citizens,

- wider participation of the businesses already in the phase of choice and optimization of the services,
- users' segmentation according to their needs.

5. Usability and structure of the public administration portals

Usability of the web presentations shows us how easily and intuitively are the web pages used, how the users find the information needed and how they feel about their usage. Of course, it is necessary to know if the web pages are lucid and understandable; i.e. how user-friendly they are. Serviceable web pages are those where the users feel good and find everything they look for quickly. The most important factor is the level of website navigation on the web presentation. The main purpose of it is not to allow the user get lost in deeper search. Also the users must be able to do everything why they attended the page. The result of bad usability could be outflow of the web pages and in connection with it also financial loss.

For finding out all the failings and mistakes which might cause wrong usability of the web presentations there are different methods of testing and evaluating of the usability. Among the advantages of these methods is getting information about real usage of the product by the user including stimulating remarks used in the further development. Among the disadvantages is that the user interface should be prepared for testing and also the testing itself do not offer direct solution to the problem. [3]

According to this the testing of usability was carried out in the selected portals of the public administration in the member states of the EU. Reduction of the number of testing portals was necessary because of the language barrier (some portals are accessible only in the national language of the member state). Time and organization were the other reasons for reduction, because it was not possible to test all 27 portals. The conditions were set for these reasons for development into the main phase of testing and evaluating the usability. They were set in order to follow the language version of the portal and for its structure, configuration and accessibility of required information.

1. Is there an English version of the portal?
2. Is there segmentation according to the theme or life's problems? (in all language mutations)
3. Is it possible to get the required information from the home page without necessity to search for it? (e.g. by switching the bookmark or the role – in every language mutation)
4. Is there a possibility for searching? (in English version of the portal).

For the progress towards the main phase it was necessary for the portal to fulfil the first and the second condition and at the same time at least one of the other two conditions. These requirements were fulfilled by 15 portals of the public administration of the member states of the EU, such as Belgium, the Czech Republic, Estonia, Finland, France, Cyprus, Latvia, Hungary, Malta, Poland, Austria, Greece, Slovakia, Slovenia and the UK.

As the main criteria for the choice of the suitable testing method and evaluation of the usability were these criteria set:

1. minimal time demand of testing (including preparation and progress of the main testing, not processing of the results),
2. special equipment (method which did not need any special equipment – PC is thought to be the basic equipment),
3. recruit the participants (according to the high number of the tested portals it was necessary to recruit the sufficient number of them – it was expected that the portals would be divided into groups, i.e. that each group would need its own participants),
4. minimal knowledge and skills of the participants (basic knowledge of work with computers and searching on the internet, knowledge of English language etc.).

In respect of information above the testing method and evaluation of the usability was chosen as a method by questionnaire survey. Specifically, these methods were used [4]:

- Questionnaire for User Interface Satisfaction (QUIS) measuring overall satisfaction with the user interface. This method consists of questions divided into 5 groups: overall reaction to the software (website), which consists of 6 questions, screen (consists of 4 questions), terminology and system (website) information (6 questions), learning (6 questions) and system capabilities (5 questions). Each question is rated on a ten-point scale (from 0 to 9) with appropriate anchors at each end (e.g. overall reaction to the website: from terrible to wonderful).
- Nielsen's Attributes of Usability (NAU) – this usability test only has five questions that focus on the usability with the questions based on ability to learn, efficiency, ability to remember, errors (accuracy) and subjective satisfaction. The specific scale of the test ranges from bad to good with a rating starting from 1 (up to 7).
- After Scenario Questionnaire (ASQ) is a three-item questionnaire and consists of three questions in general: I am satisfied with the ease of completing the tasks in this scenario; I am satisfied with the amount of time it took to complete the tasks in this scenario and I am satisfied with the support information (online help, error messages, documentation) when completing the tasks. After participants finished a scenario, in this case it means questions of the methods QUIS and NAU, they completed the ASQ.

Because the methods require answers to the questions such as arrangement of the text on the page, order and speed of the pages in case of QUIS method or ability to learn and efficiency in case of NAU method, it was necessary to form a set of eight questions, which were carried out by the evaluators before testing. The aim of these questions was obvious. It should have enabled the evaluators to try each function part of the portals and get to know the environment which were to evaluate.

At the set of eight questions for each portal the overall time for their filling and its rate was studied (there were 3 possibilities – answer YES or YES, but after a longer time or NO). The results of testing for the questions QUIS, NAU and ASQ are shown in Tab. 1, where the numbers in the first line mean:

1. QUIS – overall reaction to the software (website),
2. QUIS – screen,
3. QUIS – terminology and system (website) information,
4. QUIS – learning,
5. QUIS – system capabilities,
6. NAU – ability to learn,
7. NAU – efficiency,
8. NAU – ability to remember,
9. NAU – errors (accuracy),
10. NAU – subjective satisfaction,
11. ASQ – I am satisfied with the ease of completing the tasks in this scenario in general,
12. ASQ – I am satisfied with the amount of time it took to complete the tasks in this scenario in general,
13. ASQ – I am satisfied with the information support (online help, error messages, documentation) when completing the tasks, in general.

Values in Tab. 1 are in forms of average values as they were gained from the participants testing the specific portal. There were 125 evaluators altogether, but each of them could test only 3 portals due to the time consuming procedure, i.e. each portal was tested by 25 evaluators.

Tab. 1: Results of usability testing with methods QUIS, NAU and ASQ.

	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Austria</i>	7,24	7,11	6,22	6,12	7,65	5,32	4,24	4,98	5,28	5,76	4,32	4,88	3,64
<i>Belgium</i>	5,84	6,77	5,58	6,91	6,74	4,92	3,88	4,85	5,16	5,28	4,36	4,60	3,52
<i>Cyprus</i>	4,28	4,82	3,84	3,34	3,12	3,08	2,96	3,02	2,96	2,76	2,72	2,64	2,96
<i>CZ</i>	6,14	6,65	6,33	7,61	6,12	5,04	4,04	5,14	5,52	5,16	4,08	4,68	3,72
<i>Estonia</i>	5,75	6,33	6,12	7,20	6,23	4,84	3,96	4,72	4,96	4,92	4,56	4,76	3,84
<i>Finland</i>	7,03	7,56	6,43	7,34	6,88	5,36	4,12	5,09	5,20	5,60	4,48	4,92	3,68
<i>France</i>	4,74	5,42	3,45	4,71	3,34	2,88	3,16	3,22	3,12	2,88	3,04	2,88	3,24
<i>Greece</i>	5,12	5,68	4,91	5,24	4,94	3,96	3,44	3,78	3,36	4,52	3,68	3,60	3,20
<i>Hungary</i>	5,44	5,95	4,91	5,48	4,95	4,16	3,36	4,14	3,76	3,76	4,12	4,16	3,56
<i>Latvia</i>	5,71	6,35	5,44	6,19	4,82	4,24	3,24	3,95	3,68	3,52	4,16	4,32	3,48
<i>Malta</i>	4,91	5,45	4,24	4,11	4,98	3,20	3,04	3,36	3,04	3,16	3,96	2,92	3,08
<i>Poland</i>	5,29	6,12	5,12	5,56	4,83	4,16	3,52	3,67	3,56	4,24	3,64	3,36	2,88
<i>Slovakia</i>	6,03	5,82	6,08	5,34	4,72	4,24	3,68	4,22	3,44	4,68	3,80	3,52	3,68
<i>Slovenia</i>	5,26	6,08	5,82	6,11	5,28	3,84	3,24	4,16	2,96	4,32	3,88	4,12	3,44
<i>UK</i>	5,69	5,92	5,44	5,82	4,54	3,68	3,36	4,01	3,08	4,24	3,80	4,04	3,12

Source: [3]

Calculation of the final value was worked out the way that the evaluator chose one number of the interval, e.g. at 10. NAU – subjective satisfaction, choice from ‘bad’ for 1 point to ‘good’ for 7 points. These points were then added for each portal and divided by number of the evaluators of this portal. The formula could be this:

$$\bar{o}_k = \frac{1}{n} \sum_{i=1}^n o_{ik}$$

where ‘k’ is a number of questions studied at one portal (k=1,...,35) and ‘n’ is a number of evaluators for each portal (n = 1,...,25).

Only for better lucidity of the table the questions of QUIS method (1-5) were transformed using the arithmetical average into 5 groups (as they are defined by the method itself), i.e. in case 1 QUIS – overall reaction on the web presentation, which consists of 6 questions, all average values were added and divided by number of questions. Nevertheless, there were 35 questions of all methods altogether.

Except questions of QUIS, NAU and ASQ methods at the portals were also studied other attributes such as average time needed for testing or average mark for the portal (further information in [3]). The data matrix was formed from all gained data; the standardization and correlation were carried out (in order to eliminate dependent attributes which were taken away afterwards). Also the number of clusters was determined by using the neuron networks and at last the clustering was set using the algorithm K-Means. The results of the clustering including the division of the state into groups and their common features are shown in Tab. 2.

Tab. 2: Results of the clustering.

Cluster	Country	Common features
Cluster 1	Austria, Belgium, CZ, Estonia, Finland.	<ul style="list-style-type: none"> • The group is quite compact, only an average time needed for the testing of the portal, the CR is different, • high average point of evaluation, • lucid structure and arrangement of information and the portal itself, • modern design and function, • satisfaction with demandingness of tasks fulfilling, • satisfaction with information support when tasks fulfilling, • very good average mark.
Cluster 2	Cyprus, France, Malta.	<ul style="list-style-type: none"> • Bad searching for information, • confused structure and arrangement of information, • discontent with demandingness of tasks fulfilling, • discontent with information support when tasks fulfilling, • long average time for testing, • very bad average mark.
Cluster	Country	Common features
Cluster 3	Greece, Poland, Slovakia.	<ul style="list-style-type: none"> • Long average time for testing, • but good searching for information on the portal, • lucid structure and arrangement of information (except Greece, which reached subnormal results), • mild discontent with time demandingness when tasks fulfilling, • in Poland also discontent with information support when tasks fulfilling.
Cluster 4	Hungary, Latvia, Slovenia, UK.	<ul style="list-style-type: none"> • Long average testing time of one portal, • good graphics and design, • lucid structure and arrangement of information and the portal itself, • satisfaction with demandingness when tasks fulfilling, • easy searching for information, • bad average mark.

Source: [3]

Except above information the main common features could be defined in the selected portals of the public administration in general:

- menu could be found in top part or at the sides, it causes the important role while searching for information,
- national colours of the portals are preferred and also there are usually state symbols,
- most of the portals are available in other language mutations, most often in English version,
- on home page references could be found connected to a brief political, historical and cultural description of the specific state, mainly according to the public administration and administrative structures – for each region and municipality there is usually its own portal,
- interactive maps with wide range of functions – maps are usually divided into the administrative regions of the country,
- current news and terms of the public administration, calendar with the important terms – e.g. tax payments, requirements etc.,
- references to the official web presentations of the president, the government, the ministries and other bodies of the public administration,
- information division according to interest groups – mainly the basic segmentation for the citizens, the businesses and the bodies of the public administration; another division is into groups like – children, youth, workforce, retired people, people with disabilities etc.; the information are also for immigrants, tourists, minorities etc.
- various coloured sections of each role – for the citizens versus the businesses,
- thematic information sections – family, law, education, tax, health etc.
- life's problems – help with solving problems including the contacts to the relevant bodies,
- references to the EU institutions or references to the portals of the public administration in other EU member states,
- there are not advertisements which would not connect the public administration sphere or presentations of the countries,
- possibility of sign in and using electronic services, documents for downloading or references to web presentations which offer them,
- sections for registered and non-registered users and information offered to them with emphasis on secure communication – e.g. digital certificates,
- social networks as one of the possibilities of communication with the users, but also for better knowledge about functions of the public administration and offered services.

In some selected portals of the public administration there could be identified some mistakes in the usability according to the results of testing and evaluation of the usability:

- Different structure and arrangement of information in other language mutations – some sections are completely missing; names of the sections are translated

into the chosen language, but the information inside is not. It is seen on the portals of Belgium, the Czech Republic, France, Latvia, Hungary, Austria, Greece, Slovenia and the UK.

- Plain icons for switching languages and signing in on the portals – the portals of the Czech Republic, Cyprus and Malta.
- Missing reference to home page – logo of the pages is not connected to the home page – the portals of Finland and Hungary.
- Inconveniently chosen form of the website navigation or its placement – the portal of Cyprus.
- Importance of the single objects on the pages is not enough visually distinguished – usually the type size and icons - the portals of Cyprus, Hungary and Greece.
- Inconveniently chosen graphics – colours should not be highlighted too much and go beyond the information value of the web presentation – the portals of Estonia and France.
- Inconveniently placed or plain menu – the portals of Belgium, Cyprus, Hungary, Malta and Greece.
- Badly signposted and inconveniently placed window for searching – the portals of Cyprus, Latvia, Poland and Greece.

The most mistakes in the usability were found on the portal of the public administration of Cyprus, where the portal was inconveniently placed into the space of the browser. For most of the information it was necessary to roll up and down the page because at the top part of the portal there are placed references to other web presentations and on the sides there is a free space. There is also not very good website navigation when entering the section Family, Education, Workforce etc., because a confused collage of pictures appears there. The type size is not possible to enlarge, the window for searching is placed at the bottom of the page and the portal is very confused and user unfriendly in general.

6. Conclusion

In the field of the usability most of the tested portals of the public administration is on a very high level. Evaluated portals are mainly lucid, the information retrieval is not time consuming although the portals are not without mistakes.

Failings are in general about missing language alternatives on the portals which are accessible only in the national language of the state. The other often problem is the minimum information in other language mutations (mainly in English) where there is not many information translated compared to the national language version. Among other mistakes could be included plain icons, type size and marking the sections of the portal. However, the main advantage is information support when working with and searching on the portal, i.e. help, map of the pages and other advice or help making the users' work easier.

The portals of the public administration have had an important role nowadays as a main tool of the public administration in the field of the Internet. During the project and functions of these portals it is necessary to think in advance the specific demands of the users as well as possibilities of communication and exchanging information between the bodies of the public administration on one side and the users on the other. The main emphasis in the EU has been nowadays put on cross-border cooperation and information exchange among the EU member states.

Acknowledgement

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Appendix 1: List of the public administration portals in the EU countries.

Member state	URL of the portal
Austria	http://www.help.gv.at/
Belgium	http://www.belgium.be/
Bulgaria	http://www.government.bg/
Cyprus	http://www.cyprus.gov.cy/
Czech Republic	http://portal.gov.cz/
Denmark	http://www.borger.dk/
Estonia	http://www.eesti.ee/
Finland	http://www.suomi.fi/
France	http://www.service-public.fr/
Germany	http://www.bund.de/
Greece	http://www.ermis.gov.gr/
Hungary	http://magyarorszag.hu/
Ireland	http://www.gov.ie/
Italy	http://www.italia.gov.it/
Latvia	http://www.latvija.lv/
Lithuania	http://www.epaslaugos.lt/
Luxembourg	http://www.guichet.public.lu/
Malta	http://www.gov.mt/
Netherlands	http://www.rijksoverheid.nl/
Poland	http://www.poland.pl/
Portugal	http://www.portaldocidadao.pt/
Romania	http://www.e-guvernare.ro/
Slovakia	http://portal.gov.sk/
Slovenia	http://e-uprava.gov.si/
Spain	http://www.060.es/
Sweden	http://sweden.gov.se/
United Kingdom	http://www.direct.gov.uk/

Source: [3]

POSSIBILITIES FOR THE PUBLIC SERVICE INNOVATIONS

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***Abstract:** Innovating as a process expressing a certain change is a constant driving force behind the development and advance of an organization. New Public Management and the concept of Good Governance have brought methods of effective public service built on sustainable economic and social development. These two concepts, however, face difficulties in relation to management ethics. That is why a scope for further innovations of the paradigm of governing increases by the level of ethics.*

***Keywords:** Innovations, Public Service, Public Management, Ethics.*

***JEL Classification:** H70, H700.*

1. Introduction

In the Czech Republic, after major restructuring and reforming of the public sector in the nineties, efforts at more significant functional changes of the public service have begun to occur. Based on the changes, not only the question connected to efficiency of its actions gains ground, but also the ethical concept, which reflects quality of the public service administration.

The text deals with the question of development of modern public service management. It is based on innovations as a basic principle of organization improvement. It stems from the analysis of two basic concepts of public service management and their instruments and methods that are instrumental to the application of set goals and functions. By comparing to the results from practice, it tries to find out the real situation. On this basis, it will propose new visions for innovations of the basic paradigm of public service management. The aim is to demonstrate possible ways of public service innovations by means of application of the management ethics model.

2. Ways for innovation management

Innovation is a process expressing a certain change; an application of new innovating systems whose aim is an improvement. Innovations can take place in different forms. Tidd et al. differ *four broad categories (the 4Ps of innovation): Product innovation – changes in the things (products/services) which an organization offers. Process innovation – changes in the ways in which they are created and delivered. Position innovation – changes in the context in which the product/services are introduced. Paradigm innovation – changes in the underlying mental models which frame what the organization does.* [5]

While implementing changes, it is necessary to take both internal and external environments into account. In the context of public service we will assume a more continuous way of improvement; a situation in which an innovation is a manifestation

of continuous changes and a gradual transformation. A sudden change is not a common phenomenon in this field. This fact is, to a great extent, given by the principle of the public sphere. The public service is primarily characterized by a higher level of institutionalization of organization, which is complemented by close ties to the law while performing individual actions. Rigidity rate of the processes in the public service and in the self government is different. In the case of self-governing actions there is a looser operational range, in contrast to the public service which is more bound to legislative standards. In comparison to the private sector, there are stricter legal limits in both cases. Also the operational range of exercising the public services and self-government itself is given by the law. In this respect, the possibilities to innovate the public service management are limited.

3. Transformation of goals and functions

The point of the public service is mostly seen in general goals of improving the quality of citizens' lives, represented by providing quality public services. Specific goals and functions of organizations in the public service are given by the public interest that is aggregated and transmitted to the system mainly via political actors. One of the main instruments is legislation and legislative norms that subsequently define an operational range of the public service. Wright and Nemec set three basic areas that are characteristic of the public service management. *Public organizations act on the basis of politically defined needs; they exist in different legal surroundings and the profit activity motive based on efficiency measuring is absent.* [6] If we take Tidde's scale into account, then for product innovations that are offered to citizens, through processes by which they are distributed and the position to which they are introduced, there are currently many instruments. However the basis is a given paradigm, a certain concept that determines the direction of the public service. The paradigm represents a certain coherent position to the primary functions and goals that it should accomplish.

The change of the modern management concept of the public service was apparent in the model of New Public Management (NPM). The purpose was to offer an alternative possibility of management, focused on efficiency, ideas of citizens as customers and consequent orientation on the public services as a product, emphasized by the responsibility of the manager for the profit, meaning practices resembling market behavior with strong elements of competition. What also served this were the used methods such as delegation of competences, budget procedures, controlling human resources, controlling, benchmarking etc. The drawbacks of this management model lie mainly in excessive orientation on the market way of competition, emphasis on an individual, not a team, economic tasks or selected methods of efficiency measuring.

Solution to the drawbacks of the New Public Management has brought the concept of Good Governance that is no longer so closely oriented on economic efficiency. A client is not perceived as a consumer but more as a citizen. The principle of the reformation of the government paradigm was the necessity to respond more to the question of civil rights, transparency and responsibility. Generally this paradigm is

defined as a group of requirements which lead to such conditions of modern public service functioning, that come out from the Charter of Fundamental Rights and Freedoms. In Council of Europe documents, concretely in Code of Good Governance are defined eight rules, which should be fulfilled by public sector. Generally this paradigm is defined as group of requirements which lead to such conditions of modern public service functioning, that comes out from the Charter of Fundamental Rights and Freedoms. In Council of Europe documents, concretely in Code of Good Governance are defined eight rules, which should be fulfilled by public sector. There are these principles: legitimacy, coequality, impartialness, proportionality, legal certainty, acting in appropriate time period, participation and respect for privacy finally.

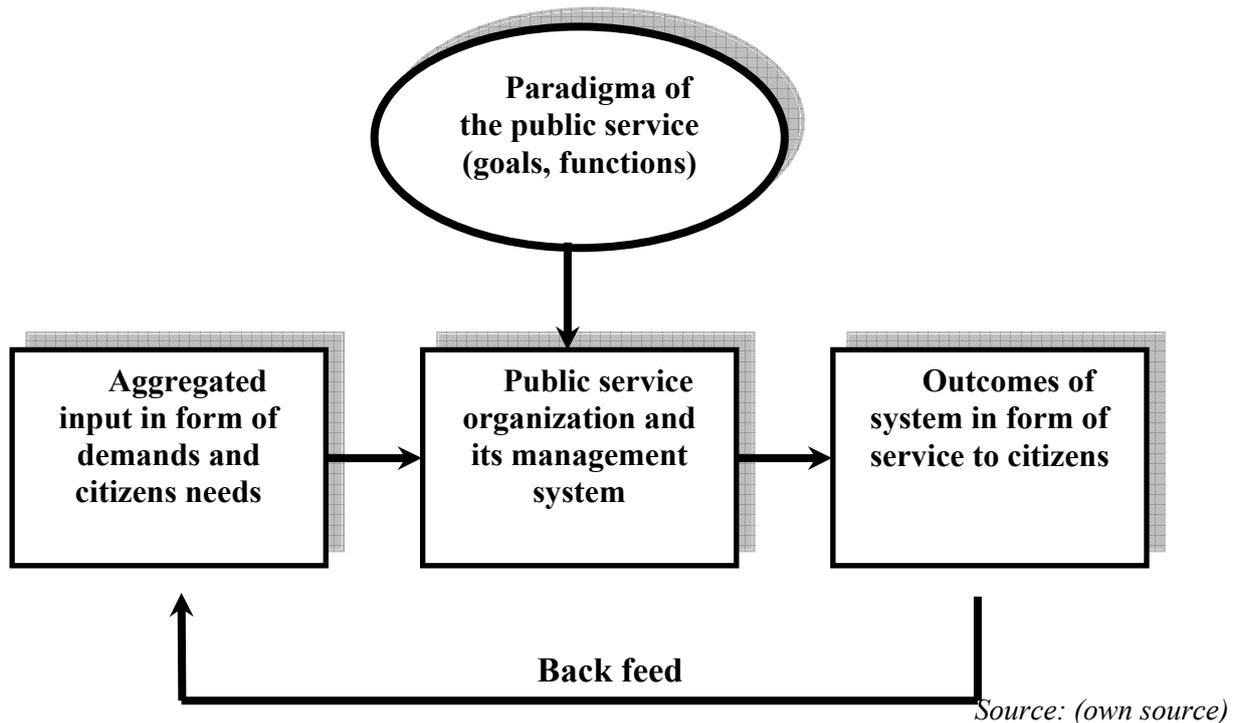
Complementing the efficiency-orientation of the public service management with the question of democratic character helped reached a fundamental advance. Effective providing of public services, built on a permanent economic and social development is a good direction for the public service. Reinforcement of control mechanisms, restructuring of public service organization and better engagement of the citizens represent positive steps.

4. Scope for a new paradigma of the public service management

The development of new paradigms of public service management so far has gone in two directions built on an organizational reconstruction. This should be followed by another level of progress represented by ethics application. The ethical dimension of public affairs management should represent another base for progress in public management. Steps such as engaging citizens in decision-making, better transparency, fair and impartial behavior, adherence to legislature etc. form supporting processes in terms of ethics application. In the public service, there is a space for maximum application of ethics especially in connection with decision-making. The leading role is played by authority management that applies general patterns of management algorithm also in the area of public service. The difference lies in the view of the owner of the organization. The public sphere does not conform to the demand of a private owner but to the public interest that is defined differently. Here ethics represent a possible viewpoint of performance efficiency.

Public Service isn't an isolated system. It is closely related to its surroundings without which it couldn't exist. Thus, a manager has to take his surroundings into account and has to control his organization in connection with the surroundings. This establishes a need for responsible management focused on quality management, development in ethical approach, therefore, in general, application of management ethics system that will be the basic method of application of ethical governance concept.

Fig. 1: Systematic model of the public service



5. Current management methods

Application of modern management methods fully taken from the private sector, modified or specially designed for the public service represents a way to management improvement in this sector. It is a reaction to the changes happening in connection to the reformation after the year 1989. Modifications in management style are to help improve the quality and efficiency of performance, support democratic principles and orient on the citizens' satisfaction. We can summarize the most used methods according to a certain range, areas on which they are focused. There is a wide range of methods; the following list represents a summary of the most used ones.

Strategic management represents a basic method of management prospects creation and organization direction. The goal of strategic management and planning is the creation of medium-term and long-term visions. It expects the creation of an environment for fulfilling the functions and goals including optimizing the sources usage and development. The purpose of strategy is operating in the long-term horizon. Suitable supplement of strategic planning is **Balanced Scorecard**. BSC serves to strategic planning by means of balanced indicators. Efficiency of organization is valued by the help of combination of financial and non-financial indicators. It helps assess the results of activity of the organization in a more complex way.

