Department of System Analysis
University of Economics, Prague

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Content

ANTONIN ROSICKY - MEMORIAL

V září roku 2015 nás po dlouhé nemoci opustil kolega, přítel, velký systémový myslitel a kybernetik Antonín Rosický.

Na úvod vzpomeňme jeho oblíbený citát „*Information is the difference that makes a difference*". (*G. Bateson*). Antonín Rosický dokázal svou prací a pílí takový rozdíl vytvořit a předávat dále svým studentům. Za léta jeho působení na akademické půdě mu jich prošly pod rukami tisíce. Ne všichni studenti však byli schopni a ochotni pochopit podstatu předávaných informací. Přeci jen „kybernetika je největší sousto z ovoce stromu poznání, které si lidstvo ukouslo za posledních 2000 let." (opět *G. Bateson*). Otevíral témata, která jsou aktuální a přibližoval ta, která byla náročnější na pochopení, ale pomáhala kriticky myslet a učila rozhodovat v souvislostech. Sudenti tak dostali výbornou příležitost stát se dobrými pozorovateli svého systémového okolí.

Nejen jeho teoretické a systémové znalosti byly obrovské, vycházel z více než 20 leté praxe a studia v oblastech systémových věd a kybernetiky. Měl také bohaté zkušenosti z klasické kybernetiky v praxi a navíc zkušenosti z vedoucích pozic a projektové práce. Neopomenutelnou součástí jeho odborného působení jsou účasti na světových konferencích, kde na něho a jeho příspěvky světoví odborníci dodnes vzpomínají s úctou. V zahraničním kolektivu odborníků byl velmi uznávaný pro své názory a obrovské vědomosti a především schopnost nad věcmi uvažovat.

Opustil nás nejen velký odborník, ale především velký člověk, který svým přístupem za svůj život dokázal vybudovat spoustu dobrých vztahů. Byl zakladatelem např. Pražského turistického klubu a Prázdninové školy Lipnice, tvůrcem krásných vzpomínek a především přispěl k rozvoji poznání v té oblasti, ve které strávil většinu svého aktivního života. Jeho odkaz bude žít dále v akademické sféře, díky jeho žákům, klíčovým pracem a v neposlední řadě i publikacím, které byly vrcholem jeho dlouholeté práce.

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SYSTEM THINKING IN SOCIAL SYSTEM MODELLING

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ABSTRACT

This article deals with selected quality of life (QL) evaluations analysis done by means of System Thinking (ST). This evaluation is executed by using various indicators developed by the Economist Intelligence Unit Limited, by Eurofound Foundation and by the Organisation for Economic Co-operation and Development. The relevant case study works with data that are available for individual Visegrad Four (V4) countries. For these countries, values of partial indicators are discussed in relation with: the EU average value, the dynamic of these indicators for the given years and the utilization of objective and subjective indicators for the complex QL evaluation.

KEY WORDS

Evaluation, Indicators, Quality of life, System thinking.

INTRODUCTION

When solving problems it is essential to work with the category "system". It is essential to see problems in a complex manner, in their external and internal contexts with the goal to create a model of a system. To understand the model and to identify problem areas we can use mental models. These models generally represent knowledge, familiarity with and notions of a human being, however depend on his/her acquired way of thinking. This subjective element in a model can be minimized by using ST. The substance of ST is stated in (Mildeová et al., 2011), which is based on the Feedback concept as known in cybernetics and servo-mechanism theory. Differences between ST and a classic managerial approach (Command and Control Thinking) are stated in (Middleton, 2010). It is possible to say that:

- ST is a specific view of the world. It is a view that has its specific methods and tools and that strives to overcome our mental models that we ourselves create (Bureš, 2009)
- ST is a holistic approach to analysis which focuses on the way how a system's constituent parts interrelate and show how systems work over time and within the context of the system as a whole (Forrester, 2007)
- In system thinking, system behaviour results from the effects of self-reinforcing (positive) and balancing (self correcting or negative) processes. A reinforcing process (positive loop) leads to an increase of some system component (Nakiyimba, 2014)
- The usage of system thinking is driven by the effort to explain and reason the behaviour of real objects by means of systems whose integrity is defined by a set of interrelated elements. (Bertalanffy, 2003)
- One of the prominent characteristics of system thinking is the ability to see system dynamics and to recognize relations (including the feed-back ones) that exist between the elements of the system and its environment (Exnarová, Exnar, 2013).