ISO norms introduce a system of organization management according to a specific type (9001, 14 001, 27 001 etc.). It deals with management systems focused on effective functioning and prevention. What is used the most in the public sector is the management of quality. To a certain extent, the **Total Quality Management**, also called the most complex quality system, is a superstructure of ISO 9001.

A range of next methods is built on learning, searching for optimal processes by the help of analysis of the inner and outer surroundings. **The method of a learning organization** is based on the system in which all parts of an organization take part in the identification and dealing with troubles. By this, a continuous improvement is achieved. **Benchmarking** represents a way of comparing to the others. The point is to find a good practice from the experience of more parties, determine a standard and then applying it in general. They are confronted according to selected characteristic of a corresponding organization which is usable in the public sector with respect to its nature. **The CAF model** or Common Assessment Framework was created for the purpose of the public sector. It is expected that the rising results of efficiency of the organization in the area of relationships with citizens are achieved by self classification. The principle lies in management efficiency assessment and searching for organizational causes whose goal is an improvement. Another source of self classification is, for instance, the model of excellence **EFQM**.

Budget procedure's goal is to form a budget system that spends resources that an organization has in the most effective way. The budget can be stamped as a certain financial instrument of organization management. It is a short-term instrument because the budget is, in principle, put together for one calendar year. Also, more long-term budget prospects apply but they are not so tight and they more often represent hypothesis.

Controlling is a broad concept whose sense is to regulate the course of an organization. The control is focused more on the organization as a whole, emphasizing the strategic level.

In practice, all the above mentioned methods are applied. Many institutions utilize their combination and mutual combination. Application of individual methods without conceptual frame is not pragmatic and does not offer appropriate result. The management system is a complex process that consists of certain advancement. In decision-making, it is necessary to pay attention to inner and outer surroundings, to understand a given problem in context of the whole society and a task of an organization in it, and according to these findings use a suitable combination of methods.

6. Management ethics – a new way of public service management

The task of the public service management is not only the orientation on institutional action results. It also has an essential function of creating the social surroundings and its cultivation. This fact is also supported by the transition from NPM to the Good Government concept. However, the foreshadowed development is not yet finished. Innovations are, above all, dependant on knowledge. It is a process of creation of new possibilities based on acquired knowledge and experience. The principle of the proposed paradigm transition is built on acquired knowledge oriented to the necessity for establishment of an ethical dimension of society functioning, as a means of tenability. All organizations, and above all the public ones, should lay stress on non-economic values in management. Because as Dytrt and Striteska show: *Practical application of ethics in management positively affects the forms and methods*

of managing events, which creates the internal structure of public organizations. Unilateral management objectives, as well as unilateral non-complex decisions do not have only the impact of an economic nature in the end. [2]

What is extremely important while managing any type of an organization are the indicators. This, however, doesn't mean that only quantitative and financially measurable indicators have to be used. By using the balance model of qualitative and quantitative indicators, optimal functioning of an organization, also with respect to the non-measurable values, can be achieved. *The goal is to apply an efficiency measuring system that moves away from the financial measures and is oriented to creation of values. So called non-financial indicators represent an area suitable for providing the public service efficiency performance whose function is not a creation of profit. Non financial indicators are indicators of fulfillment of strategic goals of the public service. [2]*

Currently the used public sphere management methods are not directly concentrated on the area of ethics. However, they can be used for its application in real circumstances. What is important, though, is the general dimension that opens the question of ethics and prepares ground for its practical application. That is the reason why it is necessary to struggle for further development of the public service management paradigm. A manager in the public sector needs not only effective methods but he is also bound by general goals and function of the public service.

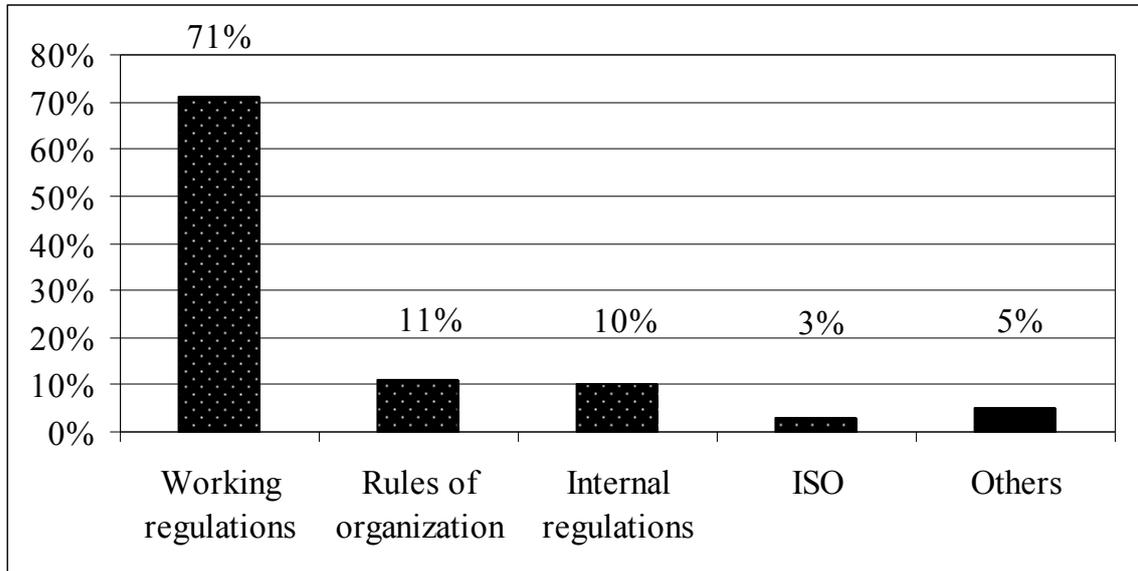
Public service management should therefore be built on strategic decision-making and should be oriented to the long-term goals fulfillment. Application of ethics is a complex, forward-looking process. It has to be applied systematically. It is an essential prerequisite of a long-term and effective organization functioning. *. Business ethics-driven object leads to economic efficiency. Business ethics and long-term economic effectiveness are commonly manifested in the final goal as the culture of the organization. [2]*

The transition in the paradigm and the importance of applying the management ethics system is evident in current practice. The research of town authorities⁴ shows that an overwhelming majority of managers consider current ways of ethics application sufficient, and they use unsatisfactory instruments. The instrument of ethical codex of employees was applied only in 22 % of cases out of all respondents. What is striking is that 72 % of respondents do not miss any further instruments for ethics application in the process of public service management. For a half of the polled in this group, a sufficient instrument for ethics application is the current legislation. Even though the task of legal norms is not to directly apply ethical questions that are connected with a general conceptual dimension. According to Dolista and Ježek, *the law cannot provide a detailed answer for every question. This is where a space for ethics occurs. [1]* The remaining half sees the working regulations, rules of

⁴ Source: Own research – questionnaire form of research. Research was addressed to 583 towns in Czech Republic with more than 2 500 inhabitants. Answers sent 179 respondents, i.e. 30, 70 %.

organization, internal regulations of authorities and ISO norms as appropriate supplemental instruments.

Fig. 2: A diagram of instruments frequency



Source: (own source)

It would be useful to present a comprehensive concept of management mechanism built on an expansion and elaboration of the existing public service concept.

7. Conclusion

The same way in which it was proven that NPM is not an ideal concept of the public service, a similar development is beginning to occur also in Good Governance. Companies suffer from a deficit of ethical environment. Current schemes for the public service management do not provide adequate instruments for ethics application to the management system. As it was pointed out, the used methods are concentrated on different goals and values, which are, to a certain extent, caused by the defined function of the public service. Therefore, there is a broad space for innovations built on changes in the underlying mental models. If there is an alteration to the paradigm, it is possible to use the currently introduced methods in the appropriate manner.

However, as it was emphasized, management ethics has to be applied as a complex system built on transparent functions and goals. From this point of view, it is necessary to develop the mechanisms of an appropriate application dimension to the management environment providing the brought changes.

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THE NETWORK APPROACH OF INTERNATIONALIZATION – STUDY CASE OF SME SEGMENT

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Abstract: *The current development of the World economy depends on simultaneous integration and globalization tendencies. Small and medium enterprises (SME) play an important role in this process. SME form an essential source of economic growth, dynamics and flexibility as well for the advanced industrialized countries as in the emergent economies. It is of great interest to examine how a contemporary small and medium-sized enterprises deals with its international activities and operations. We have determinate the main goal of submitted paper. The attention is devoted to the examples to describe the role of relationships and networks in the business activities and internationalization processes.*

Keywords: *Internationalization, Small and Medium Sized Enterprises, Business, Network.*

JEL Classification: *L26, F23, M16.*

1 Introduction

The small and medium sized business sector is identified as the prime vehicle for economic development of developed as well as developing countries. Further, this sector is a major source of employment, revenue generation, innovation and technological advancement. In most of the countries in the world, the level of economic dependence on small and medium enterprises has increased in recent years. Since, it has been becoming most important asset of the economy and the level of the economic depend on SMEs is increasing day by day.

Increasingly, small and medium sized enterprises are confronted with international competition and are forced to play a role in international markets. The internal market of the European Union, e-commerce, and other institutional changes are gradually shifting the behavioral pattern within the Slovak SME sector (Mura, 2010). We know that the creation of business networks is becoming important in the internationalization process. The number of small and medium enterprises operating on international markets has been growing, and simultaneously the process of internationalisation has been accelerating.

The changing business environment creates new opportunities and incentives for SMEs to internationalize. On the one hand, trade liberalization opens up new opportunities. On the other hand, it also confronts domestic enterprises with the threat of international competition. SMEs are increasingly facing foreign competition and need to respond to these changes of their strategic environment. This not only implies adjusting their domestic strategy, but increasingly forces enterprises to go abroad.

The process of globalization influences the development of countries as well as that regions. Due to the increasing competition in the business world the issue of internationalization has become apparent to most firm regardless of size and maturity. Companies operating at international markets are changing their strategies and altering their organizational structures. A key element of the internationalisation process concerns „where“ an organization chooses to do business outside its country. Many enterprises conduct an incomplete analysis of potential markets. This is due, in part, to a lack of awareness regarding global demographic. The internationalization can be perceived as a part of the ongoing strategy process of most business enterprises, presented (Andersen, Buvik, 2000). The internationalization process effects the creation of business network. According to (Elo, 2005) business networks represents arenas of networking. The complex nature of business networks makes it difficult to classify and compare them.

In presented paper, the attention is devoted to issues of the network approach of internationalization in SME segment, to describe the role of relationships and networks in the business activities of small and medium enterprises and internationalization processes.

2. Materials and methods

The purpose of the study is to analyse the theoretical and practical adaptation how the small and medium enterprises internationalize by using a business network approach and to analyse how a firm's network influences the internationalization process. We were used the logic – cognition methods, as an analysis, synthesis and comparison. The interesting questions from the research objective are the following: to understand firm's internationalisation by analysing of the focal enterprise and to describe the evolution of business network during the internationalisation process of enterprise. The characteristics of the traditional approaches – systematic and non – systematic are examined and compared with a relationship approach.

3. Results and discussion

Membership of clusters and networks can enhance the productivity, rate of innovation and competitive performance of enterprises. Business networks can allow small enterprises to combine advantages of small scale with various of the benefits of large scale. Public policy on clusters and networks can help SMEs realise the opportunities and meet the challenges associated with globalisation.

In summary a partnership should be characterized by involvement along the lines of activities, resources and individuals. A partnership is one relationship management strategy – a strategy among others – with the ultimate aim of doing profitable business. The logic of partnership is that working together, cooperating, being interdependent and creating and exploiting interdependencies with a business partner is means to do profitable business in the long run.

According to (Elo, 2005) is the business network explains a set of two or more connected business relationships. Two connected relationships of interest can

themselves be both directly and indirectly connected with other relationships that have some bearing of them, as part of a larger business network. There are three essential elements of business networks – activities, resources and actors. In total, the business networks represent area of networking. The complex nature of business networks makes it difficult to classify and compare them. There are differing viewpoints on the different types of networks:

- industrial networks – consist of relationships. From the viewpoint of theory, the relationships are also called dyads – the existence of the secondary functions means that they also are parts of networks,
- social networks,
- networks – can be seen as market, groupings of firms or organizations,
- networks – can be of a diffuse character, representing new forms of organization,
- networks – can be categorized as :
 - vertical networks are co – operative relationships between suppliers, producers and buyers aiming at the a solution of marketing problems, improved production efficiency or exploitation of market opportunities. Subcontracting relationships are also considered as networks.
 - horizontal networks – often include co-operation among competitors, they may be partially competitive and partially co – operative i.e. co – opetitive networks. (Ghuri et al. 2003) define horizontal network as co – operative network relationships among manufacturers that want to solve a common marketing problem, improve production efficiency or exploit a market opportunity through resource mobilization and sharing. Export grouping nets are a good example of such networks.
- networks – are of an increasingly non – domestic character. They overcome borders and regions,
- cross cultural business networks.

According to (Mura, Gašparíková, 2010) and (Šúbertová, 2010), the development of networks was very speedy. The business chains from the standpoint of this study have own hinterland and support in the managerial accesses, including:

- “just in time” – JIT
- “total quality management” – TQM
- “supply chain management” – SCM
- “customer relationships management” – CRM
- “business process reengineering” – BPR

In accordance with other authors we argue that the networks have “common ground” and “core firm”. Position in a business net is defined by the characteristics of the company’s relationships and the benefits and commitments that arise from them. Network effect is an impact, including effects in the relationships, effects on the relationships, effects on a portfolio and effects on a network. Interconnectedness in business context emphasizes that each enterprise is dependent on resources controlled by other enterprises. Autonomy – A legally independent enterprise in a business

network is influenced by the interconnectedness and embeddedness, which may reduce its autonomy. Interdependency influences the activities and decision making of industrial firms, where business network has a broader meaning as a configuration of actors. By (Kjellman et al. 2004) theoretically and practically, the analysis of business network will be submitted by network horizon, network context and network identity:

- network horizon explains how extended an actor's view of the network is. Factors influencing the view are experience, structural features and connectedness,
- network context determinates the actors, who they are and how they related to each other; the activities, what activities are performed and the ways in which they are linked together; and the resources, what resources are used and the pattern of adaptation between them,
- network identity refers to how the firms see themselves in the network and how they are seen by the other actors,
- another aspects in analysis is the network role of an actor. Defined roles are the architect, the lead operator, and the caretaker.

A lot of research has been done concerning the networks of large corporations, multinational companies and alliances. The creation, development and entrepreneurial environment introduce the process of globalization of market and production with regard to the both, the EU countries and the world. Technically, it is affected by development of information and communication technologies. The theory deals with process of the establishment and development of the supplier – customer relationship overtime according to the variables of experience, uncertainty, distance (including aspects of social, geographical, cultural, technical and temporal distance), commitment and adaptations. Partnership in industrial networks are strategic choices to organize a mutually beneficial relationship.

3.1 Culture environment and business networks

According to (Mura, Gašparíková, 2010) internationalization process resulted from a combination of strategic thinking and actions, opportunities and needs. Because of the given complexity of this phenomenon it is very difficult to create a general concept of internationalization process. The internationalization process as a part of a wider business network provides not only the related context, but also additional cultural dimensions to be understood. There are numerous aspects – social, cultural, emotional, temporal and other tacit dimensions – that influence the firms's development in the network. According to (Francesco, Gold, 2000) culture can explain that in general terms, culture is a way of life of a group of people. Researchers from diverse fields, including anthropology, sociology and management have studied culture for a long time. In connection with business networks the sources of culture have been divided into the following categories: language, nationality, education, profession, ethnic group, religion, family, sex, social class, and corporate or organizational culture.

The increasing interdependence of the global economy is heightening the need to understand how business relationships develop between company managers from

different cultures. (Tronroos, 2002) and (Elo, 2005) argue that culture is embedded in different types of cultural settings and contexts. Key areas of interest for business networks are how to negotiate, manage organizations, market products and services and how to adequately perceive the influential network connections and handle business relationships. Multicultural environment of the EU and the whole Europe have an important impact on the attitudes, behavior and communication of the EU people as well as enterprises.

3.1.1 An example – internationalization process of enterprise A

The enterprise was established in 1955. During 1965 – 1997 the firm's organization structure and activities have been changed from the viewpoint of the development of business network. In 2005 and 2006 there are established two foreign daughter companies. It means that the business network is spread to Slovakia and Bosnia.

Internationalization process of enterprise A according to the basic structure (Fig. 1):

1. stage – at the beginning of 1960 – a demand on domestic and foreign market is increasing,
2. stage – a market crisis in the post – communist countries. This situation stems from the relation between product's price in comparison with the product's price of competitors. The product's prices of enterprise a are higher.
3. stage – in 2005 the enterprise A has been established teh forein daughter company in Bosnia according to motto „Production follows markets“. From the point of view of lower production costs the daughter company in host country has become the competitiveness on the South – Eastern as well as Central European markets.
4. stage – in 2006 the enterprise A has been established the second foreign daughter company in Slovakia. The main role of daughter company is to secure the distribution of products on the markets of Central Europe. It means that her business activity depends on the production of „Bosnia's sister“.
5. stage – a strengthening of leader position on the market of host countries and a looking for of new export areas.

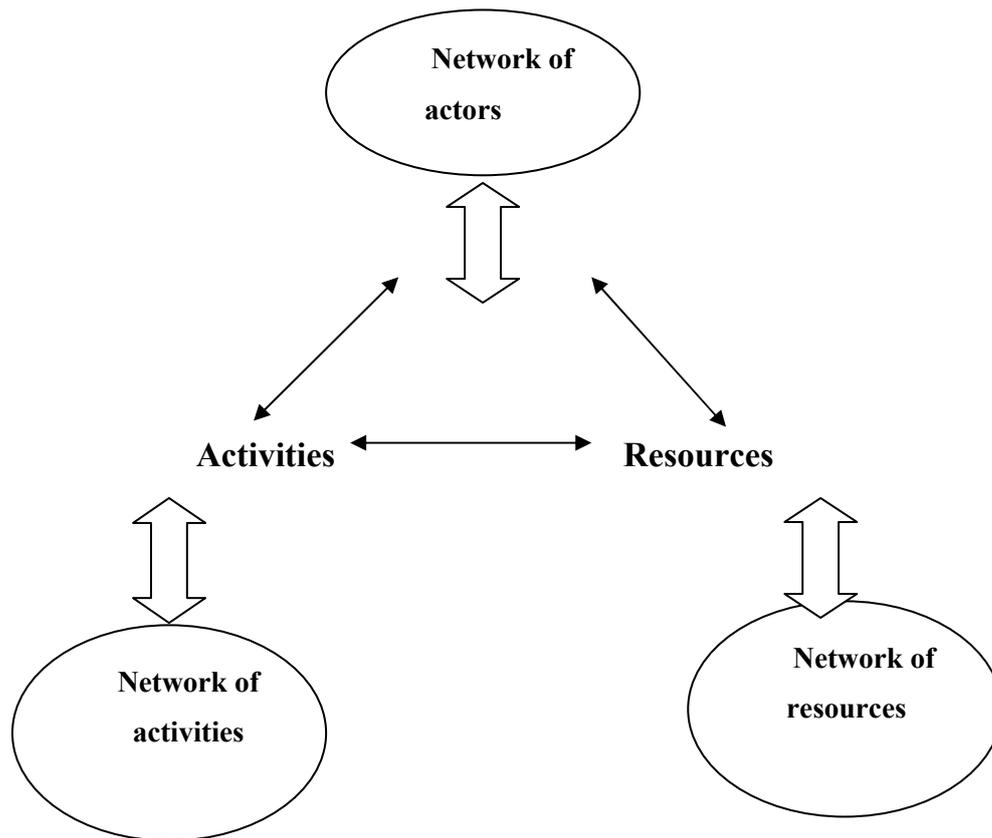


Fig. 1: Basic structure of the basic model

Source: (FORSSTRÖM, 2005)

Relationships and networks are of a great importance in the processes of internationalization. Industrial buyer – seller relationships in international business networks represent one key interest area for research when looking at any development processes, whether from the supplier’s or from the buyer’s perspective.

4. Conclusions

Small and medium enterprises are the focus of this study as they are a key economic sector in Slovakia. SMEs constitute 97 % of enterprises and contribute to the flexibility and resilience of the economy as well being active in international markets. For many small business networking should be an essential part of their business. The study introduces new elements in the chain “actors – activities – resources” in the context of internationalization process specially in SME sector. According to the theoretical review and practical adaptation, the dynamics of business networks must be understood when creating tools and programs for an firm’s export policy that supports business networks. The net structure illustrates the actors into group according to their roles and position in the value chain continuum. This may represent a simplification of a general network horizon in a particular phase of the continuum. Based on the information above the network structure includes a constellation of actors, activities and resources.

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CYBER MODEL OF ELECTRONIC COMMERCE ACUSTOMER CENTRIC

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Abstract: *This paper describes how to implement methods of cybernetics into the economy. The mathematical model was created in MATLAB software. Created model works with two feed backs, which are realized through question forms. The goal of this model is to decrease difference between demand and offer.*

Keywords: *Electronic Commerce, Strategy, Technology, Marketing, E-commerce, Business to Customer, Business to Business.*

JEL Classification: *C52, C67, L21, M15.*

1. Introduction

This paper aims to create a model of e-business, focusing on customer needs. The result of solving this problem is the creation of a model where the selected dynamic processes are examined. Addressing of the strategic management of e-commerce in the company, is focused primarily on customers. It is very important to make a survey of the entire company, to learn its business decisions and obtaining information not only about the market, but also in internal affairs. Among the results belong the characteristics of company strategy and information characterization, which are based on a commercial (business) corporate strategy and corporate strategy quality, or other strategies. The strategy is continually evaluated at certain intervals and adapted to current requirements. Using MATLAB software an economic model of electronic commerce is designed. For the actual model Simulink as a special toolbox for modeling cybernetic systems is used.

2. Formulation of the problem

2.1 Description of the company and the customer's first order equatio

The proposed model describes the behavior of consumer and company by transfer function of the first order. Transfer functions of consumer's subsystems and subsystems of the company have only a demonstration transmissions. It is not a case where the behavior of these subsystems are precisely identified.

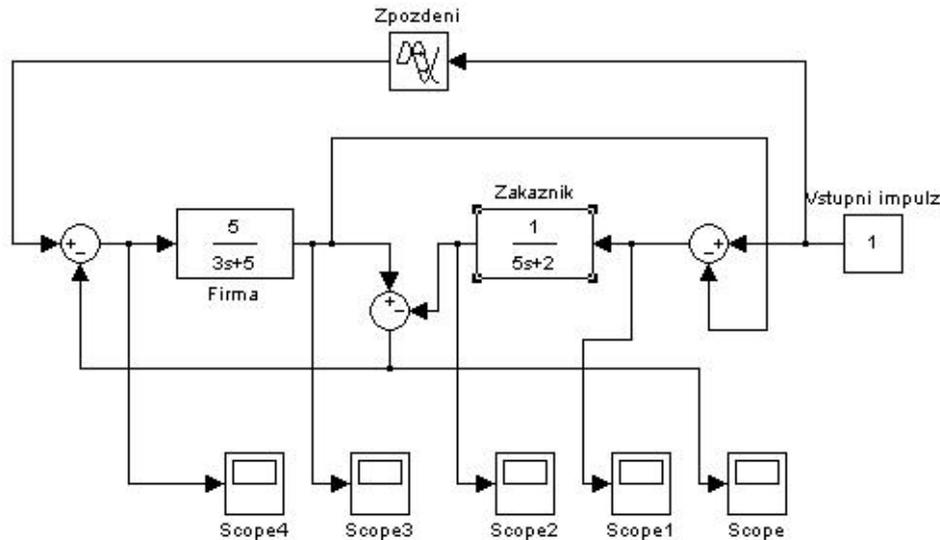


Fig. 1: Simplified model depicting the involvement of a time lag

Source: (Own processing)

2.1.1 General description of the blocks used

- Step (pulse input)

The element that generates a step signal of the change from zero to one or to a demanded value. In the economic model, this element generates a signal of the customer who has already chosen the company (business) and runs the whole model.

- Transfer Function (Customer / Company)

A part of the model, which defines the behavior of a firm and a customer, using transfer functions. When creating a model, the behavior description of several options, such as neural network and fuzzy logic, can be used.

- Summation

The element that ensures the implementation of the feedback.

- Time Delay

The element that creates a time delay. In this model it realizes the waiting time of the company before a modification of offer according to customer needs starts.

- Scope

Element, which graphically shows the changes of the parts of the whole model that depend on time.

Priority is given to the customer, restrictive terms of production values in this business segment for the products in the menu to meet customer requirements are described. This model has the transfer functions in a simplified form to be able to

examine how consumers can influence the dynamics in terms of production, how rapidly production can be adapted to customer requirements.