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In social research it is essential to accept paradigms of social/society research as well as concrete methods and processes for collecting data acquired during a concrete research. Here system approach and integration approach are substantial (Loučková, 2010) quoted in (Křupka et al., 2013). One area of social research is the topic of QL, both on regional and national levels. On the European level this issue is influenced by the European Social Charter. On the national level it is influenced by the White Book of Social Services. Results from these types of research can be used for e.g. social policy planning and related services, for grants planning and so on. QL is a notion that is very broad and hard to define and it is defined by a number of definitions (Mederly et al., 2004; Šanda, Křupka, 2014), e.g. according to (Heřmanová, 2012; Mandys et al., 2009; Payne, Mühlpachr, 2005; Phillips, 2006; Qlru, 2011; Rapley, 2003; Svobodová, 2012; Vaďurová, Mühlpachr, 2005) quoted in (Křupka et al., 2013).

QL is evaluated by use of indicators. The evaluation of QL is a difficult thing. Number of similar opinions and approaches (Křupka et al., 2010; Šanda, Křupka, 2014) exist regarding the relevant set of indicators and the concrete evaluation tools used for this area. In the Czech Republic (CR), the Czech Statistical Office (CSO) includes among the QL indicators (Csu, 2011) "changes in demographic developments" (natality/birth-rate, mortality/death-rate, the impact of foreigners in the CR, divorce-rate, share of persons in post-productive age in relation to age-distribution of the population), "security of inhabitants" (expenses on keeping public order and security, the intensity and structure of criminal behaviour in the CR, the relation between discovered and perceived criminality and the prison service in the CR (Csu 2011). Other QL indicators used by the CSO (Csu, 2013) are: GDP per inhabitant, revenues per inhabitant, level of employment/unemployment, housing, security and health expenditures, culture expenditures and expenditures for travelling as free-time and aging related activities (Šanda, Křupka, 2014).

The objective of this article is to analyse the possibilities of QL evaluation on the European level based on selected indicators. The countries that are evaluated are the V4 countries, including the possibility to evaluate dynamics and complexity as the important attributes of ST.

PROBLEM FORMULATION

Number of world institutions follow and evaluate QL and human development. These institutions are: The World Bank, UN Development Program, European Environment Agency, Eurostat and other institutions (Novák et al., 2010; Šanda, Křupka, 2014). QL is also related to subsistence level that can be defined as the rate of material and non-material needs and desires satisfaction for individuals and for groups. The most commonly used indicators for subsistence level description and expression are the following: HDI, Index of Sustainable Economic Welfare, Quality of Life Index, Legatum Prosperity Index, Happiness Indicators etc. These indicators are based on very similar elements (ecologic, economic and social) that have been developed for estimation of sustainable development of individual countries, regions and undertakings (Křupka, Provazníková, 2014; Šanda, Křupka, 2014).

Also organizations such as the Economist Intelligence Unit Limited (hereinafter EIU), foundation Eurofound (hereinafter EF) or the Organisation for Economic Co-operation and Development (OECD) have their QL evaluations. The EIU evaluation evaluates, annually, cities from world-wide view: which are the most suitable cities for life. The EF evaluation compares information on life and work conditions across the entire European Union. The OECD executes evaluation of primarily member states by means of OECD Better Life Index (BLI), where the evaluation of QL (OECD, 2013) is a part of sustainable and inclusive growth (OECD360, 2015).

The EIU evaluation has a large scale of usage, such as perceived level of development comparison. The EIU evaluation quantifies problems that could be presented to inhabitants regarding life style in a given area. The EIU evaluation makes possible direct comparison between individual places. The result of this evaluation can be also used for e.g. decision about allocating subsidies or grants for an individual city for its further development and support. Five basic attributes are evaluated: Stability (weight in the total evaluation is 25%), Healthcare (weight is 20%), Culture and Environment (weight is 25%), Education (weight is 10%), and Infrastructure (weight is 20%) (EIU, 2015). Each of the areas uses a set of indicators.

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Indicators (EIU, 2015) of Stability are: Prevalence of petty crime, Prevalence of violent crime, Threat of terror, Threat of military conflict, Threat of civil unrest/conflict. Indicators of Healthcare are: Availability of private healthcare, Quality of private healthcare, Availability of public healthcare, Quality of public healthcare, availability of over-the-counter drugs, General healthcare indicators). Indicators of Culture and environment are: Humidity/temperature rating, Discomfort of climate to travellers, Level of corruption, Social or religious restrictions, Level of censorship, Sporting availability, Cultural availability, Food and drink, Consumer goods and services. Indicators of Education are: Availability of private education, Quality of private education, Public education indicators). Indicators of Infrastructure are: Quality of road network, Quality of public transport, Quality of international links, Availability of good quality housing, Quality of energy provision, Quality of water provision, Quality of telecommunications.