2.1.2 Processes of individual stages of the first order model

The below stated graphs show the system stage/state variables versus time. Individual plots belong to elements in the SCOPE Figure 1

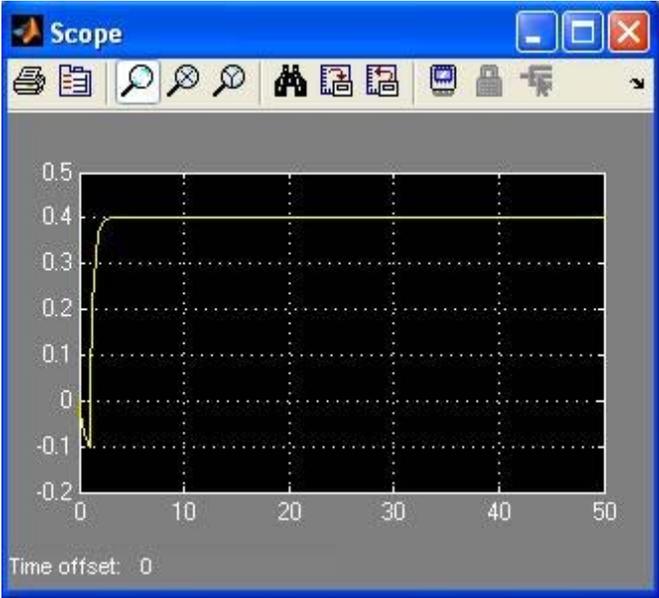


Fig. 2: SCOPE

Source: (Own processing)

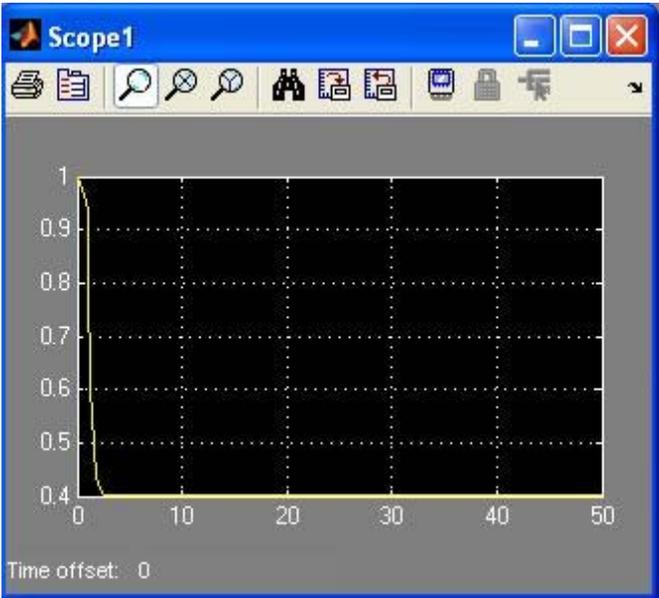


Fig. 3: SCOPE

Source: (Own processing)

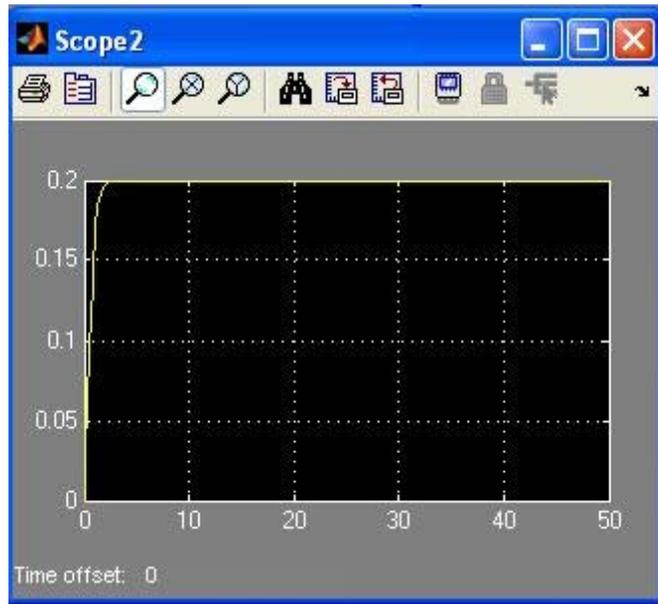


Fig. 4. SCOPE

Source: (Own processing)

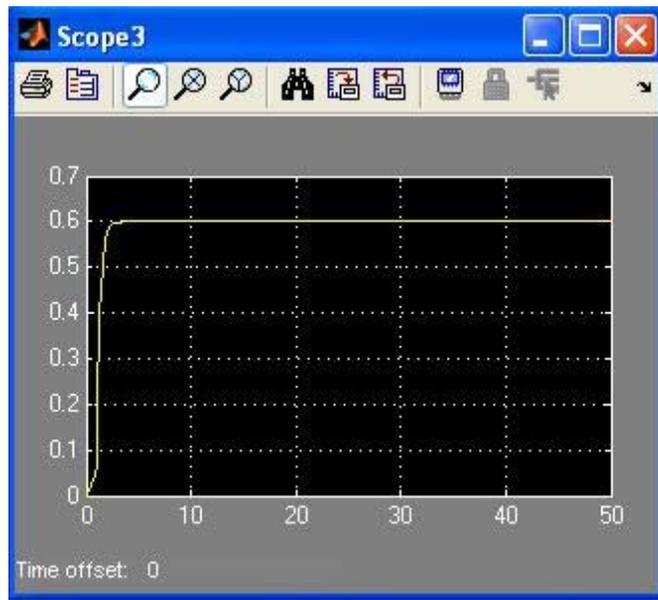


Fig. 5: SCOPE

Source: (Own processing)

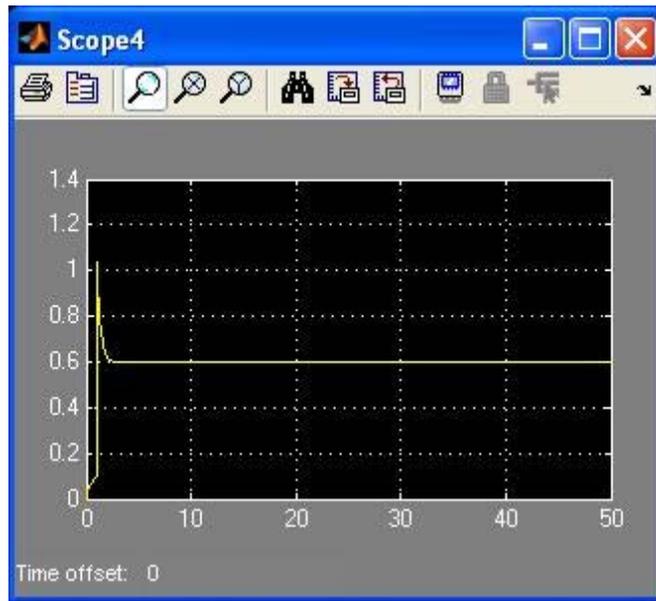


Fig. 6: SCOPE

Source: (Own processing)

Graphs show the behavior of a cybernetic model of electronic commerce in various stages. Stocks represent a part of a system variables, depending on the time. The amount of the customers must be assessed on the basis of system throughput.

For the company's strategy it is complicated to satisfy customers needs by electronic commerce in real time.

- SCOPE 4: Shows real (customer's) demand for a product in the company. This affects the production. Query execution system retains its value.
- SCOPE 3: An expression of the running production ability to realize the demand request. A stabilization will occur, the demand/ requirement is fulfilled.
- SCOPE 2: Shows the way of customer's options, that can affect the production (a customer over an idea, the company realizes).
- SCOPE 1: A (feed-back) correction of customer demands (according) to the production ability.
- Scope: A satisfaction of customer demands/ requirements in term of all internal relations between company and customer, e.g. in term of:
 - the production of the company,
 - the customer's needs and their's corrections,
 - the firm possibilities.

2.2 Description of the company and the customer's by equations

Another proposed model describes the behavior of the customer and the company by second-order transfer function. Transfer functions of consumer and company subsystems have only the demonstration type of transmissions. It is not the case of precisely identified behavior of these subsystems.

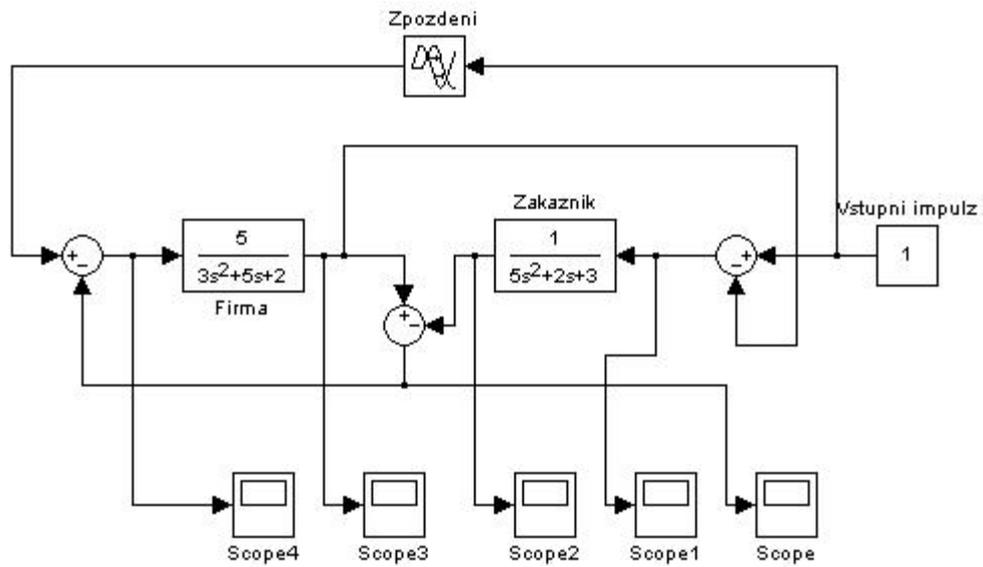


Fig. 7: Simplified model depicting the involvement of a time lag
 Source: (Own processing)

2.2.1 The progress of the individual states of the second-order model

The graphs below show the state of value system parts in relation to time. Individual plots belong to elements in the SCOPE Figure No. 7

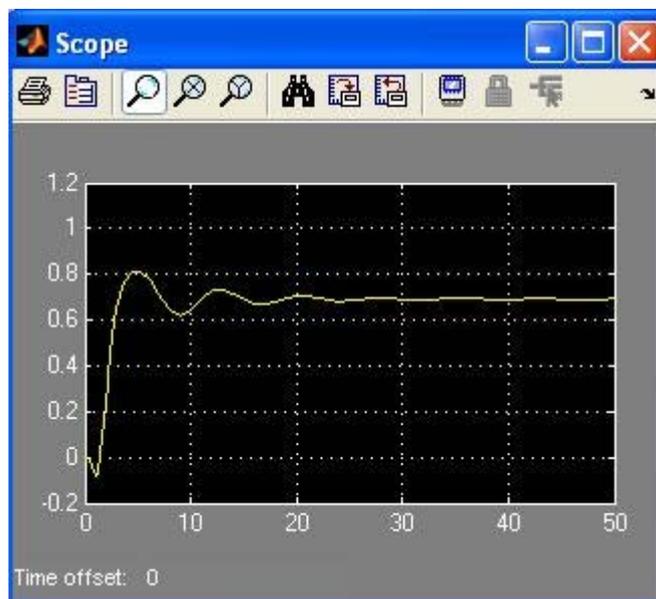


Fig. 8: SCOPE
 Source: (Own processing)

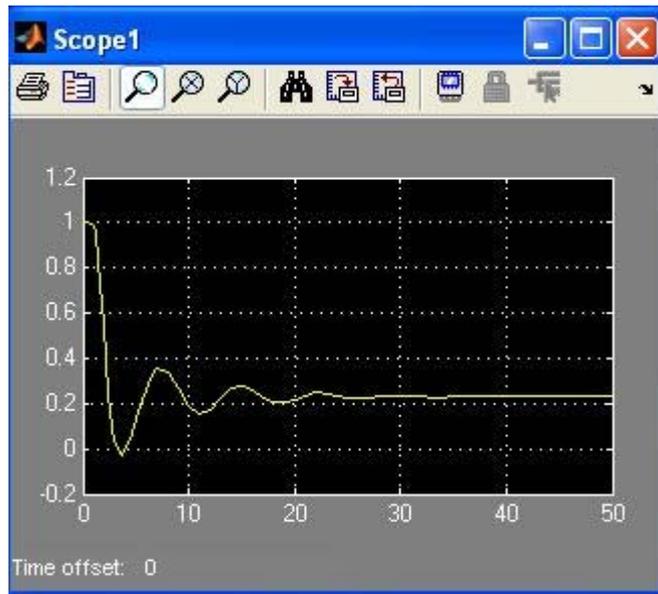


Fig. 9: SCOPE

Source: (Own processing)

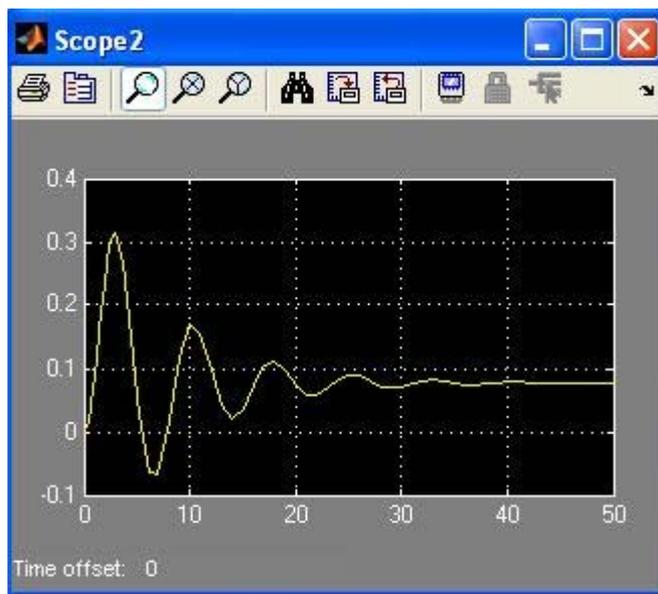


Fig. 10: SCOPE

Source: (Own processing)

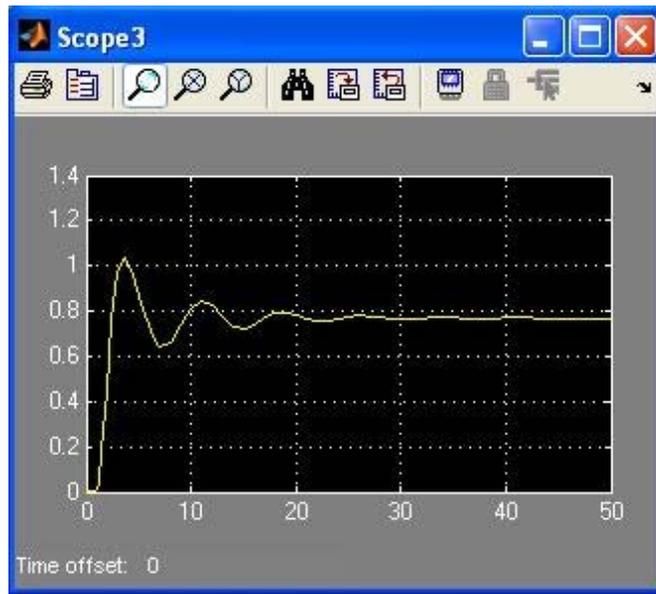


Fig. 11: SCOPE

Source: (Own processing)

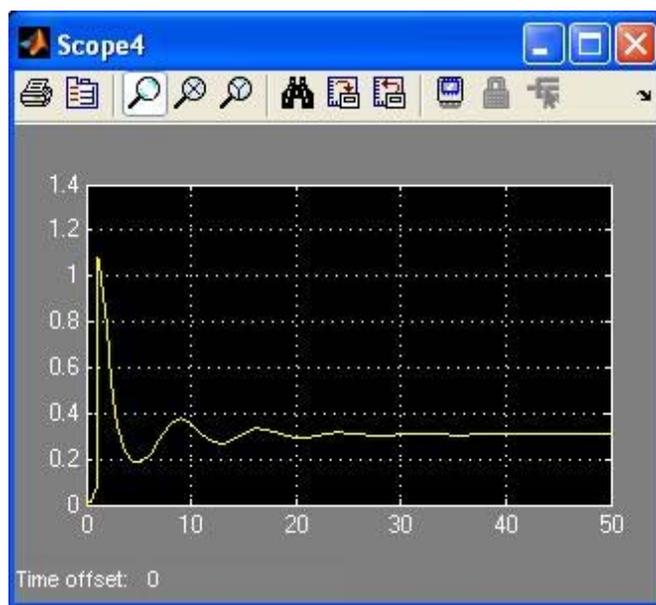


Fig. 12: SCOPE

Source: (Own processing)

2.2.2 The possibilities how to identify the customer and the company

The above mentioned system is composed of the subsystems, which are not exhaustive in description of the behavior. This is not an accurate description of the behavior of particular subjects. The identification itself is in the middle of Economics a difficult task. The MATLAB software contains several toolboxes that make work easier by modeling of particular subsystems. Neural networks, fuzzy sets, etc. can be used.

3. Solving the problem

The simplest way to address these needs, is to map the dynamic properties of a strategy and to determine the transient response. In cases in which it is impossible to get re-course characteristics, the frequency response can be used. The acquirement of it is more difficult. To obtain the transient response of regulated system an abrupt change in the so-called action variables and fall is used. The response of the regulated system - the course of the controlled variable - is measured. From this step response can be obtained the possibility to determine the quantities characterizing the dynamic properties \rightarrow degrading strategies such as - for example - time and speed of adaptation response to new conditions.

In the case of the frequency response a harmonic signal is applied to the input of investigated member. The model examines in which extent the steady state of response by selection of goods Unit jump can be seen for example as a reaction to the news in the market. An entry into the model depends on the needs and requirements of the customer due to his understanding, A strategy of purchase follows. Transmission properties of individual subsystems, in particular customers demands, should be expressed as a result of the statistical examination of the two segments (ie, production and customer needs). This approach characterises a new point of view on the possibilities how to model the needs of the strategic management of e-commerce in the company.

4. Conclusion

The system created by using MATLAB software and toolbox SIMULINK creates an economic system model of e-commerce focused on the customer's feedback. The aim of the company is, by using feedback, to adjust its current offer to customer requirements. The system does not address the customer's choice of the company. It only enables the company offer specification and reduces the difference between customer demand and company offer. The problem of economic systems is the large number of measurable and unmeasurable inputs and a sensitivity to the changes in initial conditions. It is important to quantify the system to the sufficient extent. The created model allowed the description of subsystems of the company and of the customer by transfer functions of the first and second order. On this level of the description complexity, the system has settled down in real time and the company has found a common plane with the customer to optimize the offer/ supply. On the higher level of the description complexity of the behavior, such as by using the 5th-order transfer equation, the system has began to show instability. The economic systems should be quantified enough for mathematical modelling. The system works only with model descriptions of company and customer behavior.

Further precisising of valuation of this model can be achieved by application of neural networks and fuzzy logic to identify the behavior of firms and customers.

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ANALYSIS OF THE HIGHEST WAGES IN THE SLOVAK REPUBLIC

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Abstract: *This article contains the results of statistical analysis of the highest wages in the Slovak Republic in 2009 using the methods of statistical inference. The information from the sample of the employees with wage higher than the 99th percentile is generalized to the population using the Pareto distribution of wages. There are also identified the factors that have a significant impact on the frequency and on the level of extreme wages. These factors are gender, level of education, industry and region of residence.*

Keywords: *Gros Wage, Pareto Distribution, Goodness-of-fit Tests, Quantiles.*

JEL Classification: *C46, C83, D14, D31, D33*

1. Introduction

Reliable information about wages in each country is very important of several economic and social reasons. Therefore, the data about incomes of persons or households are collected in number of sample surveys and obtained data are analyzed by various methods.

Most of such analysis is limited to a simple description of sample data. This gives unreliable information, especially on the highest incomes, which are rare in the sample.

Statistical inference methods provide a tool to generalize the information from the sample to the population that in our case is the set of all employees in the Slovak Republic (further referred to as SR) in 2009. Observed random variable is the gross monthly wage of the employees in SR.

In recent years in Slovakia and in the Czech Republic several authors have successfully dealt with the analysis and modeling of household income using the methods of statistical inference.

The results of such analysis are several interesting publications about the distribution of household's income, for example Bartošová, J. (2007), Sipková, L. and Sipko, J. (2010), or Labudová, V. and Šoltés, E. (2008).

This article aims to obtain reliable information on wages of all employees in Slovakia in 2009, using methods of statistical inference. It focuses mainly on the highest wages, their distribution and the fundamental factors affecting the amount of those wages. These factors are gender, level of education, industry and region of residence. All analysis use the statistical software package Statgraphics Centurion XV.

2. Statement of a problem

The analysis of the highest gross monthly wages, particularly those beyond the 99th percentile of the sample uses the sample survey information system on labour costs, which has been realized by Trexima in the Slovak Republic since 1992. Therefore the basis of analyse is sampling data set of one percentage of employees in the number of 9 069 in SR, who earned a gross monthly wage of more than 3 488,76 EUR in 2009.

The most advanced generalization of information from the sample to population is to find the probability distribution of observed variable. In our case probability distribution provides full information on the wages of all employees of the SR with a gross monthly wage above 99th percentile of the sample. Knowledge of appropriate probabilistic model allows the calculation of the characteristics of the population, quantiles, probabilities of any intervals of wages and so on.

Pareto probability model with a lower bound a is suitable for modeling of gross monthly wages at the upper tail of distribution.

This distribution is named after economist W. Pareto (1848 – 1923), who used it to model welfare economics. We will use it as a probabilistic model of gross monthly wages above 3 488,76 EUR in Slovakia in 2009. This variable will be referred to as X_a .

When a random variable X_a has a Pareto distribution with parameters $a > 0$ and $b > 0$, its distribution function is given by

$$F_a(x) = 1 - \left(\frac{a}{x}\right)^b, \quad x \geq a \quad (1)$$

where $a > 0$ is threshold parameter and $b > 0$ is shape parameter [5, p. 20].

The mean value is expressed as follows:

$$E(X_a) = \frac{a \cdot b}{b - 1}, \quad b > 1 \quad (2)$$

and the variance

$$D(X_a) = \frac{a^2 \cdot b}{(b - 1)^2 \cdot (b - 2)}, \quad b > 2 \quad (3)$$

3. Problem solving

3.1. Sample statistics

In the sample, which consists of 9 069 employees with the highest 1 % gross monthly wage (over 3 488,76 EUR), average gross monthly wage is 6 089,28 EUR, half of the employees earns more than the median level 4 763,50 EUR, gross monthly wage of a quarter of employees exceeded 6 497,96 EUR and the maximum wage is 5 9648,30 EUR. Existence of outliers is confirmed by the high value of coefficient of variation, that is 72,35 %.

A visual form of the layout values of gross monthly wages above 99th percentile in the sample provides a box plot in Fig. 1.

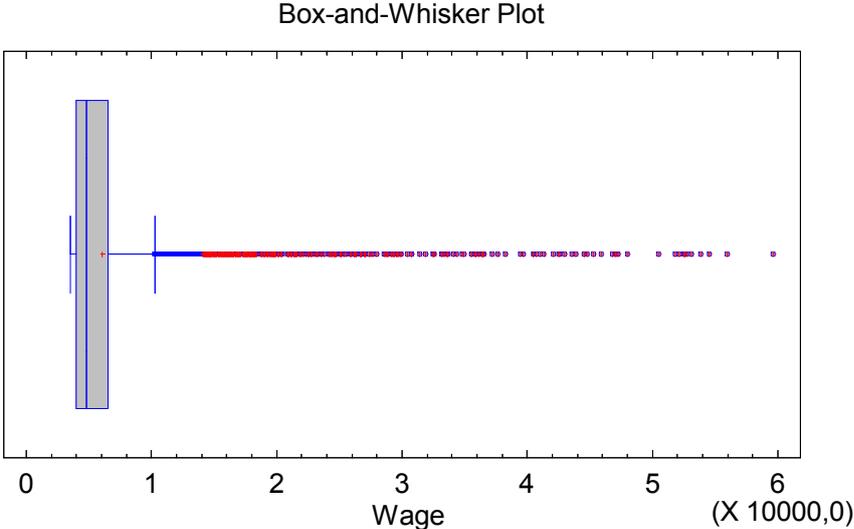


Fig. 1: Box plot of gross monthly wages higher than 99th percentile

3.2. Pareto distribution of the highest gross monthly wages

Distribution fitting procedure in the statistical software package Statgraphics Centurion XV allows by the sample data, exceeding a certain value *a*, to estimate the parameters *a*, *b* of Pareto distribution by maximum likelihood method (Pacáková, 2004: 67-68) and to verify with help of the seven goodness of fit tests, whether sample data may originate from such distribution. We have used Kolmogorov-Smirnov test (Pacáková 2004: 82-84). This test has confirmed good fit with the Pareto distribution with parameters *a* = 3 488,76 and *b* = 2,28473 at significance level 0,05 (*p*-value 0,08686 > 0,05), as follows from the distribution fitting procedure output at Fig. 2.

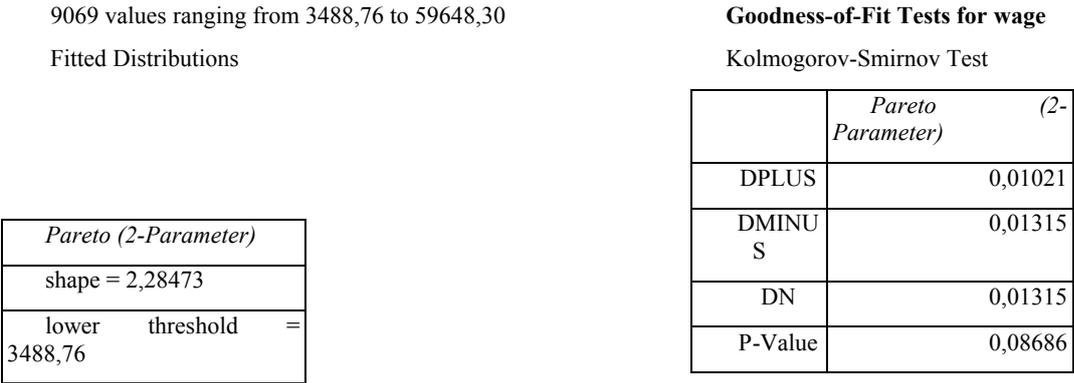


Fig. 2: Result of goodness of fit test with Pareto distribution

From Fig. 3, that shows a histogram of sample data together with Pareto density function is evident, that the sample data may originate from the fitted distribution.

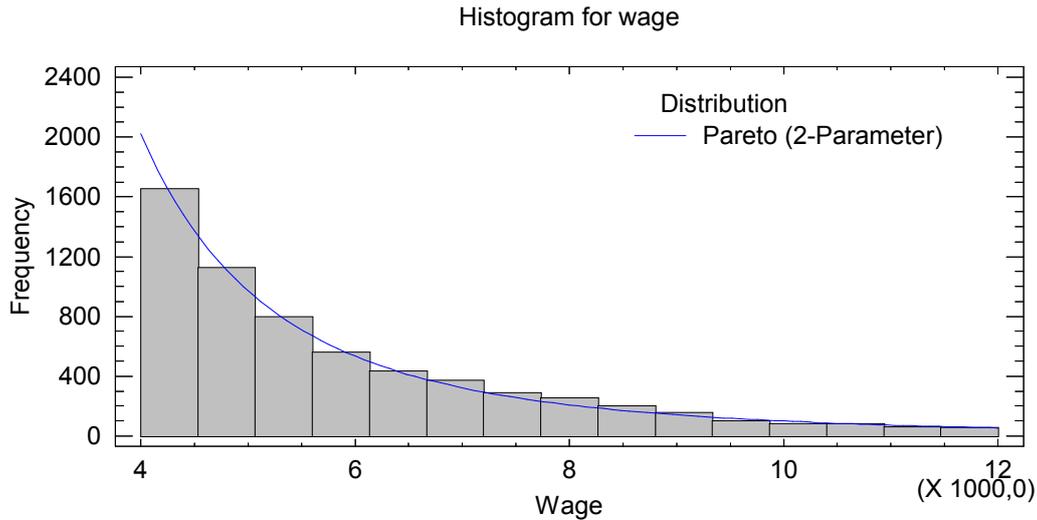


Fig. 3: Graphical verification of good fit with Pareto distribution

Statgraphics Centurion XV allows us to find any percentile of gross monthly wages distribution, as we can see on the output in Tab. 1. These quantiles give us valuable information, for example that 5 % of employees in SR in 2009 with a gross monthly wage above 3 488,76 EUR received a wage higher than 12 945,40 EUR. According to equation (2) we can obtain the basic characteristics of the Pareto distribution: $E(X_a) = 6\,204,32$ and $D(X_a) = 59\,172\,526,63$.

Tab.1: Selected quantiles of gross monthly wages above 99th percentile in SR in 2009

Lower Tail Area (\leq)	Pareto (2- Parameter)
0,10	3653,41
0,50	4725,28
0,75	6400,08
0,90	9557,81
0,95	12945,40

3.2 Factors affecting the amount of the wages above 99th percentile

The method of the analysis of variance allows verifying significance of the factors *gender, education, industry and residence region of the employee* on the amount of the wages above 99th percentile in Slovakia in 2009.

Tab. 2: Sample statistics of the highest wages by gender

Gender	Count	Average	Median	Coefficient of variation	Minimum	Maximum	Upper	5/6
							Quartile	Sextile
1-male	7185	6253,61	4863,15	74,04 %	3488,76	59648,30	6729,33	7916,67
2-female	1884	5462,57	4526,21	61,20 %	3489,31	52739,10	5747,64	6669,29
Total	9069	6089,28	4763,50	72,35 %	3488,76	59648,30	6497,96	7678,39

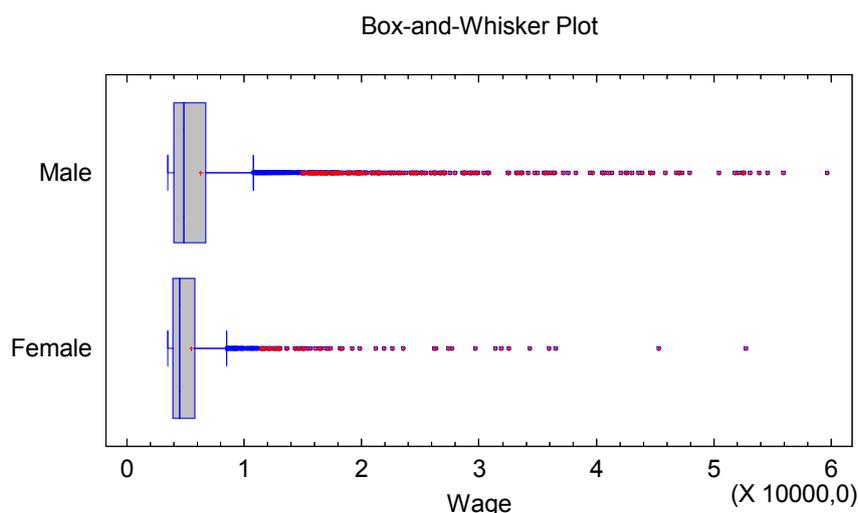


Fig. 4: Box plots of the highest monthly wages by gender

The sample statistics in Tab. 2 (1-male and 2-female) shows lower percentage of female (only 20,77 %) and also lower female wage level in a set of 1 % of employees with the highest wages in Slovakia in 2009.

Tab. 3: Sample statistics of the highest wages by education

Education	Count	Percent	Average	Median	Coefficient of variation	Minimum	Maximum	Upper	5/6
								Quartile	Sextile
0	994	10,96	6688,77	4930,87	90,88 %	3492,12	55941,40	7011,10	8498,14
1	22	0,24	5086,74	4550,82	25,53 %	3625,97	8262,28	6143,80	6689,12
2	80	0,88	5644,04	4310,28	54,57 %	3489,50	18060,00	6021,78	7613,49
3	46	0,51	4940,27	4337,02	37,95 %	3505,69	15059,60	5311,03	6032,58
4	253	2,79	5321,23	4401,98	63,99 %	3489,62	34952,60	5726,46	6486,21
5	219	2,41	5877,48	4757,20	69,70 %	3492,70	47079,10	6195,42	7840,67
6	529	5,83	5689,18	4613,92	68,44 %	3489,03	45881,10	6293,19	7166,24
7	38	0,42	6286,36	4932,55	86,40 %	3512,28	35929,70	5749,70	6436,39
8	220	2,43	6153,66	4806,05	63,68 %	3489,31	35764,10	6387,78	7739,31
9	6530	72,00	6065,09	4772,69	68,57 %	3488,76	59648,30	6514,17	7673,40
10	138	1,52	6837,72	4711,96	93,76 %	3501,89	47021,70	7322,36	8457,01
Total	9069	100,00	6089,28	4763,50	72,35 %	3488,76	59648,30	6497,96	7678,39

Education factor has 11 observed levels: 0-not reported, 1-primary, 2-apprenticeship, 3-secondary (without exam), 4-apprenticeship with leaving exam, 5-full secondary general, 6-full secondary vocational, 7-higher, 8-university 1st degree (bachelor), 9-university 2nd degree, 10-university 3rd degree (research qualification).

Tab. 3 contains sample statistics and the percentage of employees on the different educational level.

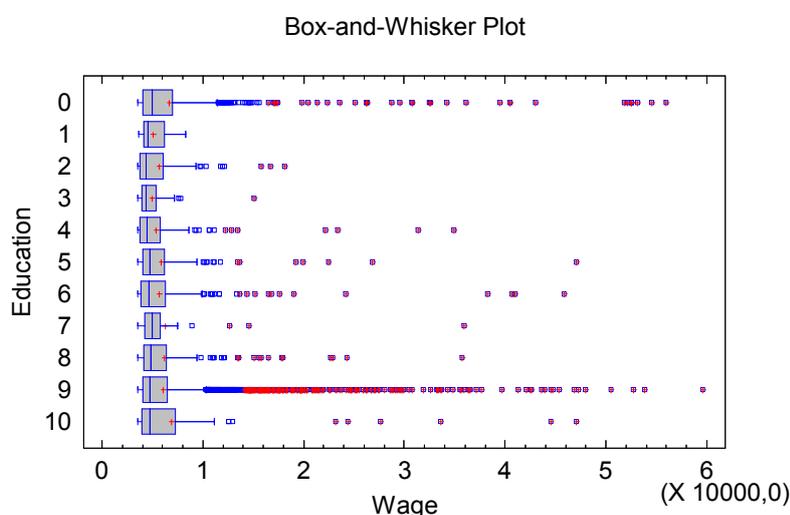


Fig. 5: Box plots of the highest monthly wages by education

The largest group (72 %) consists of university educated employees (9-university 2nd degree) in the set of 1 % employees with the highest gross monthly wages in Slovakia in 2009. The highest educated employees (research qualification) have surprisingly low representation, only 1,52 %, in this set of employees.

Tab. 4: Sample statistics of the highest wages by selected industries

SK NACE	Count	Percent	Average	Median	Coefficient of variation	Minimum	Maximum	Upper	5/6
								Quartile	Sextile
C	2190	24,15	6004,92	4796,78	63,28 %	3488,80	50447,70	6535,27	7587,77
D	468	5,16	5797,32	4897,14	51,60 %	3490,40	30787,00	6570,94	7557,77
F	334	3,68	6779,29	4985,54	85,76 %	3493,40	59648,30	6934,27	8701,92
G	1117	12,32	6354,32	4868,30	77,81 %	3489,04	47280,60	6644,72	7913,13
H	525	5,79	5856,04	4886,15	59,12 %	3494,00	47968,10	6790,31	7464,81
J	1666	18,37	5872,25	4585,82	74,90 %	3489,15	54546,20	6072,22	7257,35
K	1339	14,76	6100,91	4742,24	66,04 %	3488,76	47079,10	6526,89	8098,74
M	677	7,46	6930,83	5098,46	96,60 %	3489,59	55941,40	7011,94	8202,55
N	110	1,21	7486,50	5162,31	87,49 %	3503,24	41015,00	8443,92	9818,66
O	127	1,40	5137,31	4145,51	48,60 %	3506,82	15725,00	5035,82	6245,90
Q	185	2,04	5138,24	4177,94	50,72 %	3496,15	21960,70	5111,31	5902,50
Total	9069	100,00	6089,28	4763,50	72,35 %	3488,76	59648,30	6497,96	7678,39

Industry factor in the sample has 21 modifications. Employees with high salaries are not represented in all sectors. Their representation in some sectors is negligible compared to the other.

Codes of *selected industries* are as follows: C-manufacturing, D-electricity, gas, steam and air conditioning supply, F-construction, G-wholesale and retail trade, H-transportation and storage, J-information and communication, K-financial and insurance activities, M-professional, scientific and technical activities, N-administrative and support service activities, O-public administration and defence, Q-human health and social work activities. The greatest proportion of employees with the highest monthly wages, nearly one quarter, is in industry C-manufacturing. High proportion of employees with salaries above 99 percentile is also in industries J-information and communication, K-financial and insurance activities and G-wholesale and retail trade. More detailed information is provided by Tab. 4 and Fig. 6.

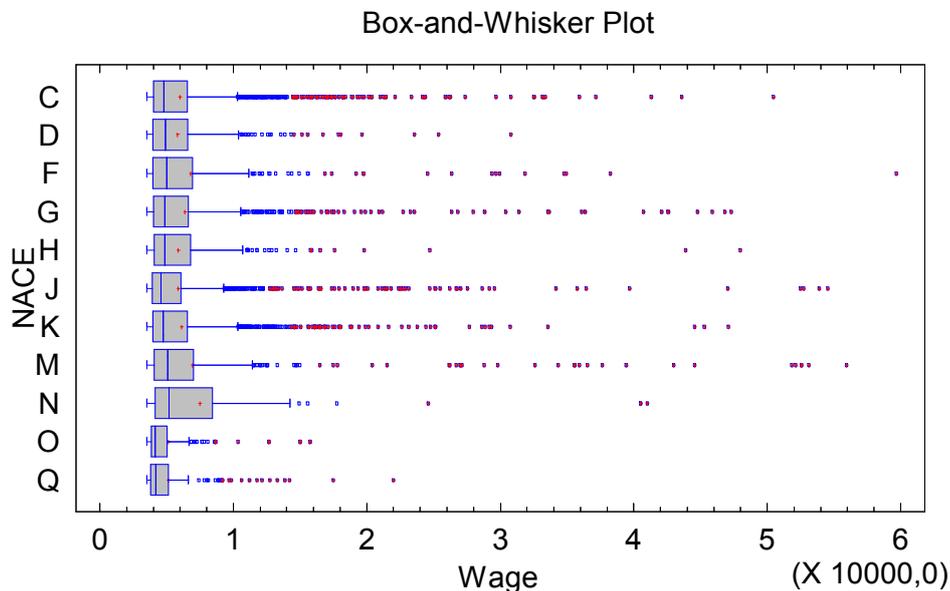


Fig. 6: Box plots of the highest monthly wages by industry

Significant differences in the number of employees with gross monthly wages beyond the 99th percentile as well as in the amount of their wages causing also factor *the region of residence*. Codes of regions are as follows: 1-Bratislava region, 2-Trnava region, 3-Trenčín region, 4-Nitra region, 5-Žilina region, 6-Banská Bystrica region, 7-Prešov region, 8-Košice region.

Tab. 5: Sample characteristics of the highest wages by region

Region	Count	Percent	Average	Median	Coefficient of variation	Minimum	Maximum	Upper	5/6
								Quartile	Sextile
1	5679	62,62	6209,62	4805,23	74,30 %	3488,76	55941,40	6655,72	7887,67
2	523	5,77	6450,69	4771,91	83,46 %	3489,03	44569,70	6700,86	7691,82
3	534	5,89	5761,52	4675,73	70,23 %	3491,03	59648,30	6320,17	7055,91
4	453	5,00	5780,06	4643,21	66,11 %	3490,71	41331,50	6090,74	7002,83
5	631	6,96	6037,64	4869,17	60,85 %	3491,32	30782,20	6569,30	7725,63
6	386	4,26	5504,97	4541,74	55,99 %	3489,15	41015,00	5791,46	6958,45
7	256	2,82	5924,64	4756,76	62,70 %	3495,94	30416,30	6184,32	6998,15
8	607	6,69	5665,74	4691,77	66,06 %	3489,82	44776,10	6015,35	7017,68
Total	9069	100,00	6089,28	4763,50	72,35 %	3488,76	59648,30	6497,96	7678,39

The highest proportion of employees with the highest gross monthly wage was in 1-Bratislava region (62,62 %). In other regions is proportional representation comparable, the lowest is in 7-Prešov Region. More detailed information is provided by Tab. 5 and Fig. 7.

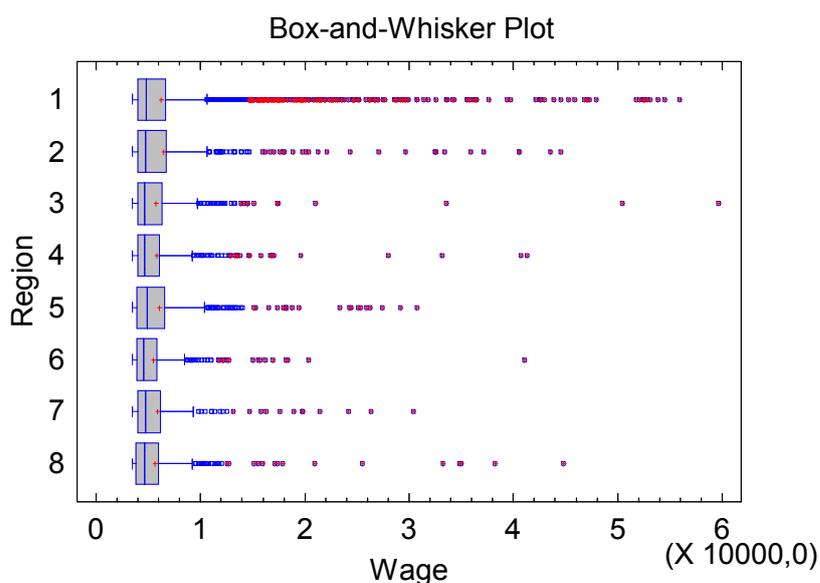


Fig. 7: Box plots of the highest monthly wages by region

4. Conclusion

Despite the worldwide crisis which has been reflected also in the economic results and living conditions in the Slovak Republic there is a group of employees with very high level of gross monthly wages. More information about this group of employees we obtained using statistical methods.

We have confirmed the significance of the factors gender, education, industry and region of residence on the highest wages and also the fact that extremely gross

monthly wages are distributed by Pareto distribution. The highest wages receive mainly male employees with 2nd degree university education, working in the industry C-Manufacturing and living in the Bratislava region.

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IMPACT OF SKELETONIZATION METHODS ON ACCURACY OF DIGITAL HOLOGRAMS EVALUATION

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***Abstract:** The method of holographic interferometry has been applied to make the temperature fields over the heated-up wooden test specimens visible. We verified impact of skeletonization methods on accuracy of digital holograms evaluation. Individual thinning algorithms have individual approach to thinning and therefore resultant skeletons of digital holograms are different.*

***Keywords:** Holographic Interferometry, Interferograms, Thinning Algorithm.*

***JEL Classification:** C02, C61, C63, C69, C88, C93.*

1. Introduction

Holographic interferometry (HI) is an experimental method which makes physical fields visible. One of them is also the temperature field and its subsequent qualitative and quantitative analysis. In the presented article we used HI method to make temperature fields over the test specimens visible.

Impact of various thinning methods on interference fringes positions determination and consequence monitoring of accuracy of digital holograms evaluation were verified by number of algorithms.

2. Basic informations

2.1 Holographic interferometry

Holographic interferometry is an optical method that makes it possible to visualise transparent objects, helps explain the physical essence of the investigated events, enables to specify and expand the possibilities of visualisation of physical fields while the investigated area is not disturbed by sensors or sensing heads by which, for example the local temperatures or concentrations are detected.

The methods of holographic interferometry are utilised to study object deformations, vibrations, or small displacements. They are also applied in the field of fluid mechanics, heat transmission, mass transfer, environmental technology and mainly as visualisation methods of investigation of inhomogenities within transparent objects and for three-dimensional recording of the elements in fluids (Černecký et al. 2006).

We now have applications of interference methods in technical and research practice that are possible only after a thorough consideration of the measurement method by the use of a holographic interferometer with digital recording. Applications of interference methods are nowadays largely dependent on the process of computer

analysis of interferograms that enables to make precise, fast and effective analysis without subjective errors.

2.2 Digital holograms

In the case of the experiments utilizing holographic interferometry either with transparent (phase) objects or with solid (diffusively reflecting) bodies the first thing to be done is the record of the holographic interferogram. If necessary the image is modified by various techniques and, finally it is qualitatively and quantitatively analysed. Nowadays, in all the phases computers with particular hardware and software (Csongrády, 1996) are successfully used to supply the slow and routine activities by automatic calculation, which considerably simplifies the processes and analyses of the experiments.

At present, during the experiments in the field of holographic interferometry the digital recordings of images are used. Digital recordings allow immediate processing and analysis of images in computer, which markedly makes the research more efficient by holographic-interference methods. Two-dimensional digital record of the object can be obtained if we display three-dimensional objects by means of lenses, for example to the plane of the CCD camera sensor, or we can create it by optical and mechanical resolution of the image, or by digitalisation of analogue image signals through digitising computer cards, or by digitalisation of photographic records by means of a scanner we can transform two-dimensional photographic patterns into two-dimensional digital recordings that are later stored in the form of computer (image) files.

2.3 Thinning algorithm

By the term thinning algorithm we understand points or original image layers removing until all the lines in the image are of width of one scanning point (pixel). Result of thinning algorithm is line file, called skeleton.

Input into thinning algorithm is binary image with brightness values 0 or 1. Objects are represented by points with brightness values of 1. Points with brightness value of 0 belongs to environment.

Concerning fact that most of thinning algorithms essentially depend on in-image-incident noise, the resultant skeleton is not hundred-per-percent straight one, there various vibrations can emerge in it, even some of the algorithms could cause lines interruption. Such malfunctions spoil required skeleton and could be restriction in further image evaluation. To eliminate these incidents in obtained skeleton we apply practices leading to removing of these accidents of continuity, vibrations and spurs.

3. Interpretation of interferograms

The interpretation of interferograms obtained from interferometric measurements is a slow, laborious and time-consuming process, therefore, it is advantageous to use computing technology and replace the whole process by automatic computing. This

For quantitative analysis of holographic images it is necessary to determine the distribution of the refractive index within the object from skeleton, and then calculate the distribution of the measured physical values from it.

From the distribution of refractive index $n(x, y)$ we can determine temperature distribution under constant pressure by state equation (Pavelek et al., 1977):

$$T(x, y) = \frac{T_{\infty}}{1 - 0,805 \cdot \frac{T_{\infty}}{l \cdot p_{\infty}} \left(s - \frac{1}{2} \right)},$$

where $T(x, y)$ – temperature distribution, T_{∞} – atmospheric temperature in the reference area, p_{∞} – pressure in the given space, s – interference order, λ – light wavelength, l – model length.

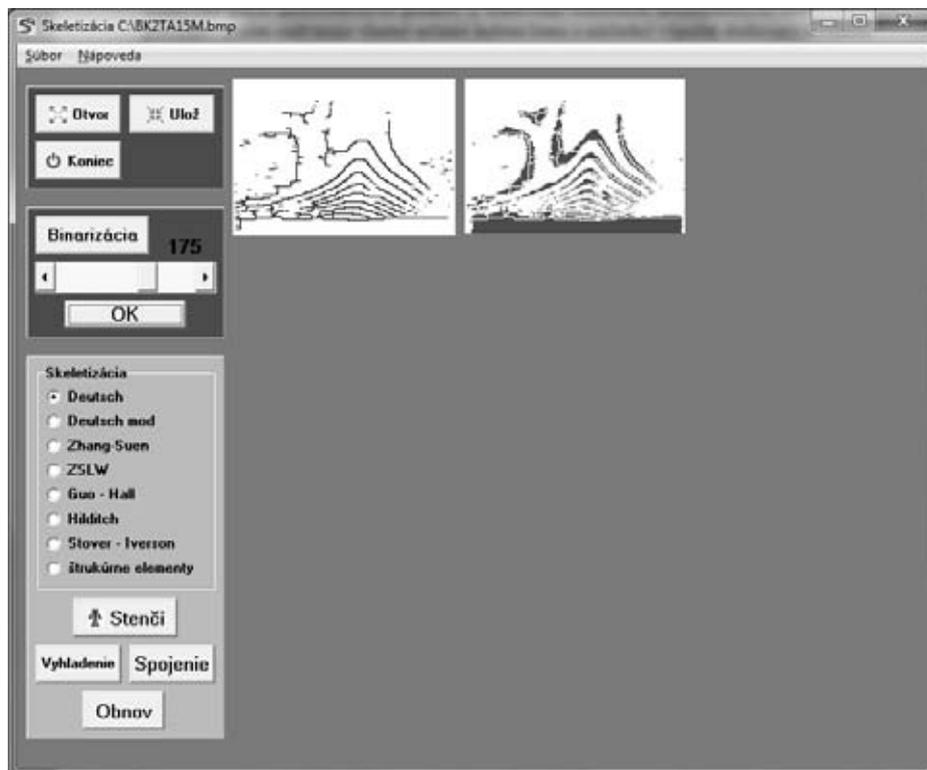


Fig. 2 Program for interferograms frameworking

Results comparison of individual thinning algorithms including calculated heights and temperatures above centre of test specimen is in Tab. 1. In table there is gained results transparent comparison upon used framework algorithm shown.

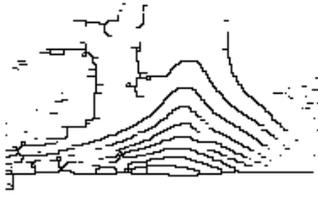
It is possible to see from the images, what the temperature were in various locations above sample body surface.

Values in small tables under the images represents framework-obtained height v above sample surface over sample body center.