The EF has developed three regularly repeated surveys to contribute to the planning and establishment of better living and working conditions. The European Quality of Life Survey (EQLS), implemented in 2003, 2007 and 2011-12, provides a comprehensive portrait of living conditions in European countries. It contains a broad range of indicators on different dimensions of quality of life, both objective and subjective (EF, 2015).

The EU evaluation works with seven basic areas (Grijpstra et al., 2014): Subjective well-being; Living standards and deprivation; Work–life balance; Family and social life; Home, housing and local environment; Health, healthcare, education and other public services and Quality of society. Each of the areas uses a set of indicators. Indicators of Subjective well-being are: Life satisfaction (1 is very dissatisfied, 10 is very satisfied), Happiness (1 is very unhappy , 10 is very happy). Indicators of Living standards and deprivation are: Proportion of households with both rent or mortgage and utility arrears, (Based on responses to: Has your household been in arrears at any time during the past 12 months, that is, unable to pay as scheduled any of the following? Rent or mortgage payments for accommodation, b. Utility bills, such as electricity, water, gas), Satisfaction with standard of living, (Based on responses to: Could you please tell me on a scale of 1 to 10 how satisfied you are with …? Your present standard of living.). Indicators of Work–life balance are: Proportion of employees coming home from work tired at least several times a month, (Based on responses to: How often has each of the following happened to you during the last 12 months? I have come home from work too tired to do some of the household jobs which need to be done.), Proportion of employees having difficulties at least several times a month fulfilling family responsibilities, (Based on responses to: How often has each of the following happened to you during the last 12 months? It has been difficult for me to fulfil my family respon¬sibilities because of the amount of time I spend on the job.), Proportion of employees having difficulty concentrating at work at least several times a month, (Based on responses to: How often has each of the following happened to you during the last 12 months? I have found it difficult to concentrate at work because of my family responsibilities.).

Indicators of Family and social life are: Satisfaction with family life, (Based on responses to: Could you please tell me on a scale of 1 to 10 how satisfied you are with each of the following items …? Your family life.), Satisfaction with social life, (Based on answers to: Could you please tell me on a scale of 1 to 10 how satisfied you are with each of the following items …? Your social life. Indicators of Home, housing and local environment are: Mean number of rooms (Based on responses to: How many rooms does the accommodation in which you live have, excluding the kitchen, bathrooms, hallways, storerooms and rooms used solely for business?), Satisfaction with accommodation, (Based on responses to: Could you please tell me on a scale of 1 to 10 how satisfied you are with each of the following items …? Your accommodation.). Indicators of Health, healthcare, education and other public services are: Satisfaction with health (Based on answers to: Could you please tell me on a scale of 1 to 10 how satisfied you are with each of the following items …? Your health.), Perceived quality of healthcare (Based on responses to: In general, how would you rate the quality of each of the following public services in [COUNTRY]? Please tell me on a scale of one to 10. Health services.), Satisfaction with education (Based on responses to: Could you please tell me on a scale of 1 to 10 how satisfied you are with each of the following items …? Your education.), Perceived quality of educational systém (Based on responses to: In general, how would you rate the quality of each of the following public services in your country? Please tell me on a scale of one to 10. Education system.), Perceived quality

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of public transport (Based on answers to: In general, how would you rate the quality of each of the following public services in your country? Please tell me on a scale of one to 10. Public transport.), Perceived quality of state pension systém (Based on responses to: In general, how would you rate the quality of each of the following public services in your country? Please tell me on a scale of one to 10. State pension system.) (Grijpstra et al., 2014).

Quality of society is represented by tension index. It use scale of 5–15, where 5 is no tension and 15 is a lot of tension. Respondents could indicate on a scale from 1 to 3 (1 is no tension, 2 is some tension, 3 is a lot of tension) how much tension they perceive between the following groups: 1) poor–rich; 2) management–workers; 3) men–women; 4) old–young; 5) different racial and ethnic groups. The tension index is the sum of these variables, which gives a tension index score for each respondent that ranges from 5 (no tension) to 15 (maximum tension) (Grijpstra et al., 2014).

The OECD BLI evaluation works with eleven basic areas (OECD.Stat, 2015): Housing, Income, Jobs, Community, Education, Environment, Civic engagement, Health, Life Satisfaction, Safety and Work-Life Balance. Each of the 11 topics of the Index is currently based on one to three indicators. Within each topic, the indicators are averaged with equal weights. The indicators have been chosen on the basis of a number of statistical criteria such as relevance (face-validity, depth, policy relevance) and data quality (predictive validity, coverage, timeliness, cross-country comparability etc.) and in consultation with OECD member countries. These indicators are good measures of the concepts of well-being, in particular in the context of a country comparative exercise. Other indicators will gradually be added to each topic. (OECD.Stat, 2015).

Indicators of Housing are: Dwellings without basic facilities, Housing expenditure, Rooms per person; indicators of Income are Household net adjusted disposable income, Household net financial wealth; indicators of Jobs are Employment rate, Job security, Long-term unemployment rate, Personal earnings; indicator of Community is Quality of support network; indicators of Education are Educational attainment, Student skills, Years in education; indicators of Environment are Air pollution, Water quality; indicators of Civic engagement are Consultation on rule-making, Voter turnout; indicators of Health are Life expectancy, Self-reported health; indicator of Life Satisfaction is Life satisfaction; indicators of Safety are Assault rate, Homicide rate; indicators of Work-Life Balance are Employees working very long hours, Time devoted to leisure and personal care.

DISCUSSION

The above-stated indicators/evaluations (the EIU, the EF, the BLI) can be used for the evaluation of the V4 countries-the Czech Republic CZ), Hungary (HU), Poland (PL) and Slovakia (SK).

Table 1 shows the evaluation of the EUI QL indicators executed in year 2015 in %. In (EUI, 2015) there are demonstrated also the "Average regional performances of Central and Eastern Europe" where the value of Stability is 66.87%, the value of Healthcare is 71.1%, and the value of Culture and environment is 70.1%, the value of Education is 76.2%, the value of Infrastructure is 68.2% and the EIU total ranking is 69.7%. In Table 1 there is also stated the average value for the EU countries (EU).

Indicators	CZ	HU	PL	SK	EU
Stability	85.0	85.0	90.0	90.0	84.3
Healthcare	79.2	91.7	70.8	75.0	88.1
Culture and environment	87.3	90.0	80.3	80.3	89.5
Education	83.3	100.0	75.0	75.0	90.5
Infrastructure	87.5	83.9	82.1	82.1	87.5
EIU total ranking	84.7	88.9	80.7	81.5	87.6

Tab 1 – The EIU Evaluation (Processing based on (EIU, 2015))

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Table 2 shows the EF QL evaluation from year 2011 in %. In Table 2 there are stated values for the V4 countries and the EU average value.

Table 3 shows selected OECD BLI values from year 2015. In (OECD.Stat, 2015) there is always stated only one value for the given area for the V4 countries and for the EU average.

Indicators	CZ	HU	PL	SK	EU
Life satisfaction	6.4	5.8	7.1	6.4	7.1
Happiness	7.1	6.9	7.3	6.9	7.4
Proportion of households with both rent or mortgage and utility arrears	7	11	16	7	9
Satisfaction with standard of living	6.3	5.7	6.2	6.4	6.9
Proportion of employees coming home from work tired at least several times a month	59	58	62	46	54
Proportion of employees having difficulties at least several times a month fulfilling family responsibilities	39	39	46	34	29
Proportion of employees having difficulty concentrating at work at least several times a month	21	23	26	20	14
Satisfaction with family life	7.2	7.6	7.6	7.6	7.9
Satisfaction with social life	6.8	6.7	6.6	6.8	7.3
Mean number of rooms	3.4	2.6	2.8	3.2	3.6
Satisfaction with accommodation	7.5	7.0	6.9	7.7	7.7
Satisfaction with health	7.1	6.7	6.8	7.3	7.3
Perceived quality of healthcare	6.5	5.1	4.6	4.9	6.2
Satisfaction with education	7.3	7.0	6.4	7.0	7.2
Perceived quality of educational system	6.6	5.7	5.9	5.7	6.3
Perceived quality of public transport	6.1	5.5	5.7	5.7	6.4
Perceived quality of state pension system	4.2	3.8	3.4	3.6	4.8
Tension index	10.9	11.8	10.1	9.9	10.5

Tab 2 – The EF Evaluation (Grijpstra et al., 2014)