Temperature t was calculated with use of above relation, therefore it is growing in certain jumps. Height changes for single calculated temperatures. We can see that these values differ for single framework algorithms

Obtained values can be applied for another processing, i.e. heat transfer coefficient calculation

Tab. 1: Results comparison of individual thinning algorithms



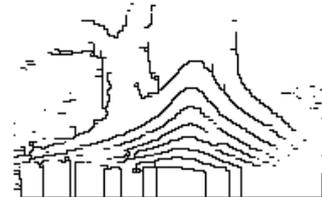
v [mm]	t [°C]
10,10	20,0
7,11	28,4
5,18	47,2
3,49	67,7
2,28	91,5
0,83	118,8

a) Deutsch algorithm



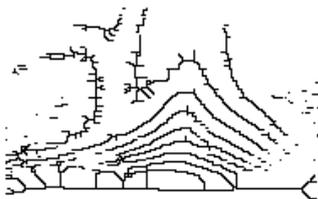
v [mm]	t [°C]
11,80	20,0
8,20	28,4
6,51	47,2
4,83	67,7
3,63	91,5
2,19	118,8

b) Deutsch modified algorithm



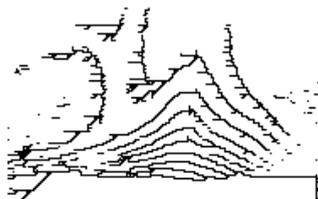
v [mm]	t [°C]
9,85	20,0
6,97	28,4
5,40	47,2
3,36	67,7
1,92	91,5
0,48	118,8

c) Zhang-Suen algorithm



v [mm]	t [°C]
9,69	20,0
6,79	28,4
5,10	47,2
3,41	67,7
2,20	91,5
0,75	118,8

d) Modified Zhang-Suen algorithm



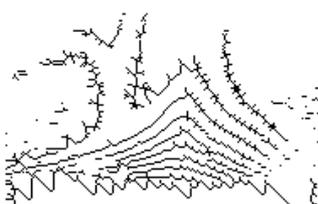
v [mm]	t [°C]
9,42	20,0
6,76	28,4
5,70	47,2
3,38	67,7
2,17	91,5
0,97	118,8

e) Guo & Hall algorithm



v [mm]	t [°C]
9,93	20,0
7,28	28,4
5,34	47,2
3,65	67,7
2,20	91,5
0,75	118,8

f) C. J. Hildish algorithm



v [mm]	t [°C]
9,58	20,0
6,70	28,4
5,20	47,2
3,34	67,7
1,89	91,5
0,45	118,8

g) Stover-Iverson algorithm



v [mm]	t [°C]
8,84	20,0
6,21	28,4
4,54	47,2
2,87	67,7
1,43	91,5

h) Sequence algorithm with usage of structural masks

v – height above centre of test specimen
 t – calculated temperature

4. Conclusion

Holographic interferometry is an optical imaging method that enables us to investigate with high sensitivity and precision the displacements and deformations on the surface of real objects, to study vibrations, small displacements of objects, to visualise physical fields. We do not consider only the immediate visualisation, but also the permanent display of the field that is later possible to analyse.

Concerning the fact that interferogram evaluation is very time consuming and laborious, it is possible to evaluate more measurements removing subjective influences using suitable software.

Impact of various thinning methods on interference fringes positions determination and consequence monitoring of accuracy of digital holograms evaluation were verified by number of algorithms.

Individual thinning algorithms have individual approach to thinning and therefore resultant skeletons of digital holograms are different.

Implementation of Guo-Hall and Stover-Iverson algorithms is not useful for interferogram frameworking, because they produce undesirable spurs and the resulting framework is rather complicated (it is an attribute of the above mentioned algorithms, see. Tab. 1 e) g)). By contrast, when using Deutsch, Zhang-Suen and Hilditch algorithm the resulting framework is rather smoothed and formed spurs are easy to remove by further processing of the framework and by curves smoothing. So these algorithms are suitable for interferograms frameworking.

The program can be used in school area by students in expert, semestral, diploma and disertation works processing.

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THE IMPORTANCE OF HUMAN CAPITAL WITH THE FOCUS ON GENERATION Y

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Abstract: *The article praises the importance of human capital for competitiveness and prosperity of a company. To achieve business goals and long term sustainability companies seek to attract and keep young talents and nurture tomorrow's leaders. Selected survey shows that young generation of workers has different expectations and needs in the world of work which should to be considered by human resources management. Finally, this paper examines the human resources policy of the company Robert Bosch, Ltd. in České Budějovice and its approach to the young generation.*

Keywords: *Human Capital, Generation Y, Human Resources Management, Workforce.*

JEL Classification: *J24; M12; O15.*

1. Introduction

The constantly changing global business environment is connected with full utilization of human capital. The world has entered a new economy, the economy based on knowledge; land, money or materials are no more dominant. Current post-industrial world accepts ability to bring into new connection knowledge, skills and abilities as a driving force of innovations. The development of human potential with its creative abilities will decide about the competitiveness and prosperity of a company. Simultaneously, the significance of human resources management rises. Human resources management is the core of the whole company management. Human resources set in motion other resources and determine their exploitation. The first condition of successfulness of a company is hence the awareness of the value and importance of human resources, awareness that people represent the greatest wealth of an organization and that their management decides whether the company succeeds or not (Koubek, 2004). The main task of human resources management is to provide qualified, talented and motivated employees. It includes recruiting, sorting, selecting and placing of workers. The ability to retain competent individuals is also crucial for every organization. If qualified workers are constantly leaving the company it is permanently necessary to look for the new personnel and that is time- and money-consuming (Donnelly, Gibson, Ivancevich, 2005).

1.1 Definition of Human Capital

Human capital represents the human factor in the organization; it is a combination of intelligence, skills and experience which gives organization a unique character. The human sector is a sector with ability to learn, change, innovate and think creatively. If motivated properly this ensures the long term survival of an organization (Bontis et al. 1999).

SCHULTZ (1993) defines human capital as a key element in improving a firm assets and employees in order to increase productivity as well as sustain competitive advantage. Human capital refers to processes related to training, education and other professional initiatives in order to increase the level of knowledge, skills, abilities, values and social assets of an employee which leads to employee's satisfaction and performance and eventually to enhancement of firm's performance.

The concerns of human capital refer to attracting, selecting, stabilizing, development of human resources and awarding in order to create and keep qualified, loyal and motivated workforce (Armstrong, 2002).

1.2 Human Capital and Firm Performance

From the individual level, Collis and Montgomery (1995) highlight that the significance of human capital depends on the degree to which it contributes to the creation of a competitive advantage. From an economic point of view, transaction costs indicate that firm gains a competitive advantage when they own firm specific resources that cannot be copied by rivals. Thus, as the uniqueness of human capital increases, firm have incentives to invest resources into its management and the aim to reduce risks and capitalize on productive potentials. Hence, individuals need to enhance their competency skills in order to be competitive in their organizations.

Also, the training aspects which are related to the individual perspective have been brought into focus. As a human capital investment can be considered any activity which improves quality (productivity) of a worker. Therefore, training is an important component of human capital investment. This refers to knowledge and training required and undergone by a person that increases his or her capabilities in performing activities of economic value. Investment in training is desirable from personal as well as social point of view.

Human capital plays important role on organizational level in strategic planning in order to create competitive advantage. Snell et al. (1999) describe two dimensions of firm's human capital – value and uniqueness. Firm indicates that resources are valuable when they allow improving effectiveness, capitalizing on opportunities and neutralizing threats. In the context of effective management, value focuses on increasing profits in comparison with associated costs. In this sense, firm's human capital can add value if it contributes to lower costs at increased performances.

The development of human resources has positive influence on creativity and innovativeness which in turn offers positive implications on firm performance necessary for long term survival in the international and global market (Selvarajan, 2007).

2. Aim and Methodology

The target of the article is to emphasize the importance of employers' ability to attract, integrate and retain talented young workers which seems to be a key factor for assuring prosperous future. For this objective was applied the survey *Managing tomorrow's people with the subheading Millennials at work: Perspectives from a new*

generation (PricewaterhouseCoopers, 2008). The results of this survey represent opinions of university graduates who entered the labour market after July, 1st 2000 and were due to start work or already shortly worked (max. one year) for PwC. Questions regarding expectations of work answered 4,271 respondents from 44 countries (1,004 North America and the Caribbean, 943 Asia, 759 Western Europe, 481 Central and Eastern Europe, 215 South and Central America, 139 Australasia and the Pacific Islands, 67 Middle East and Africa). All respondents count among Generation Y that means a generation of young people born after year 1982 who grown up in the environment saturated with communication and digital technologies. Previous generation born between years 1965 – 1982 is called Generation X. Key findings reflect the changing attitude of new generation entering the workforce for the first time.

Eventually, a valuable insight into human resources policy at company Robert Bosch, Ltd. České Budějovice will be intermediated. It will be discussed whether this company perceive young people as means of competitive advantage and higher performance. It will be examined if the human resources management is orientated on the needs and expectations of young generation discovered by the survey mentioned above.

3. Key Findings of PwC Survey

The survey (PricewaterhouseCoopers, 2008) does not represent opinions of whole generation Y, it is more of a probe which showed the similarity of opinions on many questions and topics all over the world. It pointed out some distinct characteristics of young generation in comparison with previous generations which need to be respected. The company's management has to review whether the strategy of human resources management is valid for all generations or should be more flexible and diversified in relation to the motivation of different segments of the workforce. Creation of profiles for particular employee groups will enable employers to understand the diversity in the field of expectations and needs and that way effectively affect employees' behaviour. It is convenient to put accent on values which are appreciated most by the particular generation.

The survey showed that generation Y expects global job mobility. 94 % believe they will work abroad more than their parents and 80 % of graduates want to work overseas during their career. The most desired locations is the US, followed by UK and Australia (see Fig. 1), but overall appeals the most Western Europe.

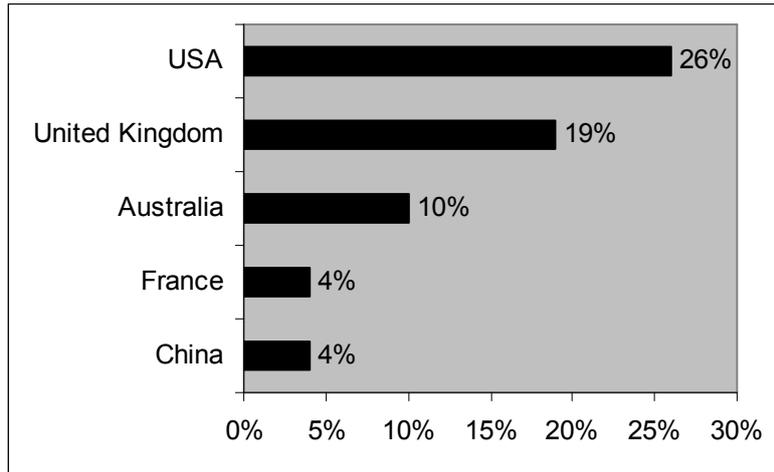


Fig. 1: Desired locations by generation Y for work abroad

Source: (PricewaterhouseCoopers, 2008)

70 % of respondents expect to use foreign language at work. Of course, this phenomenon is more frequent in countries where English is not the main language. But even in the countries where English is the main language is expected the need of another language necessary for work (34 % agreed in the US). Only 38 % stated English as their first language however 83 % expect to use English at work.

Generation Y is sometimes called internet generation. The results of the survey vindicated that technologies are considered as a key device for social and networking purposes. 85 % belong to some of the on-line social network (e.g. Facebook). Almost everyone owns a mobile phone, 86 % own an iPod or MP3 player. Young generation is strongly convinced that technology will play a critical role in tomorrow's workplace and point out the necessity for companies to keep pace with technology advancements.

Against expectations graduates do not refuse traditional work practices. Majority expect at least some element of office based working. Only 3 % expect to work mainly at home/other locations. Respondents are also ready to work regular office hours with some flexible portion. In Ireland dominate mainly regular office hours (53 %), whilst in Germany (54 %), Turkey (59 %) and France (50 %) mainly flexible hours. These expectations might change in the future in connection with the need for greater flexibility for example to look after family members.

In the question of number of employers during the career lifetime majority or respondents (75 %) believe to have between two and five employers. Only 7 % is convinced that the number of their employers exceed number ten. Nevertheless generation Y expect certain degree of job mobility, 30 % would like to alternate a variety of different roles and fields within one organization. Only 17 % of the sample would on the contrary like to remain in the same field within the same organization (see Fig. 2).

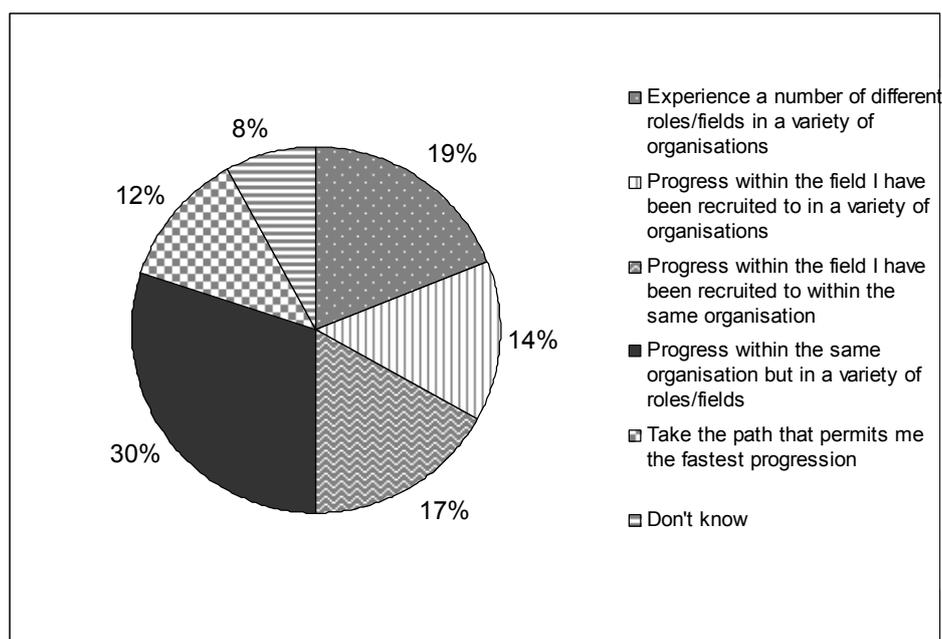


Fig. 2: Preferred career path by generation Y

Source: (PricewaterhouseCoopers, 2008)

The next area of the survey refers to benefits which young generation value most over the next five years. Among the most important benefits (apart from salary) range training and development which were chosen by almost one third of respondents (see Tab. 1). This type of benefits was indicated as a first choice benefit three times more often than cash bonuses. Regarding development 98 % of sample stated working with strong mentors and coaches was important to their personal development. All forms of personal development (training, coaching, mentoring, rotational assignment) were assessed highly whereas e-learning was least important.

Tab. 1: Most valued benefits (apart from salary) over the next 5 years (generation Y)

	1st choice	2nd choice	3rd choice
All respondents	Training and Development (53%)	Cash bonuses (41%)	Flexible working hours(41%)
Asia	Training and Development (64%)	Financial assistance with housing (46%)	Cash bonuses(39%)
Australasia and Pacific Islands	Training and Development (58%)	Flexible working hours (45%)	Cash bonuses(42%)
Central and Eastern Europe	Training and Development (61%)	Cash bonuses (40%)	Flexible working hours(32%)
Western Europe	Training and Development (57%)	Flexible working hours (38%)	Cash bonuses(36%)
Middle East and Africa	Flexible working hours (55%)	Training and Development (46%)	Cash bonuses(42%)
North America and the Caribbean	Flexible working hours (53%)	Cash bonuses (43%)	Free private health care(38%)
South and Central America	Training and Development (73%)	Cash bonuses (45%)	Flexible working hours(41%)

Source: (PricewaterhouseCoopers, 2008)

Generation Y have accepted the fact that neither the state nor their employer will fund their retirement. Over half (57 %) expect to fund their own retirement through personal investments and saving plans (see Fig. 3).

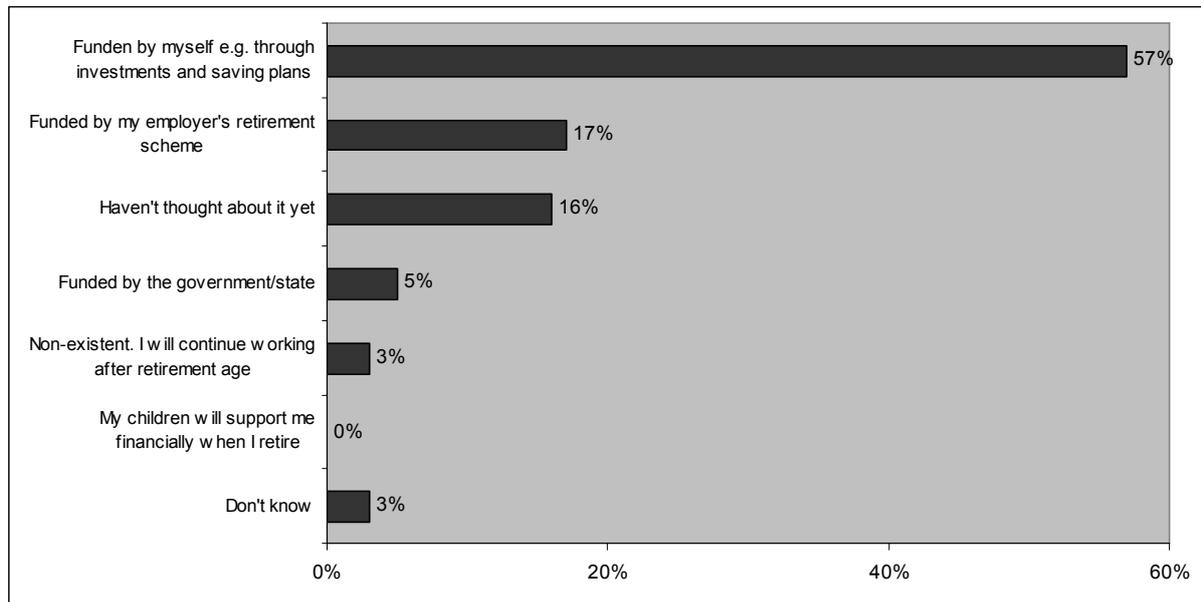


Fig. 3: Sources of retirement financing (generation Y)

Source: (PricewaterhouseCoopers, 2008)

Nowadays, firms commonly study customer needs, they define customer segments and create strategies for particular segments. In the future the analogous methodology could enter the human resources management to help develop efficient strategies for employees of various generations and life stages. Demographic changes consisting in increasing life expectancy and declining birth-rates in many parts of the world will lead to unprecedented shortage of young workers and need to keep employees past retirement age. The expectation that the unlimited source of talents will become emerging markets was not fulfilled. The lack of talents is just as critical in China, India, Eastern Europe and parts of South America. Therefore it is crucial to understand what motivates new generation, what are their priorities and expectations in the world of work.

4. Case Study

Company Robert Bosch, Ltd. České Budějovice was founded in 1992 as a joint venture of German concern Bosch, Ltd. and Motor Jikov, Inc. In 1995 Bosch became the only owner of the company in České Budějovice. The plant was built completely new with state-of-the-art equipment and infrastructure on the concern level with own research and development department including the testing facility. Over 2,500 employees participate in production and development of passenger car components. Customers are almost all significant European, Asian and American car manufacturers. At the beginning of 2007 the enlargement of development center was finished. This is used for new projects and especially as a durability tests center. Nowadays, over 300 employees work in the development department and take part in development of

products for plant in České Budějovice as well as for other plants of Bosch Group abroad (Robert Bosch, 2011).

Several times and also in year 2010 Robert Bosch České Budějovice won the competition Employer of the year of the South Bohemian region. The same company usually places highly in the competition Employer of the year of the Czech Republic. Committee assesses the personnel policy including the level of trainings, awarding, perception of company's values and trust in management.

In order to attract young talents the company cooperates with economic and technical universities in the form of diploma works and dissertations, professional practices, summer jobs, educational excursions and lectures. It also collaborates with student organizations – e.g. IAESTE on various projects (job fair, catalogue of job opportunities ...).

The company is consequently working on assuring its own future in terms of employees. For university graduates with economic or technical specialization and active knowledge of English or German language is offered a possibility to make contact with the company (Robert Bosch, 2011):

- Attending professional practice – experience operation of individual departments, participation in projects and acquiring first work experience in an international environment
- Compiling diploma work – annually company offers a list of topic for diploma works, it is also possible to arrange an individual topic, part can be also paid pre-diploma practice
- Scholarship program – for students of third and higher year with above average educational attainments
- Mentoring – program organized in cooperation with career center of the Czech Technical University in Prague which enables a student (a mentee) to experience the real environment of an international company; a student accompany his/her mentor during everyday work, improves skills, learns about decision and management methods, actively participates in meeting and projects (ČVUT v Praha, 2010).
- Company Bosch also arranges accommodation at student residence, contributes to the transportation, provides financial awards or offers possibility of future employment.

In 2010 the examined company extended its activities of new and less traditional projects (Kadlecová, 2010):

- Rough Interview – this project should advise how to succeed at selective procedure; the students can try an interview with the human resources staff and specialists
- Day of Profession - introduces the work of technologist and developer which should facilitate the choice of future position

- Bosch University - the most extensive project with target to show the process of development till production of a product from the point of view of all involved departments
- Women's Day at Company Bosch – the female students can learn about company from female managers
- Female Students of Technical Universities Get the Green Light at Bosch – the female students can contribute to solve current gender issues.

University graduates can be hired on a position of a trainee. After completing one-year-experience at different departments such person can choose his/her final assignment. The trainee program is a valuable experience and helps young people find a position which suits them best.

In general, the company offers to employees professional and language courses, trainings and further education in the Czech Republic as well as in foreign branches of Bosch Group, cash bonuses, possibility of personal and professional growth. It is possible to progress within the same organization in a variety of roles/fields. As an international corporation Bosch can ensure the usage of foreign languages, especially German and English, on daily basis. Common is a foreign assignment. Also an above standard social program including financial assistance with housing and partial funding of retirement saving plan is being provided. Working hours are regular with some flexible portion. The company is at the cutting edge of world technology.

5. Conclusion

The business atmosphere is changing and organizations are competing to gain and keep best employees who are able to think innovatively and reach certain professional and qualification level. The better knowledge of employees and potential candidates enables a company to create effective strategy to attract and retain talents and future leaders. Companies aware of specificities of young generation (generation Y) have greater chances to recruit employees of the highest quality. The knowledge of young generation with its divergences seems to be a key to future success. Why not to turn away from financial benefits and give preference to wider usage of coaching, mentoring, flexible working hours, modern technologies or global working opportunities. The obvious willingness of young generation to travel and work abroad should be a good message for companies. Globalization significantly increased the demand for mobile workers. Young employees would acquire valuable experience in the early stage of their career and the financial burden of many costly overseas positions would be reduced. An advantage is also to offer progress within one company in variety of fields. Young people have different needs and aspirations than previous generations. Therefore it is convenient to creatively create the awarding strategy and contemplate what motivation factors are suitable. Company Robert Bosch, Ltd. České Budějovice can be considered as an example of a company with well-developed human resources policy. The employees are regarded as human capital and the effort is widely focused on young generation. With various personnel projects aimed to university students the company tries to gain as many talents as possible. The opportunities of further education, trainings, foreign assignments or wide social

benefits correspond to the preferences discovered by PricewaterhouseCoopers survey. Based on these facts can be company Bosch considered as an attractive employer for the young generation. The companies which now invest in discovering specificities of young people and focus attention on generation Y will be in the best position to succeed in the future.

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THE USAGE OF SYSTEM DYNAMICS IN REGIONAL SCIENCES

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***Abstract:** The paper deals with presentation of system dynamics as the tool for modeling of economic processes. The model of regional competitiveness is used for closer characteristics of this discipline. The system dynamics enables to search and mutually to combine “hard” and “soft” processes in regional economy. The searching retroactive reactions of elements of system to interference with regional economy is the next important character.*

***Keywords:** Regions, Competitiveness of Regions, System Dynamics, Model of Competitiveness, Simulation of Model.*

***JEL Classification:** O15, O18, R11, R15.*

1. Introduction

The creation of economic models is very sophisticated matter. The creation of models is especially complicated on that account that on the one hand tries to realize economic reality in simplified form and on the other hand tries to reach maximum credibility. The next problem of modelling relates with influencing by human sense of reality. Hence this sense is only able to analyze the limited quantum of causal linkages among elements of a model. The backward reaction among original elements to evolution of a whole system is not reflected by human sense.

The discipline of system dynamics is the basis of mentioned problems. This discipline tries to intercept all feedbacks of particular elements with each other. The models (outputs) can be used especially for prediction of e.g. economical politics, economical behaviour of various subjects etc. The principle of system dynamics is for its presentation applied to field of regional studies. Hence regional economic models try to describe and analyze “soft” factors as well which influence by principal way the processes in a region.

The instruments of system dynamics it is possible to use only that time if it is possible to describe a region as a system of subjects and relations among them. The conception of the region as the system can be founded e. g. in publication written by Skokan (2004). The wider elaboration of this question is caught by Hudec et al. (2009), who underlined the importance of opened region for increasing its ability to adapt to continually changing conditions.