Indicators	CZ	HU	PL	SK	EU
Housing (Rooms per person) [Ratio]	1.4	1.1	1.1	1.1	1.7
Income(Household net financial wealth) [in USD]	17299	13277	10919	8663	37640
Jobs (Long-term unemployment rate) [in %]	3.12	5.1	3.77	9.46	5.21
Community (Quality of support network) [in %]	85	87	91	90	90
Education (Student skills) [Average score]	500	487	521	472	500
Environment (Air pollution) [Micrograms per cubic metres]	16	15	33	13	18
Civic engagement (Micrograms per cubic metres) [in %]	59	62	55	59	70
Health (Life expectancy) [Years]	78.2	75.2	76.9	76.2	80.1
Life Satisfaction [Average score]	6.5	4.9	5.8	6.1	6.4
Safety (Homicide rate) [Ratio]	0.8	1.3	0.9	1.2	1.0
Work-Life Balance (Employees working very long hours) [in %]	6.98	3.19	7.41	7.02	5.33

Tab 3 – The BLI Evaluation (Processing based on (OECD.Stat, 2015))

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CONCLUSION

If we evaluate the dynamics of the stated indicators, then we can see such dynamics in the EU and the OECD BLI evaluations. For the EIU evaluation we have not managed to get more detailed evaluation data for the previous years. For the EU evaluation we have available time series data from year 2007. For the OECD BLI there are available time series from 2013 and 2014 for all indicators from the eleven stated areas (OECD.Stat, 2015).

To answer the question if the individual evaluations use, at the same time, objective and subjective indicators as the criteria of the complexity of the QL evaluation it is possible to observe that under the EIU majority of indicators are evaluated objectively (e.g. Humidity/temperature rating, Level of corruption), however there are also exceptions and subjective evaluation (such as e.g. Quality of telecommunications, Discomfort of climate to travellers). In contrary to this the EF evaluation is subjective in all cases-all data have been acquired by means of questionnaires. For the BLI evaluation in all cases there are used objective indicators based on various statistical data/criteria. The only exception is the Life Satisfaction. Thus for the above-mentioned indicators/evaluations there has been used the approach utilizing both the objective and subjective QL evaluation.

With the individual evaluations there are also stated the average values, e.g. for the EU countries, for the Central and Eastern Europe countries, for the OECD countries or there is stated world-wide average. Thus there exists the possibility to compare the values of the individual indicators.

In future it is possible to use QL values in given areas to delimit "weak" areas in selected countries including the possibility to take this valuation up on the regional level. The objective should be "Sustainable and Inclusive Growth" and an active approach to issues labelled as „Active ageing".

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COMPARISON OF COMPLIANCE REQUIREMENTS FORMALIZATION APPROACHES

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ABSTRACT

Compliance with regulatory requirements is a crucial task for contemporary organizations operating in highly regulated and dynamically changing environments. Regulatory compliance achievement and assurance represent work intensive and expensive exercises. Therefore already a few endeavors to develop methodologies and deploy recent technologies to enable their automation have been initiated. In the most cases compliance management relates to business processes that have to conform to a set of certain quality, performance, security and other types of requirements. If we want to automate particular business process and at the same time to automate the compliance enforcement measures as well as the compliance assurance procedures, first of all we have to formulate the regulatory compliance requirements using modeling language that can be easily transformed to machine readable expressions. The measures for compliance achievement and assurance called controls are derived from risk analysis of threads of the non-compliance of particular business process, i.e. non-conformity with established control goals. Controls can be realized in the form of control processes; in simple cases control can be realized by single activity which is then called control activity. The business process enhanced with control process that is acknowledged as compliant with respective requirement is called ideal process. This paper focuses on comparison of two different possible approaches to model compliance requirements on business processes based on literature search and on experience resulting from compliance management systems' design and verification. It brings the reasoning why formulation of set of constrains is preferable to set of compliant ideal process sequences limitation for this purpose.

KEY WORDS

Compliance Algorithm, Business Process Management, Business Rules Management, Control Process, Ideal Process, Compliance Management System, Busness Process Model and Notation (BPMN), Business Process Execution Language (BPEL), Petri net, Finite State Machine, Property Specification Language (PSL).

INTRODUCTION

The approach to compliance algorithm definition published in Journal of System Integration (Šabatová, 2015) uses combination of Business Process Model and Notation (BPMN) introduced by Object Management Group (OMG, 2013), for business process modelling and a set of constraints representing the respective regulatory compliance policy modelled using Property Specification Language (Accellera, 2004). This methodology was applied following discussions with logical modelling experts, literature search as well as based on validation proving its applicability and viability. Nevertheless the reasoning for this decision seemed to me not sufficiently convincing and therefore I searched for experience with other possible regulatory requirements formalization methods. Also, my later deeper experience with Business Process Management Systems' implementations brought me to new ideas and aspects to be explored.