In case of regional competitiveness and its effort to achieve of required level of competitiveness it is necessary to mention the group of Berman Group (2006). The emphasis is especially put on interference of relevant factors of competitiveness. In terms of foreign authors can be mentioned Kitson et al. (2004), who notices relations among basic factors of competitiveness structured in hexagonal form, eventually

Gardiner et al. (2004), who deals with hierarchical structure of factors of regional competitiveness.

2. The General Dynamic Model in Graphical Form

The dynamic model can be expressed in graphic form where are evident relations among particular components of the system. The used method of graphical presentation of the above-mentioned system is causal loop diagrams or stocks and flow diagrams. The model can be displayed by the help of icons which enable an orientation in the model. In following Fig. 1 are illustrated the most important types of symbols which will be further used for representation of surveyed regional models.

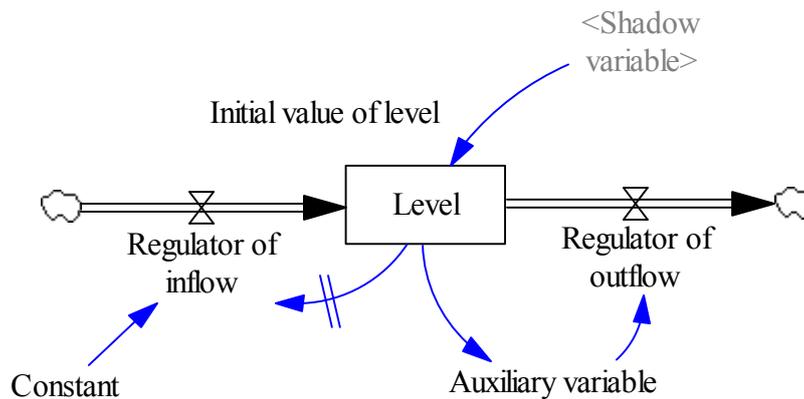


Fig. 1: The symbols used in dynamic models

Source: modified according to (Forrester, 1961) and (Burianová, 2007)

The level presents the accumulation in the system. It is the present value of those variables, which are the result between inflows and outflows. Each level has the own initial value and can be further influenced by constants and other variables. The causal feedback among variables is expressed by single indicator. The double indicator presents flow (inflow or outflow) which is influenced by regulators.

The simple arrow illustrates the causal linkages among variables (eventually among constants and variables). Double crossed arrow (illustrated between “level” and “regulator of inflow” in figure 1) represents the delay. Two-line arrow represents above mentioned flow (inflow or outflow) which is influenced by regulators. The flow can start or can finish in some accumulation or can go out the system (expressed by symbol of cloud – means border of a system). Every accumulation represents the state variable, the outflow represents the negative part of dynamic equation and inflow is the positive part of this dynamic equation.

The auxiliary variables are the next elements of the system. These variables represent exogenous variables and exact functions. Each auxiliary variable has the formula which expresses the value of this variable in dependence on other elements of system which have the linkage with it. The regulators are in principle the auxiliary variables. The shadow variables represent the other part of system. However these variables are the cross-over bridge among particular models.

3. The Description of Chosen Models of Competitiveness of Region

The competitiveness model of regions consists of the following sub-sections:

- demographic model,
- labour market model,
- capital and production model,
- infrastructure model,
- quality of life model.

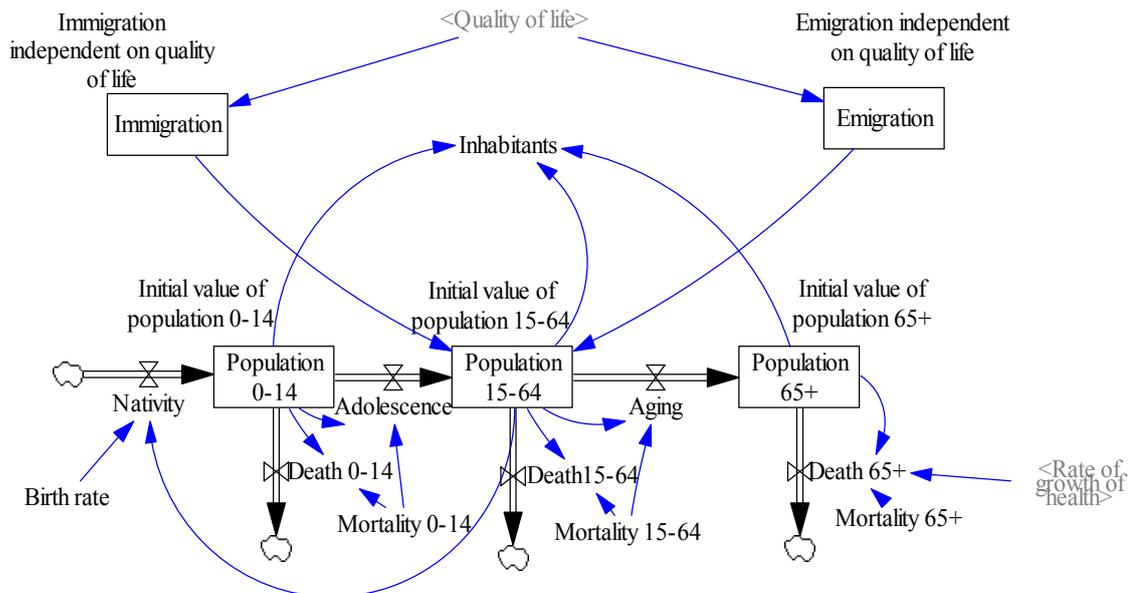


Fig. 2: The demographic model

Source: (own construction)

The demographic model shows the changes in the composition of the population due to natural movement of population and migration. The basis of the model is to create a descriptor of aging, which is based on the above mentioned population distribution and relationship between them. Status of the population is affected by the birth and death rate. The rate is essentially a constant, which reflect the population's reproduction rate, or the proportion of dead people in the population. Another important factor that affects the status of the population in a region is migration. The level of immigration (or emigration) is divided in the model into immigration (emigration) dependent on the degree of improvement in quality of life, and into immigration (emigration) not dependent on this measure. The model assumes that an increase in quality of life encourages inward migration from other regions. On the contrary, reducing the quality of life will result in a gradual decline in population caused by the departure of the population outside the surveyed region.

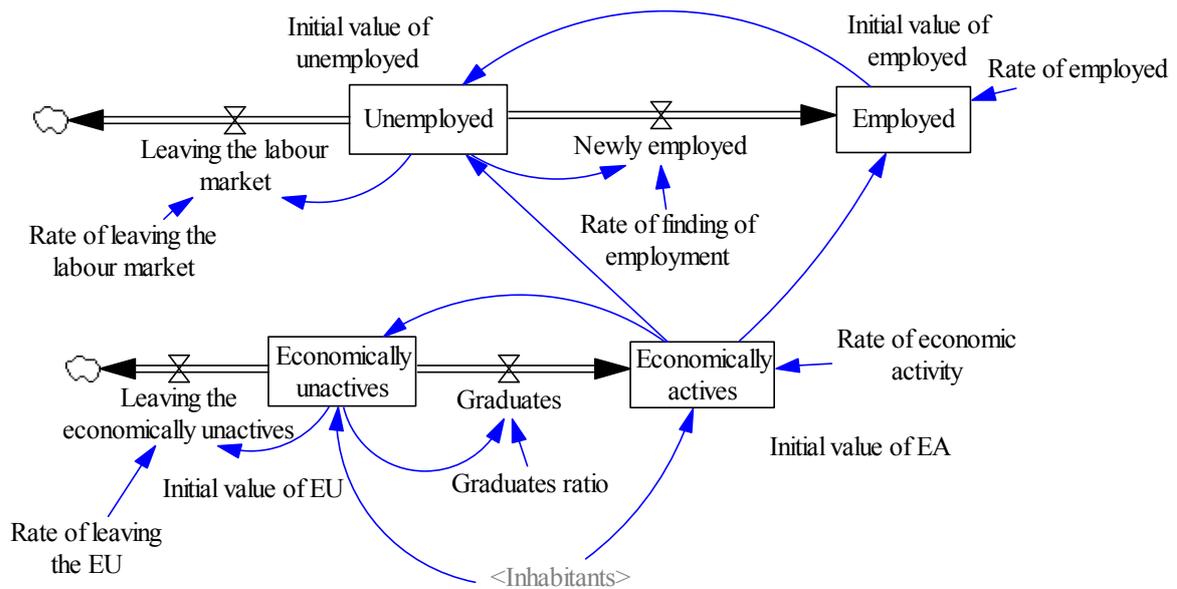


Fig. 3: Labour market model

Source: (own construction)

The model of labour market is connected with the mentioned above demographic model through the variable “population”. The model divides population according to the level of economic activity into:

- economically active (EA),
- economically inactive (EU).

The economically active population can be further divided into:

- workers,
- unemployed.

Among these four levels is the movement of people, which is expressed by auxiliary variables:

- graduates - the number of students who completed their studies and enter the labour market (for simplicity the entry of graduates into the labour market is only considered, women re-entering the labour market after maternity leave are not considered, etc.),
- leaving the labour market - the number of unemployed who are not searching for a new job, or those leaving the labour market,
- EU exit - number of economically inactive inhabitants who leave a system.

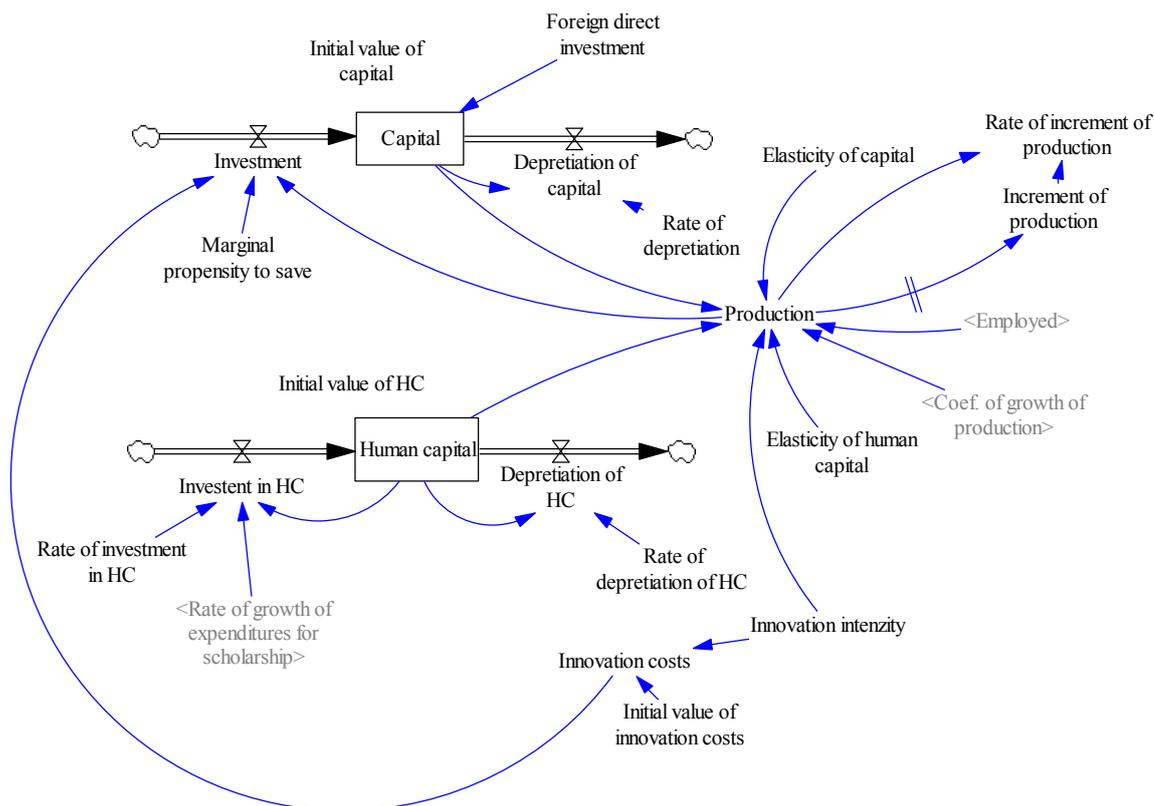


Fig. 4: The capital and production model

Source: (own construction)

The capital model results from the Solow model of stable growth. A prerequisite of this model is to identify the region with the Cobb-Douglas production function, which considers a constant returns to scale, and includes technical improvements (given exogenously). This technical improvement in the model is represented by the growth rate of production that is influenced by changes in infrastructure.

Other components of this model are foreign direct investment (FDI) and the intensity of innovation. The amount of foreign direct investment is determined by the influences outside the regional economic system. In the model, their amount is not dependent on the production size of the economy.

The intensity of innovation is a share of the cost of innovation and a firm's income. Such innovation costs affect both production growth and they also have an effect on the level of investment in the economy. The relationship between innovation and product is expressed by multifactor productivity which is represented by product growth by constant amount of capital and labour.

Another component of the model is human capital. An increase in the size of human capital is education and level of investment. The measure of investment is furthermore increased by measure of annual growth in expenditures on education.

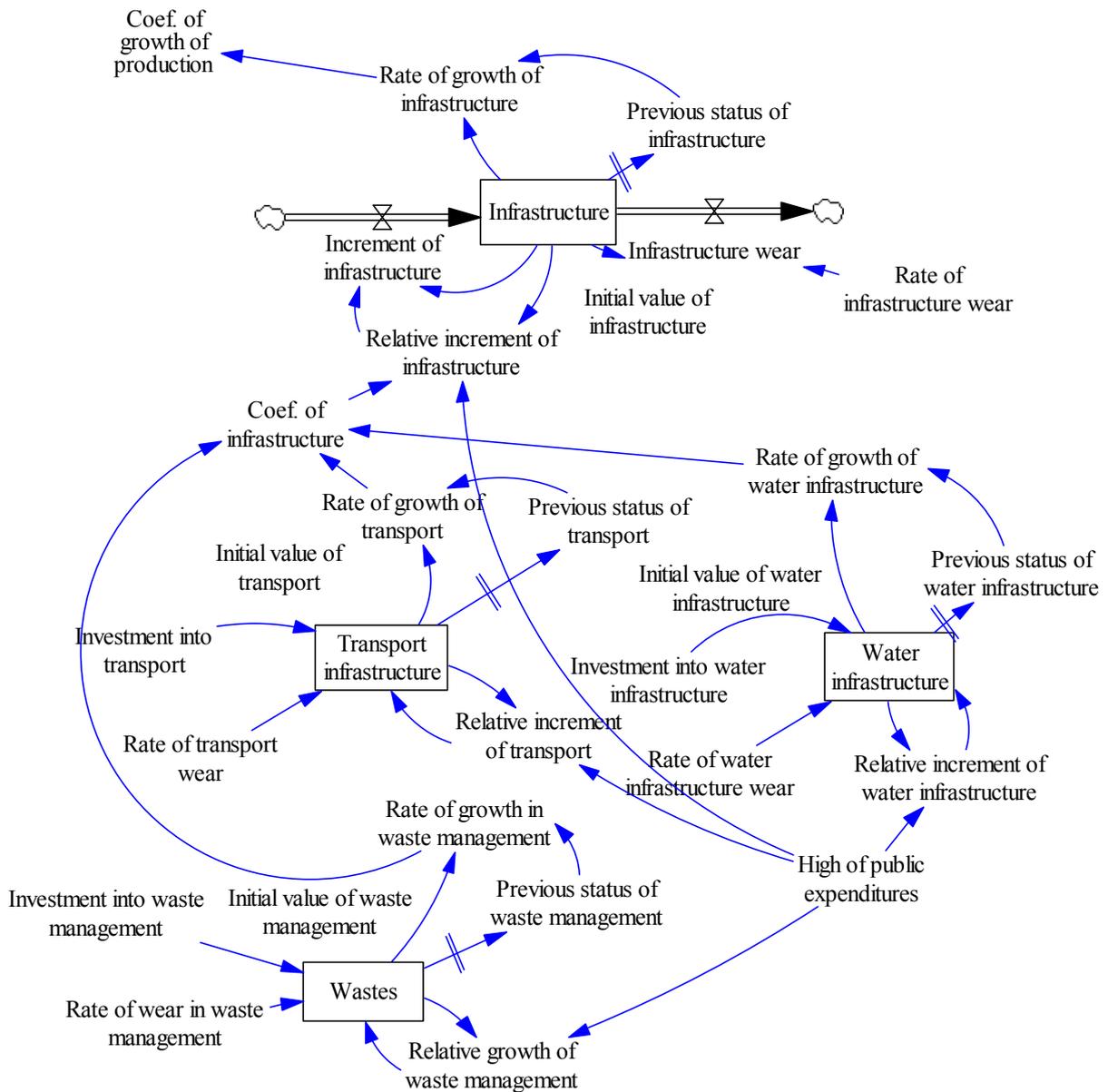


Fig. 5: The infrastructure model

Source: (own construction)

The model of infrastructure displays impacts of chosen types of infrastructure on regional production. The infrastructure in this model is divided into:

- transport infrastructure,
- water infrastructure,
- waste management.

The limiting factor for all three studied examples is public infrastructure spending. With the growing demands on infrastructure the cost for its maintenance and expansion also increases. Agglomerative losses are proved here. For each type of infrastructure, it is necessary to determine the relative growth of the kind of infrastructure; the size of growth will limit the amount of the investment.

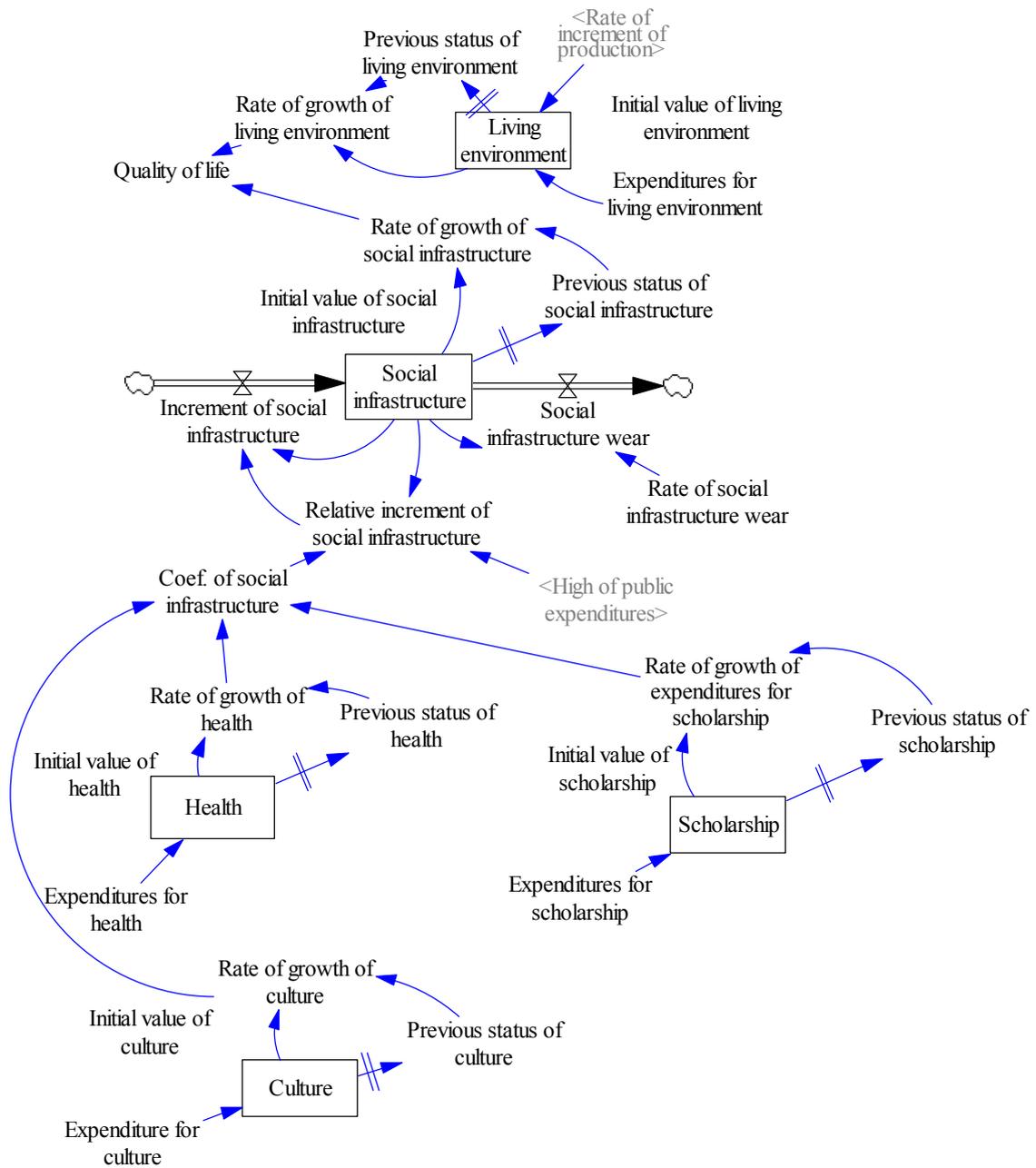


Fig. 6: The quality of life model

Source: (own construction)

In terms of the quality of life model, the chosen elements in social infrastructure contribute to its growth. This is a part of the infrastructure, which provides spatial, temporal, and proportional access to social services and activities affecting all sectors of human development. Therefore health service, education, and culture are collected in this model. Quality of life is further influenced by the living environment, where a positive working relationship between the amount of expenditures and improvement of living environment, is assumed. The state of the environment is also affected by increment in production. The existence of negative externalities, whose external symptom environmental pollution, is assumed.

As was stated above, quality of life becomes in the searching model a factor which influences migration flows in a region. Enhancing quality of life will cause a positive migration balance and on the contrary, its reduction will result in an out-flow migration of inhabitants from the region.

4. Simulation of Model of Competitiveness

The current competitive model was simulated in the program Vensim PLE. For this reason, it was necessary to add graphical models of functional dependencies between the different levels, auxiliary variables, and constants. Before running the simulation, the time horizon of 50 years was set and further, time step equal to 1 was set. This means that the simulation program made 50 repeated cycles of model. The graphical output displayed shows that the time horizon of 50 years is sufficient to detect trends in the examined variables.

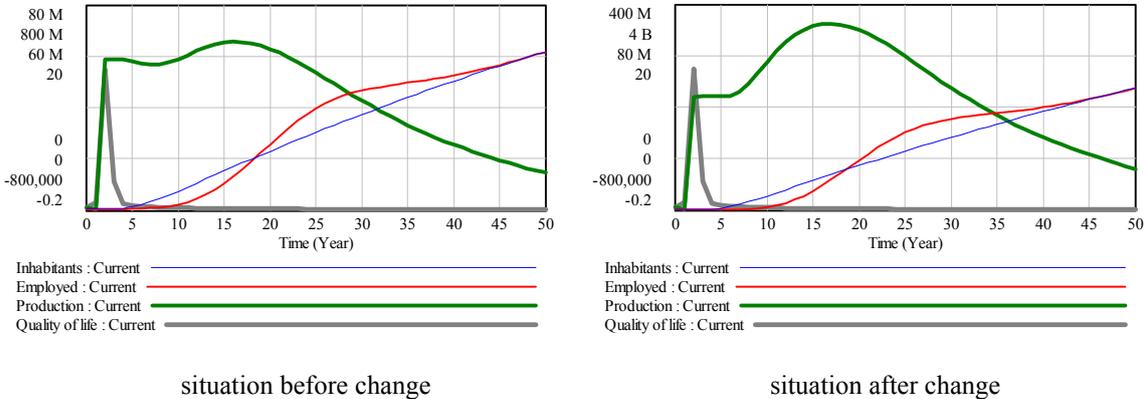


Fig. 7: The influence of migration of regional competitiveness

Source: (own construction)

The most important factor in the demographic model is migration. Simulations showed that an increase in the influx of people into the economy increases the value of the controlled variables. Trend component are virtually unchanged in graphs.

In case of production we can speak about sharper growth. After reaching its peak, the product of regional economy began to drop once more. During a period of 50 years (eventually 50 repetition of the given cycle) the peak in product shows the slightly higher values as in the case of primary model. The relationship between migration and employment growth occurred only in growth of absolute values. The trend in the curve remained unchanged. It is possible to deduce, from the above mentioned, that an increase in the number of incoming residents only caused the dislocation of all searching variables in absolute values. The trend of the curves remains unchanged. It can thus be concluded that migration has a short-term effect on the competitiveness of a region.

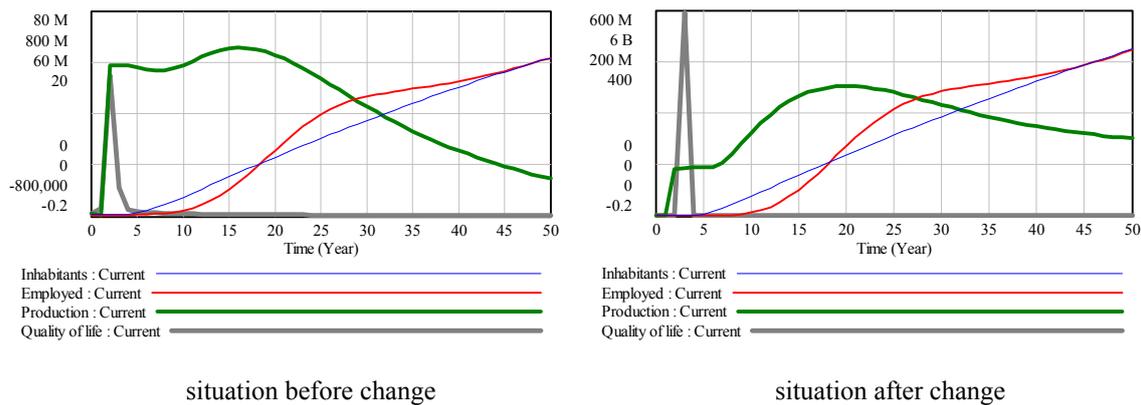


Fig. 8: The influence of increasing of intensity of innovation on regional competitiveness

Source: (own construction)

The intensity of innovation is another factor which is simulated in the model. By comparing the observed values can be stated that there was an overall increase in all indicators. Increased rates of innovation, on the one hand, caused higher growth of production in absolute values, on the other hand, the decrease of production is decelerated in longer time period. The trend of other curves does not change in this case. Therefore it is possible to deduce the long-term influence on the competitiveness of region.

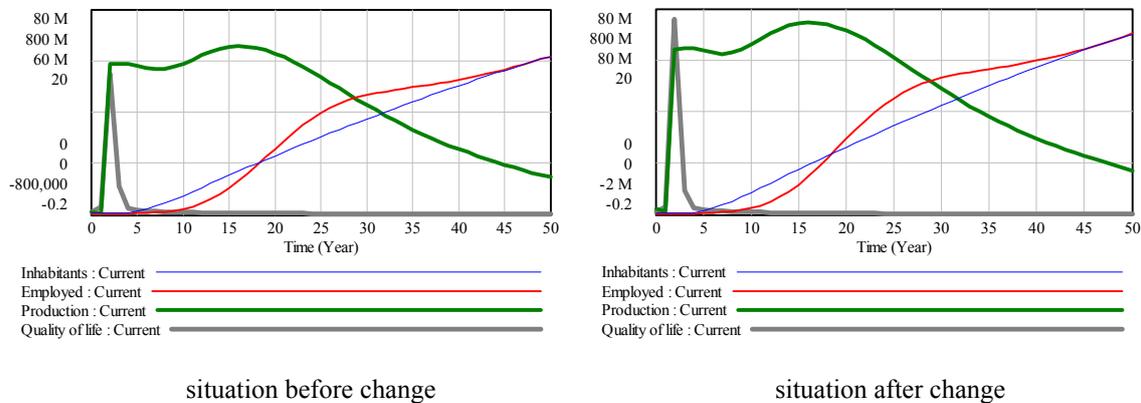


Fig. 9: The influence of increasing of foreign direct investment on regional competitiveness

Source: (own construction)

The influence of exogenous factor was tested in the third case. This factor is represented by foreign direct investment. We can speak about the shift in absolute values of searched indicators (see the previous exogenous factor of migration). The trend of all curves does not in principal change. Also the direct foreign investments support the regional competitiveness. However it is not possible to conclude from performed simulation at essential change of processes which ensure the sustained growth of competitiveness of regions.

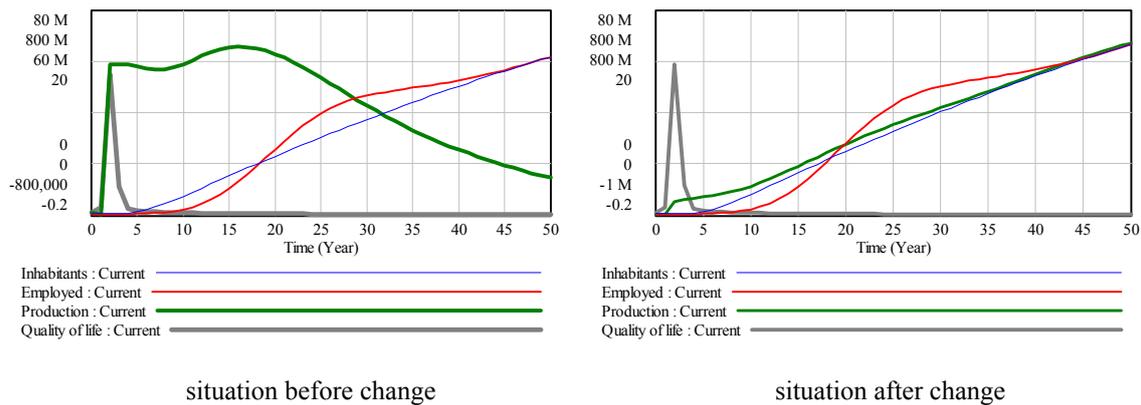


Fig. 10: The influence of increasing of rate of investment in human capital on regional competitiveness

Source: (own construction)

The increasing rate of investments in human capital brings different results in comparison with previous searched factor of regional competitiveness. The figure 10 shows the change in trend of production function. Investments in human capital bring the growth of production of the region. For the present it is not possible to speak about sustained growth of competitiveness in case of this simulation because the count of cycling was limited at 50 stages. It is possible that the trend of curves will change by the choice of longer time horizon.

5. Conclusion

The system dynamics represents one of many methods which enables to search various processes not only of economic character. This article is focused on presentation of discipline of system dynamics and for its application was chosen the question of regional competitiveness. The system dynamics namely enables to search the processes in all their causal relations. The human mind is not able to analyze the more sophisticated causal chains. Furthermore many mutual feedbacks of elements of a system occur in reality.

The model of regional competitiveness - comprehensive of five submodels influencing economic performance of a region - was used as an example. The models of system dynamics serve on one hand for analysis of relations in terms of region and on the other hand for prediction of evolution of this matter. These dynamic models namely enable to involve influences of “soft” processes in a regions as well. These processes can be connected with the notion of quality of life. It is necessary to take into account the “soft” factors in case of searching purely economic interventions in regional economy.

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ESTIMATION OF SOFTWARE PROJECT RANGE

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Abstract: *Organizations use information systems for support of their entrepreneur activities, thus as support for fulfilling their entrepreneur goals. Information systems are subject to frequent changes, such changes are realized through software projects. The goal of project management is to ensure required functionality within set time period and with relevant cost. Success rate of SW project is in interest of both customer and supplier, while the supplier can be either external (by means of outsourcing) or internal (own IT department within organization); the customer can also be either external (customer from different organization) or internal (user within organization). The customer decides, based on values determined by estimation, whether to realize SW project and whether to realize the project in given range; i.e. the customer is interested in the project not being overestimated. The supplier of IT services plans project elaborateness according to availability of their capacity, i.e. there is the interest of the supplier in project not being underestimated. The text addresses the topic of designing a method for creating estimation of SW project range by means of expert estimation modification with consideration of historical data.*

Keywords: *Software Product, Software Project, Methods of Estimation of SW Project Range, Expert Estimation.*

JEL Classification: *M11, M15.*

1. Introduction

Various organizational levels of the company requires specific type of information and specific method of information processing, while various data levels are recognized within organization [17] [18]:

- Operational data level: requires processing of data considering routine corporate agenda; information systems react on performance of daily tasks and monitor transaction flow across the organization;
- Knowledge data level: contains not only client applications of corporate information system, but also personal information tools; these applications supports growth of knowledge base of the organization and manage mainly document flow.
- Managing data level: requires information required for fulfilling of administrative tasks and decision-making support,
- Strategic data level: requires systems which support top management in course of identification of long-term trends; managing and strategic level are based mainly on analytical data, or in other words they result from operative data transformed to analytical data.

Information systems or their applications are always aimed at certain data type, on certain group of users or on certain functionality. Changes in conditions related to entrepreneur activities must necessarily reflect the requirements for organization information environment; information systems therefore change / develop according to the needs of the organization.

Changes in information support within an organization, i.e. changes in information systems, are realized by means of software projects [11]. The goal of project management is to ensure required functionality within set time limit and with relevant costs [12] [7]. Determination of software project range, especially information about realization time and project costs, is a complex process of creation of estimations in various project phases. A great volume of information which influences characteristics and functions of resulting software product needs to be processed. Estimation of software project is further burdened by unpredictable external events; project team can get an order to prefer other/key project, changes of assumptions on functionality [14]. The price of a SW product is then influenced by, besides range, other aspects, such as usability [9].

Software development is a complex process while a number of factors directly or indirectly influence the success rate of the project. Within The Standish Group company [16] a long-term study has been elaborated which addresses the evaluation of software projects success rate (it is about IT projects realized in the USA and information about projects is obtained by means of interviews or workshops with project managers); results are published annually within the CHAOS Report [5]. It is clear from the results that successful projects constitute approximately one third of all projects; these are projects finished in planned time, with planned costs and where planned goals were satisfied. Two thirds of projects are either challenged (project was finished with usable results, but time schedule was not fulfilled, costs were higher than planned or not all requested functionalities were implemented) or failed (project was either terminated before finishing or its results were never implemented).

Observation of problem of success rate of software projects is in the best interest of both customer and supplier, while the supplier can be external (by means of outsourcing) or internal (own IT department within the organization), and, consequently the customer can be either external (customer from different organization) or internal (user within the organization). For the supplier the estimation of software project is a tool for HR planning. The customer, on the other hand, is interested in delivery date or purchase price. The text is aimed at estimation possibilities performed at the start of a SW project.

2. Statement of a problem

SW project is based on methods or methodologies of information system development. These methods can be classified for example by range, scope, detail level of the method, development approach and so on. [2] [8] [18]. One of those is the RUP (Rational Unified Process) [10], where the iterative development, visual modeling, object approach and communication is stressed; for modeling and documentation purposes the UML standard [6] is applied. Within the RUP a SW

project goes through following phases – Inception (with the aim to define boundaries of the project and to identify key requirements for finite product), Elaboration (specification of requirements for purpose of analysis and design), Construction (programming itself, creation of database structure and GUI), Transition (transition of system from development environment to customer’s production environment; final testing and installation).

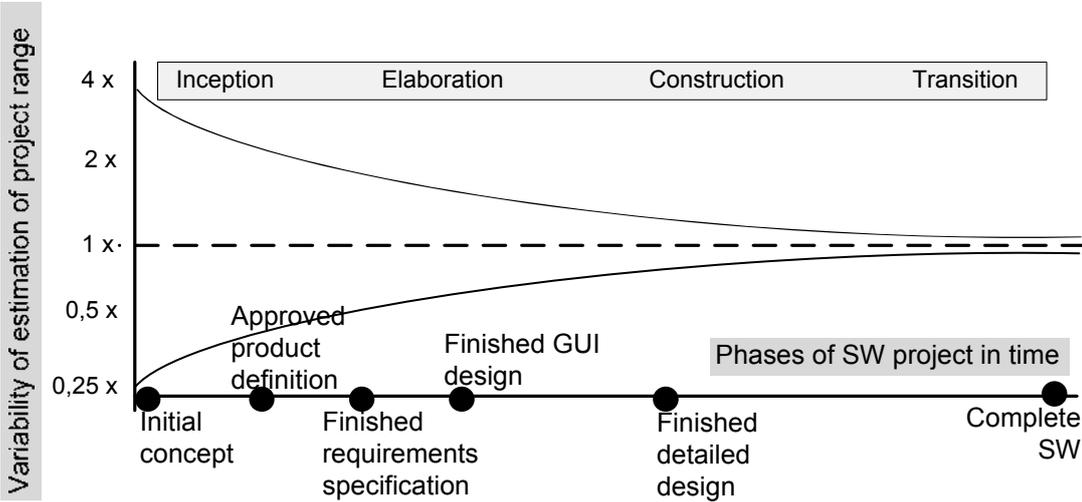


Fig. 1: Uncertainty cone expresses variability (increasing precision) in estimation of SW project within SW project steps (work, costs, characteristics)

Source: [14], [16]; own adaptation

Quick and precise estimation of SW project is an important piece of information for the purpose of deciding about realization of SW project and consequently it influences success rate of whole project. Quickness and precision of estimation of SW project are mutually conflicting. To perform estimation the fastest possible, i.e. in the beginning of a project, means to use minimal amount of information. The user defines input requirements and his/her requests for information system, but these requests tend to be further specified in more details or even change. That way elements of further phases of information system development change. That means that initial estimation is very much burdened with all the changes made, which will manifest gradually. This situation is expressed in figure 1.

The most exact “estimation” can be done at the end of the project, when all information about work realized and costs within the project are at disposal. Estimation performed in any other phase of the project development of SW project can differ from reality for example two times (real costs are in the graph expressed by hatchet line with description “1 x”). The user and supplier are both interested in estimation performed at the beginning of the SW project, but there the risk of insufficient amount of information is the greatest, which results in deviation of estimation from real and finite costs and time consumed – in sense of either overestimation or underestimation. Various estimation methods are suitable for various development phases of a SW project.

2.1 Estimation methods

Methods of software estimations can be divided into two main groups; the first group consists of methods based on experience and comparison while the other group is based on usage of “historical data“ by means of mathematic models. Utilization of these methods can be measured by various aspects [14]:

- estimated characteristics: for instance volume, extent of work,
- project volume: small projects (up to five workers, duration time in weeks or months), middle sized projects (5 to 25 workers, duration time from 3 to 12 months), large projects (over 25 workers, duration time 6 to 12 months, possibly even longer),
- development phases: stems from used method for software development,
- development phases: gradual (required finishing one phase before proceeding to next one) or iterative (phases could be repeated several times),
- reachable precision: for example classification to low, average and high.

Suitable methods for estimation of the range of a SW project are considered the following ones– Expert Estimation, Analogy, Use Case Point and Functional Points method [14].

EXPERT ESTIMATION METHOD is based on experience of an expert. It is a relatively simple method. Subjectivity of the method can be eliminated by participating of more experts. The expert estimation is suitable for smaller projects and for situations when there are no historical data about previous projects within organization. The ANALOGY METHOD is a modification of the expert estimation method by information about projects created in the past.

USE CASE POINT METHOD (UCP) evaluates project by points. Determination of points results from use case model and from classification of points by their complexity. Points obtained are then multiplied by the number of hours which are required in order to process one point while the recommended value is 20 hours per one point [3]. Calculations are based on four variables - Technical Complexity Factor (TCF), Environment Complexity Factor (ECF), Unadjusted Use Case Points (UUCP) and Productivity Factor (PF).

$$UCP = TCF * ECF * UUCP * PF \quad (1)$$

The process of the method consists of following steps – Determine and compute the Technical Factors, Determine and compute the Environmental Factors, Compute the Unadjusted Use Case Points, Determine the Productivity Factor, Compute the product of the variables. The method is suitable for any project size, necessary ground are customer defined requirements within use case models.

FUNCTIONAL POINTS METHOD (FP) measures the range of SW projects by the number of application functions and amount of data; the method requires detailed analysis. Transaction functions are related to - external inputs (EI), external outputs (EO) and external enquiry (EQ); data functions are related to internal logical files (ILF) and external interface files (EIF). Each group is assigned with weight (W) and

the number of elements (N) in group is considered. Based on these values the Unadjusted Function Point Count (UFPC) is determined.

$$UFPC = W_{EI} * N_{EI} + W_{EO} * N_{EO} + W_{EQ} * N_{EQ} + W_{ILF} * N_{ILF} + W_{EIF} * N_{EIF} \quad (2)$$

Next, general system characteristics are valuated (reliability, accessibility, response time and others) and this valuation would reflect the UFPC; from this process we will obtain finite function points. Then it is necessary to determine price and elaborateness of one function point; the result is then total cost and total elaborateness of SW project.

Further methods are based on the source code volume. The method called The Constructive Cost Model (COCOMO) [4] can serve as an example. Nevertheless, the subject matter of this text is estimation performed in initial phases of SW project, when source code does not exist yet.

2.2 Requirements of customers

Requirement is a concrete verifiable behavioural function of the system which is defined and verified within Service Level Agreement (SLA). Basic characteristics of the requirement are verifiability and feasibility; analysis of requirements is done in order to comprehend subjective problem of a customer. Specified requirements are a presumption for unification of customer’s and supplier’s conception of a SW project. Analyst, based on available information, defines the target of the project, functional and non-functional system requirements (functional requirement is system functionality; non-functional requirement is for example safety issue). In order to gain and specify requirements, interviews with customers are done, prototypes are created and GUI is modeled. Key role in specification of customer’s requirements and also risk of SW quality related to that is expressed in figure 2.

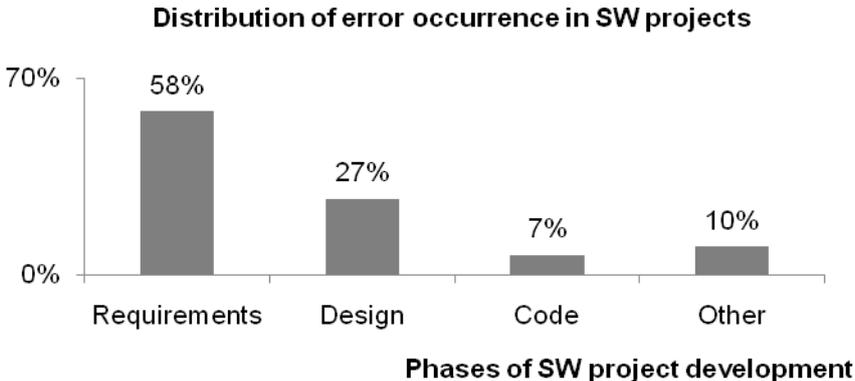


Fig. 2: Customer’s requirements as main sources of errors in SW projects

Source: [1], [13]; own adaptation

The graph in the picture stresses out the risk that more than a half of errors in SW projects are a result of inaccurately specified and analyzed customer requirements. Causes can be – incorrect, confused or ambiguous requirements, eventually omitted requirements.

3. Problem solving

The aim was to determine a method for creation of elaborateness estimations of SW projects for selected area. The method should serve to maximize precision of estimations performed in the initial phases of the SW project. Following initial conditions are stated:

- organization represents suppliers of application services, which are determined for external customer (customer uses SW services by means of outsourcing); these application services are implemented through software projects (in this case there are twelve software projects with the names Project A to Project L); organization is in “common“ situation, i.e. it is a highly expert development team and consequently there are topicality and range reserves in documentation,
- historical data – data about estimations – (estimations within categories – analysis, design, programming, testing, documentation) is archived and it is, therefore, possible to confront them with information about real project range (see figure 3);
- the estimation of the range in the organization is performed by means of subjective estimation of an expert and the value of the estimation is a significant part of dealing with a customer; cooperation between supplier and customer is then lead within SLA.

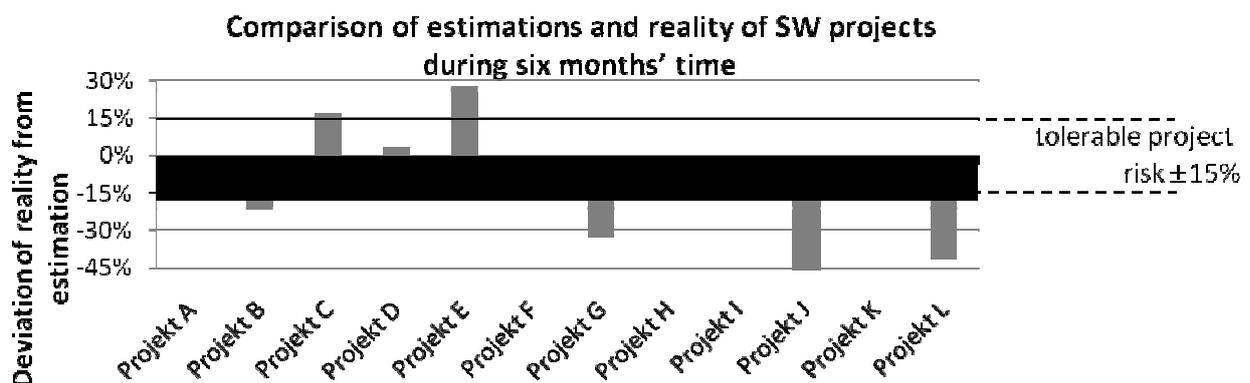


Fig. 3: Deviation of real ranges of SW projects from initial estimation

Source: (own adaptation)

The graph in figure 3 expresses a comparison of elaborateness estimation with real elaborateness, while SW projects within six-month period were compared. A tolerance of $\pm 15\%$ is used in SW project estimation; it is calculated as project risk. It is obvious from the graph that only three projects (25 % from total number) within the monitored time period were in the $\pm 15\%$ tolerance (D, F, K), seven projects were underestimated (A, B, G, M, I, J, L) under the tolerance level and two projects were overestimated over the tolerance level (C, E). That means that only in 25 % of projects the reality adhered with the estimation (within tolerated project risk) and 75 % had incorrect estimation, while there was tendency of underestimating. In the monitored organization the method of expert estimation was used for estimation. From monitoring of projects performed (see figure 3) it is obvious that projects tend to be

underestimated (58 % from total of 12 projects monitored). It is therefore necessary to specify a SW project.

Table 1 compares utilization of the methods considered – expert estimations, use case point and function point. On one hand there is a request for utilization of objective methods, on the other hand there is a request to perform estimation in initial phase of SW project. Because of the second request, utilization of UCP and FP methods seems inappropriate, since in order to efficient application analysis has to be performed beforehand; use case models for UCP method and functional requirements models for FP method.

Tab. 1: Comparison of usability of methods

	Expert estimate	UCP	FP
Data about previous projects	Does not use	Uses	Uses
Application within SW project	Possible at the beginning	Not possible at the beginning, because use case models have to be done	Not possible at the beginning, because it is necessary to have functional requirements models elaborated
Disadvantages / requirements	Subjective estimation	Partial analysis has to be performed	Detailed analysis has to be performed

Source: (own adaptation)

Design of modified estimation method is based on following reflections:

- to specify the estimation method mainly on the fact that present method led in most of projects to underestimation of elaborateness,
- base estimation of range on calculation according to the PERT method (Program Evaluation and Review Technique),
- method extended by utilization of historical data (data about previous projects) which would ensure correctness of expert estimations.

The starting point is the elaborateness estimation according to the PERT method calculation [15]:

$$T_E = (T_O + 4 * T_M + T_P) / 6, \text{ where} \quad (3)$$

T_E is estimated time necessary for activity, T_O is optimistic estimate of activity time, T_M is the most probable estimate of activity time, T_P is pessimistic estimation of activity time. Classification of following parameters was designed (ranges of elaborateness in man-days):

- R : value of real range of given type of activity (gained from historical data),
- R_{AVG} : average value of real range of given type of activity (gained from historical data),
- E_{MIN} : estimate of the best (the smallest) value of given activity type range,
- E_{MAX} : estimate of the worst (the greatest) value of given activity type range,
- E_{EXP} : estimate of expected activity range.

- T: resulting extent of the project (in T_A, T_B, T_C alternatives – see below for description).

The calculation of elaborateness estimate will not exist in three alternatives.

The first alternative is calculation according to PERT.

The second alternative is modified calculation with consideration of R_{AVG} value.

The third alternative is modified calculation, where R_{AVG} value is not available; in such case influence of E_{MAX} value is “reinforced” – mainly in order to eliminate tendency of underestimation of project range:

$$T_A = (E_{MIN} + 4 * E_{EXP} + E_{MAX})/6 \quad (4)$$

$$R_{AVG} \text{ value is available: } T_B = (E_{MIN} + 3 * E_{EXP} + R_{AVG} + E_{MAX})/6 \quad (5)$$

$$R_{AVG} \text{ value is not available: } T_C = (E_{MIN} + 2 * E_{EXP} + 2 * E_{MAX})/6 \quad (6)$$

The calculation method was the first verified on previous / realized software projects (projects A to L), see table 2. Subjective / initial estimation of elaborateness was determined by count of partial estimations on these SW project phases – analysis and design, implementation (programming), testing, user acceptance tests and project management. It is apparent from the table that all three types of calculations (T_A, T_B, T_C) have brought improvement of elaborateness estimation against reality while the most precise alternative was T_C. From the viewpoint of tolerable project risk ±15 % it can be stated that alternative T_C did not fulfill this tolerance only in one case (project J), alternative T_B did not fulfill this tolerance in three cases (projects G, I, J).