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The original idea to use PSL language for compliance policy definition came from Sinclaire (Sinclair et al., 2009). Some experts recommended definition of a set of ideal process sequences that will be confirmed as compliant by an auditor. Then all the business process instances conforming to any of these "allowed" sequences will be acknowledged as compliant instances. Petri nets seemed to provide an efficient mathematical apparatus to be applicable for this purpose.

We are facing the problem how to formulate something, what is "well understood" in human language and often depends on certain experience and specific knowledge of the domain expert and/or auditor in an exact computable form. This is a common issue that I always meet during Business Rules Management Systems (BRMS) implementations.

ALGORITHMICAL APPROACHES TO BP DESIGN

What is the best approach to business process design? This question was explored already in 2000 and the results were published by two Austrian researchers in 2001 (Hofacker, Vetschera, 2001). Their work was motivated by disputable and not convincing results of vast application of Business Process Reengineering methods in later 90's. They critically examined various algorithmical approaches to business process modelling and analyzing. First of all they studied Petri nets and their various modifications like Management Petri Nets (MPN). They identified their high potential in analysis of certain process characteristics; but they missed capability for process optimization in them.

Another approach studied by Hofacker and Vetschera was "resource-constrained project scheduling problem" (RCPSP) methodology. Application of project optimization methods for process optimization seemed to be an effective way; however they identified important deficiencies in it. First of all the complexity of activities sequence flow is much higher in processes than in projects. When sub-processes are present, the task becomes even more complex.

Third approach studied the genetic algorithms and their application to optimization problems in scheduling. This modelling framework allows parallel possible solutions i.e. high level of flexibility that is perceived to be an advantage. Genetic models were originally developed to formalize the genetic evolution including mutations.

The second part of their paper presents results of comparison of mathematical programming and branch and bound methods. They undertook a set of preliminary tests to verify the hypothesis, that there is a difference between times of computation of identical process optimization problems using different process models, which wasn't verified even with very complex and extensive processes. For me the most interesting finding in their work is the test of feasibility used for process model comprehensiveness verification.

In relation to my own research this work was inspiring, but doesn't give full answer to the original question: would Petri nets be ideal method for ideal business process modelling with regards to future usage for compliance assurance automation? The feasibility tests imply that it is not viable direction, as described further in this paper in the chapter "Set of sequences vs. set of constraints".

BPEL AND PSL FOR COMPLIANCE ANALYSIS

Even if I haven't found sufficient answer to my initial question whether the Petri nets or another similar method could formally describe a set of approved ideal process sequences, I discovered another interesting paper that supports my heuristic approach to compliance algorithm design (Šabatová, 2011b, 2015). That paper was published in IBM Systems Journal in 2007 (Liu et al., 2007) and introduces a comprehensive methodology for compliance checking for business process models. The authors use different terminology and already obsolete notations than newer resources, especially the documents introducing "Protection and Assessment Model" (Julisch et al., 2010, 2011), but they are much more factual and closer to my own findings. The philosophy and procedures are very much similar to the concept that I developed and verified.

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The authors (Liu et al., 2007) strictly segregate the business process model and the compliance rules model. To be able to compare the process instance record against the respective compliance rule, they transform the models as depicted in the figure 1. In spite of my concept they use Business Process Execution Language (BPEL) for business process topology modelling introduced e.g. by Juřič et al. (Juřič et al., 2006), which was widely replaced by using BPMN notation (OMG, 2013) during last few years resp. since the time of publication. From this point of view the introduced framework became obsolete very quickly. Also the π-calculus tool for understandable business process flow visualization is replaced by BPMN. Using latest BPMS platforms allows significant simplification in compare to Liu et al. (Liu et al., 2007). Thanks to information model related to the process topology in BPMN we don't need Finite State Machine for process instance modelling. The business object and its attributes' values records including process instance detailed parameters allow assessment against variety of constraints formulated in PSL language, or, in the nearest future, in an integrated Business Rules Management System.