Tab. 2: Deviations of new estimation determination of elaborateness against real range

Software projects	A	B	C	D	E	F	G	H	I	J	K	L	Average value (absolute values)
R (real elaborateness, man-day)	45	78	48	33	72	121	236	247	298	162	42	85	
S (subjective estimation of elaborateness, man-day)	38	64	57	34	100	112	178	210	255	110	39	60	
T _A (manday)	40	69,8	42,2	29,8	71	108	200	227	247	125	37,3	81,9	
T _B (manday)	43,6	68	44,3	31,2	74,9	110	202	227	254	127	39,1	85,3	
T _C (manday)	44,5	73,3	45,8	31,5	76,8	117	213	241	265	134	41,3	88,4	
Deviation of S from R	-18%	-22%	-16%	-3%	-28%	-8%	-33%	-18%	-17%	-47%	-8%	-42%	18%
Deviation T _A from R	-13%	-12%	-14%	-11%	-1%	-12%	-18%	-9%	-21%	-30%	-13%	-4%	13%
Deviation T _B from R	-3%	-15%	-8%	-6%	-4%	-10%	-17%	-9%	-17%	-28%	-7%	-0%	10%
Deviation T _C from R	-1%	-6%	-5%	-5%	-6%	-3%	-11%	-2%	-12%	-21%	-2%	-4%	6%

Source: (own adaptation)

After the verification on realized projects, the process was applied on new projects. For collection of estimation it was stated that the expert estimation value will be determined as first and subsequently estimations by new process will be created. The reason for that is to avoid affecting expert estimation. Practice had shown that when determining values E_{MIN} and E_{MAX} , workers consider possible effects on the given project. Results are shown in table 3. It is obvious from the values that all three calculation methods (T_A , T_B , T_C) meant more precise estimations even in further verification on new projects (projects M to Z); while the most precise was again alternative T_C . When considering $\pm 15\%$ tolerated project risk, we can state that all three alternatives (T_A , T_B , T_C) fulfilled this tolerance in all projects (M to Z).

Tab. 3: Deviations of new elaborateness estimation determination (alternatives T_A , T_B , T_C) from real project range; applied on new projects (projects M to Z)

		Software projects												Average value (absolute values)	
		M	N	O	P	Q	R	S	T	U	V	X	Y		Z
		Values in %													
Deviation from R	T_S	-3	-15	-18	10	11	-7	0	14	-5	-12	-13	-8	13	9%
Deviation from R	T_A	-8	-13	-10	5	7	-3	4	4	-7	-8	-8	-8	-7	6%
Deviation from R	T_B	-6	-9	-2	11	13	-3	13	5	-8	-9	-7	-7	0	7%
Deviation from R	T_C	-2	-5	-1	10	15	3	12	9	-2	-1	0	0	-1	5%

Source: (own adaptation)

4. Conclusion

Estimation of a SW product elaborateness is an important piece of information not only for the customer, but also for the supplier. In environment of a supplier IT company there is an efficient IT team with experience in development of SW products; many SW products repeat (customers ask for similar products), which contributes to more qualified estimations of “usual” SW products. In such environment it is usual to use the expert estimation method, which is based mainly on experience. In the monitored organization during analysis of historical data from previous projects we could state that most of SW projects were underestimated, i.e. the real time period and costs of SW projects were higher for the supplier than the customer paid for according to the signed contract. It was caused by certain routine in estimations when creators of the estimation did not consider other / limiting factors that much.

For design of new process following was stated following; the organization has its own IT team; historical data about previous projects are available, current estimations of experts mostly led to underestimation of range. That is why requirements were determined – to create method for specification of estimations, to utilize historical data, to eliminate tendency of project range underestimation. Three methods of calculation were determined; the first method (T_A) results from the PERT method; the second method (T_B) extends this calculation by value gained from historical data; the

third method (T_C) extends this calculation by enforcing higher valuation of range. These three methods were confronted with currently performed expert estimation and with real SW project range. All three calculation alternatives were more precise than expert estimation. It is necessary to state that even expert estimation had increased its precision, while its creators started to consider various limiting factors. It is apparent from values gained that the most precise values are obtained from alternatives T_B and T_C . Alternative T_C is suitable for such organizations, where current expert estimations showed often underestimation under tolerated -15 % in most of SW projects. Alternative T_B is suitable for organizations, where current expert estimations showed “equal“ underestimation and overestimation over ± 15 % tolerance.

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THE SURVEY OF TACIT KNOWLEDGE SHARING IN ORGANISATION

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Abstract: *At present the knowledge and experience of employees are considered to be the most valuable sources that organisations have to strive to protect. The correct, efficient, precise and timely management of knowledge of knowledge employees by the organisation's managers creates a competitive advantage. The purpose of the contribution is to identify the reasons for knowledge transfer in an organisation, test a dependency among selected qualitative characteristics and identification of preconditions supporting knowledge sharing as well as reasons for sharing knowledge by employees. The data has been collected through quantitative research done on the basis of a questionnaire survey aimed at managers in organisations in the Czech Republic.*

Keywords: *Knowledge Employee, Tacit Knowledge, Knowledge Sharing, Knowledge Continuity, Organisation, Survey.*

JEL Classification: *J24.*

1. Introduction

Information is an important and valuable commodity of today. If used efficiently (combined with an individual's ideas, skills and abilities), information is transformed into the most valuable knowledge. Information not only has to be transferred speedily and efficiently, but it has to be collected, stored and efficiently shared in order to get transformed "by hand of a capable person" – a manager or an employee – into knowledge. Formerly knowledge management and administration of knowledge were performed by individual in-company units, but they gradually gained strategic importance for the entire organisation. At present knowledge management is one of the most studied areas in organisations. This is because without their employees organisations would not be able to achieve the set goals. Only thanks to knowledge that is carried by people organisations can succeed compared to others. All an organisations' employees – regardless of the type of work they do – possess knowledge, predominantly tacit knowledge. It is important to understand who knows what and how they treat their knowledge and to make sure that it is not lost when an employee leaves the organisation.

Society has always had employees that could be described as knowledge employees. In the last fifty years, however, developed economies have seen a rapid increase in their percentage in relation to the overall number of employees, and organisations' growth and prosperity are attributable primarily to these employees (Mládková, 2004; Truneček, 2004). (Drucker, 1998) says that further economic growth cannot be achieved by the continuous growth of human resources. The productivity of each individual has to be enhanced, i.e. the transformation into a knowledge employee

has to take place. (Reboul et al. 2006) list the following characteristics of knowledge employees:

- Their main work tool is their brain, the loss of a knowledge employee therefore means a loss of the company's capital.
- They utilize knowledge in their work – they create it, distribute it or apply it.
- Their work position requires constant learning and improvement.
- They have their own ways – two knowledge employees would never use exactly the same method.
- Their productivity and quality of work is hard to measure.
- They dislike being told how to proceed.

According to (Nonaka and Takeuchi, 1995) all employees of an organisation, including workers, can be knowledge employees, i.e. people with the necessary (critical) knowledge who are able to utilize it at the right moment. They thus emphasise the concept of knowledge management as a strategic advantage of an organisation which determines the change in organisational culture shared by all employees. (Mládková, 2004) defines a knowledge employee as an individual who possesses a specific item of knowledge or a set of such items, the so-called tacit knowledge.

It is possible to say that tacit knowledge is associated with a specific carrier and its transfer to another employee is more difficult than in the case of explicit knowledge. The major part of knowledge possessed by an employee is considered to be tacit knowledge. This type of knowledge is crucial for an organisation. For other employees in the organisation it may be difficult to gain this knowledge (it can be time consuming and costly or completely impossible if they lack the knowledge or skill that conditions the creation of a specific piece of knowledge) or use it (if it is tied to a certain certificate, usually a university diploma or a certificate of apprenticeship). A knowledge employee is often the only person in an organisation who possesses this specific piece of knowledge.

(Mládková, 2004 and Reboul et al., 2006) highlight that managing a knowledge employee is connected with a number of obstacles, for example:

- a part of the knowledge s/he works with can be subconscious, which can cause problems when training the employee's successor,
- a knowledge employee's leaving can cause greater problems than expected.

In other words, the main problem regarding knowledge employees lies in the fact that the process through which they create value takes place in their heads, is partially subconscious and managers are therefore unable to check it directly (Mládková, 2004).

2. Statement of a problem

The aim of the contribution is to identify the reasons for knowledge transfer in an organisation and test a hypothesis that the employee's motivation to transfer knowledge depends on the size of the organization whether there is no such dependency. Furthermore, the article specifies preconditions facilitating the use of

tacit knowledge by knowledge employees. The first part is dedicated to the explanation of key terms, and the following parts deal with the identification of preconditions supporting knowledge sharing as well as reasons for sharing knowledge by employees.

The article is based on the analysis of secondary sources and the synthesis of outcomes. The data has been collected in a quantitative survey designed as questionnaire investigation. The respondents (167) were medium- and higher-level managers employed by organisations from different sectors operating in the Czech Republic. The data was evaluated by means of absolute and relative frequencies using the LimeSurvey application and the Microsoft Excel 2007 and SPSS software. Testing is done by Pearson Chi-Square and Fisher's exact test.

3. Problem solving

3.1 Role of a knowledge employee in an organisation

A knowledge employee is therefore described as a person who possesses the relevant piece of knowledge, knows how to use it and, most importantly, is given an opportunity to use it. Knowledge employees also include managers, i.e. employees who are responsible for the performance or process of certain activities and for the achievement of an organisation's goals. To perform their work they also need certain knowledge, skills and abilities.

Tacit knowledge is associated with one specific carrier. In case knowledge employees leave the organisation, their knowledge leaves too. Organisations have to be able to identify knowledge employees, carriers of knowledge that is critical for organisations (critical knowledge being knowledge without which certain job cannot be performed properly (Beazley, 2004; Eucker, 2007; Stam, 2009), and in case they want to leave (e.g. for reasons of retirement or joining a competitor) to motivate them and stimulate them to transfer their tacit knowledge to their successors, i.e. to ensure knowledge continuity.

One of the individual psychological factors that manifest in the process of implementation of knowledge management in organisations is, for example, the fact that many employees still associate knowledge with power. Therefore an employee providing his/her knowledge to another person feels that they are losing this power. These employees usually worry about the loss of exclusiveness of their influence that is a guarantee of work and colleagues' respect. What can also matter is the fear of revealing the knowledge to others because the carrier is afraid that the information provided would not be sufficiently appreciated by the recipients.

In particular younger and less experienced employees feel insecure, as they are unable to correctly assess the benefit their work brings. Employees' motivation plays an important role too. Knowledge sharing can be perceived as extra work; this is closely connected with the fear of loss of compensation. Some employees see knowledge sharing as a way of depriving themselves of the possible remuneration for their work.

When introducing knowledge management it often appears that some employees have difficulties identifying the basic company values, needs and goals. They are not aware of individual elements of the organisational culture and they often experience conflicts of motives and incompatible tendencies, i.e. deciding between two or among more different tendencies.

In the first quarter of 2010 a survey was carried out among organisation managers. They were asked to participate in the survey on the application of knowledge management and management of knowledge continuity. 814 managers at the middle and higher levels of management were selected, regardless of the sector in which their organisations operate. Respondents had to meet three selection criteria. The following people were addressed:

- middle- and higher-level managers responsible for the functioning of their organisation,
- 2 managers per organisation, as a maximum,
- respondents who have at least one direct subordinate.

The questionnaire was completed by 167 managers and the total percentage of questionnaires returned was 20.52 %.

The survey question “Do you share your knowledge? If not, please state why.” was answered as follows: the first group of respondents (56 %) answered that they preferred to share all knowledge under any circumstances while the second group of respondents (44 %) said they preferred to share only general knowledge. The latter do not wish to transfer a major part of their knowledge as they consider it their competitive advantage against others and they do not want to lose their job and be substituted by somebody who is better than they are. See Figure no.1.

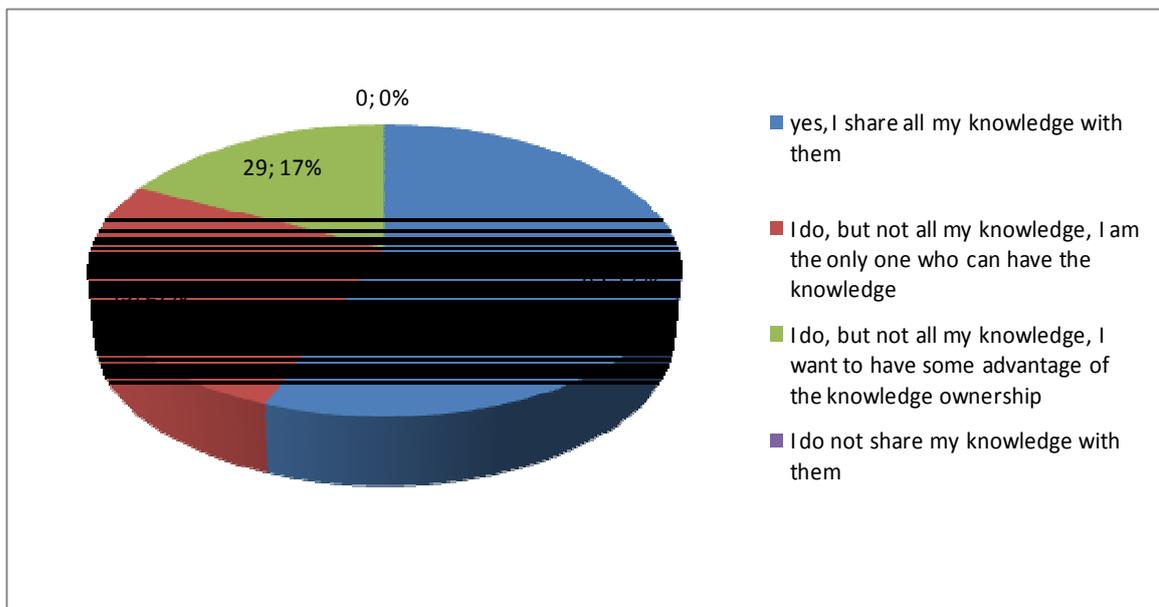


Fig. 1: Knowledge sharing in organisations

Source: (author's survey)

A total of 117 respondents (70 %) responded that when they shared knowledge with their colleagues they did so because they were pleased that it would be spread throughout the organisation and would be of use to everybody. This is so-called altruism. On the other hand, 43 respondents (26 %) said they expected to be provided with a piece of knowledge in exchange for the piece of knowledge they had communicated. This is so-called reciprocity. Only 7 respondents (4 %) provided knowledge with the aim of improving their image and reputation. The results in graphic form are displayed in Figure no. 2.

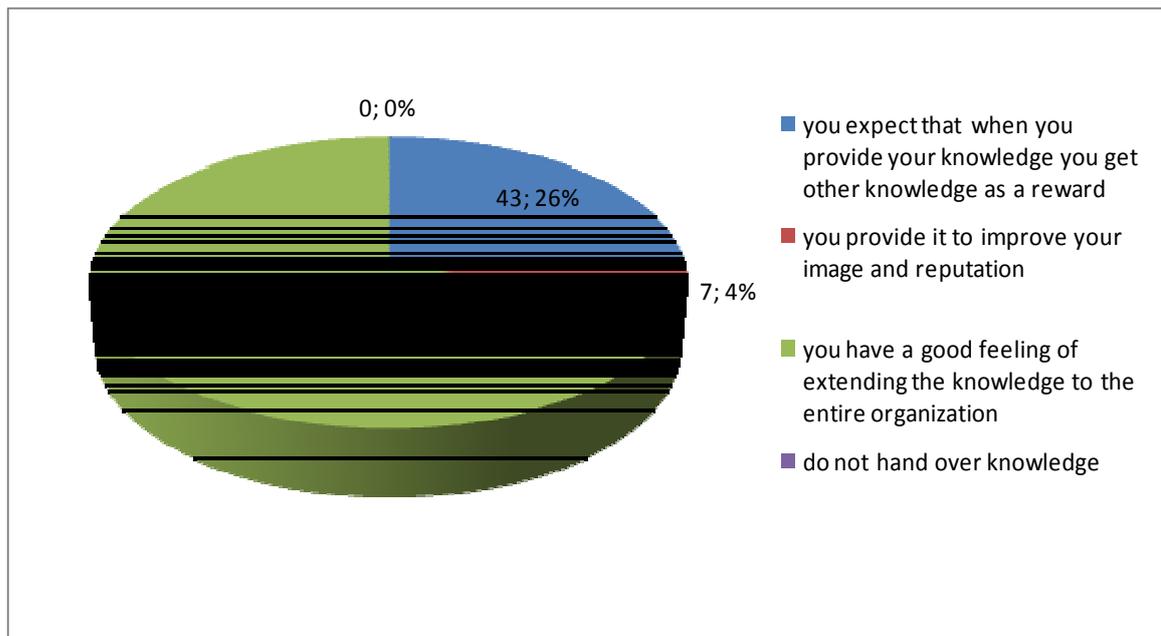


Fig. 2: Reasons for knowledge sharing in organisation

Source: (author's survey)

Employees who possess knowledge and experience should be treated as experts by their organisations and the management team should be aware of these employees. Organisation should stimulate their employees to transfer knowledge and experience and to try to eliminate the traditional rivalry accompanying the transfer of experience and knowledge. Managers at the middle level of management should concentrate on assisting their direct subordinates to succeed and thus perform the role of instructors within their organisation.

The research was also focused on determining whether employees were stimulated to share, transfer and preserve knowledge and experience in the given organisation. More than half of the respondents, 61.7 % in total, responded that in their organisation they were not stimulated to do so. Only 38.3 % of the managers addressed stated that they were stimulated and therefore had internal motivation for the transfer thereof.

As the question was presented as half-open, the respondents could specify how they were stimulated and subsequently motivated to share, transfer and preserve knowledge and experience. 11 of the respondents who gave a positive answer (i.e. "yes") did not provide any specification. A total of 53 respondents said that their organisation stimulated and ensured knowledge continuity. For example, 13 of the respondents

mentioned the financial compensation given to employees leaving the organisation as one factor. Two respondents from the above 13 said financial sanctions were also applied in the event that leaving employees were not willing to transfer the knowledge and experience related to their work position to their successors. Four respondents expressly stated that this process was enacted in their corporate culture. Other respondents (36 in total) mentioned that the sharing, transfer and preservation of knowledge and experience by a leaving employee (document filing, handover documents, database completion, initial training of a successor, monitoring (supervision) of a trained successor, etc.) were required, but were not incorporated in the organisational culture. In cases where the knowledge continuity ensuring was not part of the organisational culture, organisations relied on good long-term working relationships with the leaving employee and a personal agreement that would stimulate the employee's will to train his/her successor.

The hypothesis was tested based on the above findings: H0 - Motivation of employees leaving with critical knowledge to transfer their knowledge does not depend on the size of organisation.

Tab. 1: Contingency table

			Stimulation and motivation		Total
			no	yes	
Velikost organizace	do 19 zaměstnanců	Count	30	11	41
		Expected Count	25,3	15,7	41,0
		% within Velikost organizace	73,2%	26,8%	100,0%
		% within Stimulace a motivace	29,1%	17,2%	24,6%
		Adjusted Residual	1,7	-1,7	
	20-99 zaměstnanců	Count	43	14	57
		Expected Count	35,2	21,8	57,0
		% within Velikost organizace	75,4%	24,6%	100,0%
		% within Stimulace a motivace	41,7%	21,9%	34,1%
		Adjusted Residual	2,6	-2,6	
	100-249 zaměstnanců	Count	14	9	23
		Expected Count	14,2	8,8	23,0
		% within Velikost organizace	60,9%	39,1%	100,0%
		% within Stimulace a motivace	13,6%	14,1%	13,8%
		Adjusted Residual	,0	,1	
	250 a více zaměstnanců	Count	16	30	46
		Expected Count	28,4	17,6	46,0
		% within Velikost organizace	34,8%	65,2%	100,0%
		% within Stimulace a motivace	15,5%	46,9%	27,5%
		Adjusted Residual	-4,4	4,4	
Total	Count	103	64	167	
	Expected Count	103,0	64,0	167,0	
	% within Velikost organizace	61,7%	38,3%	100,0%	
	% within Stimulace a motivace	100,0%	100,0%	100,0%	
	Adjusted Residual				

Source: (author's survey)

Contingency Table 1 shows the relationship between stimulating and motivating staff to transfer knowledge and experience and size of organisation. The results show that workers are most stimulated and motivated in large organisations (i.e. 65.2 %), followed by small organisations with under 19 employees (26.8 %) and the organisations with 20-99 workers (24.6 %).

The conclusiveness of the gathered outputs was evaluated by tools of descriptive statistics i.e. absolute and relative frequency. The Pearson Chi-Square test checks dependencies in a contingency table. The Pearson's chi-square test, also known as the chi-square goodness-of-fit test, is used to match expected and observed frequency (i. e. H0). If an H0 is rejected the observed frequency differs from expected.

In table 2 there are listed other results of Chi-Square tests. Likelihood Ratio provides statistically same estimation as Pearson's chi-square test. For overall interpretation of test results asymptotical significance level is important and is compared to value specified at 0.05. Linear-by-Linear Association shows level of coupling between variables in contingency table.

Tab. 2: Dependency test of qualitative features for contingency table no. 1

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20,941 ^a	3	,000
Likelihood Ratio	20,851	3	,000
Linear-by-Linear Association	17,168	1	,000
N of Valid Cases	167		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8,81.

Source: (author's survey)

Table 2 shows the results of the qualitative features of the test subject. Since the p - value observed by using χ^2 test (Pearson Chi-Square) is 0.000 (statistically) lower than the selected significance level $\alpha = 0.05$, the zero hypothesis H0 is rejected. Doing stimulation and motivation of leaving employees with critical skills depends on the size of the organization. Dependence between the stimulating and motivating departing employees and the size of the organisation is statistically significant at the 5 % significance level. Therefore the larger the organisation is, the more it stimulates its employees to transfer knowledge and experience to the successor, which are then more personally motivated. The power of dependency was determined by the correlation coefficient and Cramer's coefficient (see table 3).

Tab. 3: Dependency test

	Value	Approx. Sig.
Nominal by Nominal		
Phi	,354	,000
Cramer's V	,354	,000
Contingency Coefficient	,334	,000
N of Valid Cases	167	

Source: (author's survey)

Based on the contingency coefficient the proven statistical relationship among the descriptive characteristics can be confirmed as direct (due to its positive value) and weak (relative to the calculated absolute correlation characteristics near 0.4).

From the specified the hypothesis H0 was rejected and an alternative hypothesis H1 was accepted. Both are telling about the dependence among investigated characteristic. Also the force of dependence measured is 0,4. The following hypothesis was confirmed: Motivation of leaving employees with critical knowledge depends on the size of organization (the dependence is direct, weak). Presented results can be generalized on selected sample.

The results are consistent with a research of Kim, Lee (2006), which states that a reward system influences willingness to share knowledge. It also state, that stimulation of employees is more sophisticated in large organisations. Smith and Mckeen (2003) and Zhang et. al. (2006) state that existence of reward system (e.g. bonuses) strengthens employee motivation to share knowledge. It means that regard system can stimulate knowledge transfer and simplify access to the knowledge in the organisation. Motivation system has also positive effect on knowledge quality.

3.2 Discussion

One of the crucial preconditions for the utilization of tacit knowledge is to understand the significance of tacit knowledge of each individual for the organisation. This should be embedded in the organisational culture which should clearly recognise that employees and their knowledge are indispensable for any organisation. The organisational culture should also stipulate that the organisation supports learning and continuous improvement of qualifications and knowledge of its employees. Each employee should identify with the organisational culture which should teach him/her from the very beginning of his/her professional career in the organisation to share, transfer and preserve tacit knowledge and experience and to adopt this as his/her personal duty and not as an obligation imposed in a directive manner. This can be achieved by a suitably designed motivational remuneration system – covering not only financial remuneration, but also opportunities for professional growth, etc. It is clear from the above that knowledge is still frequently seen as a source of power and sharing it with other people as risky, dangerous and threatening. One of the solutions consists in creating a team of managers and employees of the organisation that will be involved in the implementation of knowledge management and management of knowledge continuity. It is equally important to appoint a so-called knowledge professional holding, for example, the position of a Chief Knowledge Officer who would be able to

motivate employees in a suitable way and fairly evaluate their willingness to share and transfer their knowledge. The basic activities of a high-quality knowledge manager include participation in the development of an appropriate organisational culture that encourages knowledge sharing.

Organisation management should respect the fact that tacit knowledge is the intellectual property of the given employee. Managers should realise that sharing, transfer and preservation of knowledge in organisations cannot be imposed in a directive manner. Such an approach would demotivate employees and undermine their will to share knowledge with their colleagues (knowledge management) or transfer it to their successors (knowledge continuity management). Therefore it is fundamental to create a suitable organisational climate and friendly atmosphere that would enhance the use of tacit knowledge, its sharing through apprenticeship, storytelling and communities.

In terms of business strategy, management of knowledge means trying to surpass what is already known earlier than somebody else does and benefiting from the creation of challenges and opportunities that others have no idea of.

4. Conclusion

Organisations start to realise that in a continually swifter competitive environment they can no longer rely solely on their size and capital strength, but primarily on their employees, i.e. knowledge employees who are knowledge carriers. Employees are usually carriers of tacit knowledge and it is very important for organisations to focus on the identification of critical knowledge of their employees and to encourage, to the maximum possible extent, sharing, transfer and preservation of such knowledge.

The survey has confirmed that in a well set-up organisational environment there is willingness to transfer knowledge and organisations should take advantage of that since this in itself is a motivational element. The requirements for a person's knowledge and skills are constantly changing in modern society and for man to succeed on the labour market and to compare favourably with his/her competitors, s/he has to continuously deepen and widen his/her knowledge and thus increase the competitiveness of the organisation s/he works for. This is how s/he turns into a knowledge employee possessing critical knowledge that is highly valued in today's organisations.

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