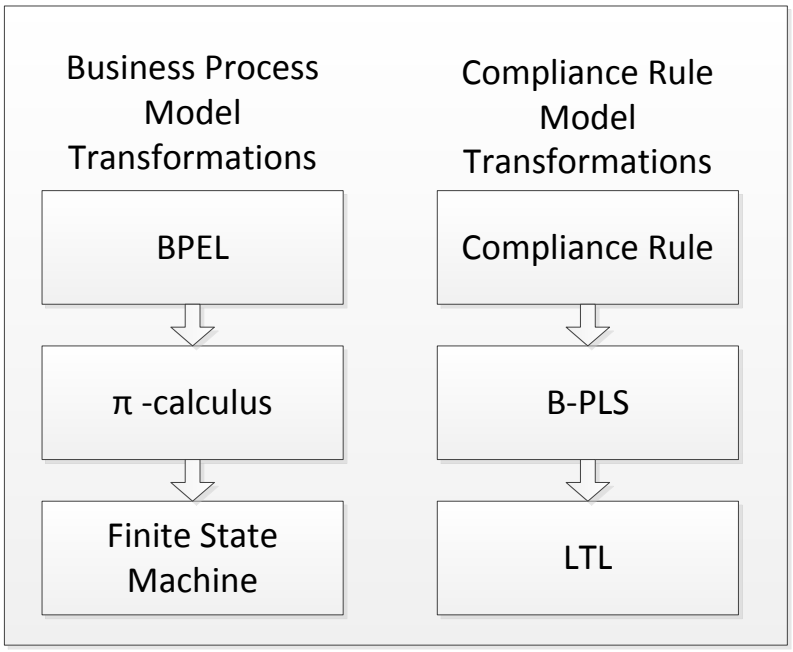

Figure 1: Transformations of Business Process Model and Compliance Rule Model.
Source: Author based on (Liu et al, 2007)

ALL POSSIBLE BP SEQUENCES IDENTIFICATION

Let's return to the question whether all possible business process sequences can be identified. It is possible in simple business processes, cycle-less and without any sub-processes instantiated repeatedly and without activities triggered by an event or by business rule expression evaluation. Savvion BPM system provides process analysts and designers with a patented technology called 360 degree view on a process invented by Jambor-Sadeghi (Jambor-Sadeghi, 2015). The construction of such view is assumed in figure 2; the center of this "dartboard" schema represents the first activity after triggering the process, then the second annulus one or more following activities and so on to the most outer annuluses that represent all the possible ends of this particular business process. The depicted process of DVD production comes from Progress Software document (Progress Software, 2011).

Even if this algorithm is a real advance in BP analysis, it neither resolves the problems of cyclic activities and sub-processes nor the cases of by event and/or rule repeatedly triggered activities. Each correctly run process instance has a finite number of sequenced activities. The issue is that in a complex process we never know in advance how many activities will be performed in a particular instance, because the

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environment is dynamic a and the conditions ruling the course of the process instance are changing even during it starts. In the patent description (Jambor-Sadeghi, 2015) the inventor describes his approach to visualize recurring activity, however the 360 degree view can only display activity iterations encapsulated in single angular sector and it can't display activities and/or sequences triggered by events or rules. This fact represents a substantial limitation preventing usage of this „dartboard" for ideal process modelling for real world complex business processes.

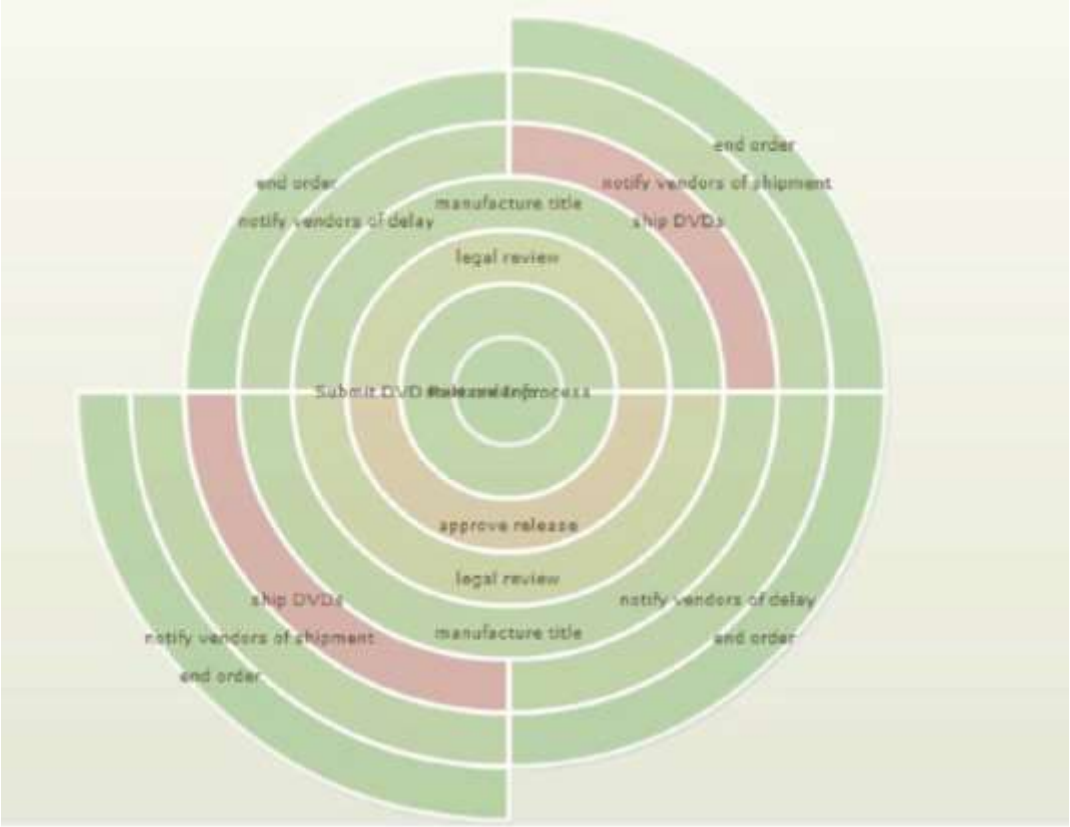

Figure 2: 360 degree view of Business Process Model in an angular graph created by Savvion BPMS. Source: Progress Software Corporation (2011)

SET OF SEQUENCES VS. SET OF CONSTRAINTS

None of the considered business process topology models e.g. BPEL, BPMN, Petri nets, Finite State Machine etc. resolves the issue with iterated activities and by event/rule triggered activities or process sequences. Therefore ideal process modelling using such apparatuses can be used exclusively for simple business processes where iterated and/or by event triggered elements/sequences not occur. For real world complex processes we can't identify the finite set of possible process flow sequences to be able to acknowledge a subset of them as compliant to particular regulatory requirement. This restriction implies that the identification and formulation of set of constraints is better approach to compliance assessment because it is generally applicable.

CONCLUSIONS

The findings from presented resources search, expert discussions and considerations didn't convince me that the definition of ideal process by set of acknowledged sequences could be generally applicable. I haven't found any methodology that would resolve the problem described in the previous chapter. On the contrary the study of static compliance checking framework (Liu et al., 2007) supports my approach

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to design compliance algorithms in dynamic service oriented environment using modelling the processes in BPMN (OMG, 2013) and modelling the compliance assessment policy using PSL (Accelera, 2004). Detailed description of compliance algorithm modeling methodology was published in Journal of System Integration (Šabatová, 2015). This methodology guides the compliance analyst through the entire procedure beginning with identification of the relevant control objectives, following with risk analysis, design of control processes to the formulation of compliance assessment policy.

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APPROACHES TO THE DEFINITION OF BASIC CONCEPTS OF INCLUSIVE EDUCATIONAL PARADIGM IN THE UKRAINIAN SCIENTIFIC DISCOURSE

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ABSTRACT

The article deals with approaches to the definition of basic concepts of inclusive educational paradigm in the Ukrainian scientific discourse, as it is important for inclusive education implementation in Ukraine. It is identified by such terms as "inclusion", "integration", "habilitation", "adaptation", "segregation" and "exceptions" which are scientifically justified in the article.

The concept of "exclusion" and "inclusion" was brought to life as a result of the change in the key social paradigms in the world at the end of the 20th- beginning of the 21th century. The concepts of integration and inclusion (which were often not differed and combined before) have become the key terms of pedagogical and sociological discourse in Ukraine.

We consider the inclusive education to be the initial stage of broader forms of integration of people with different physical, financial and social opportunities. We relate the concepts of inclusion and integration as partial and general. Inclusion and exclusion are the forms of different concepts of integration according to the principle of inclusion/exclusion. The concepts of habilitation and adaptation are intermediate social differences between people with different individual abilities, gender, racial, cultural, or other characteristics, processes of integration itself.

As prospects for further researches we offer a study of psychological and mental, social and organizational conditions of implementation of inclusive education in higher education systems of the European Union countries.

KEYWORDS

Exclusion, abundance, habilitation, adaptation, inclusion, social inclusion, inclusive education.

INTRODUCTION

At the present stage of development of international standards in the field of human rights, the main idea is participation of each person in public life based on equality and without discrimination. The demands to the quality of education set by modern society assumes the satisfaction of educational needs of each individual, including persons with disabilities. These disabled persons shouldn't be separated from the usual social environment, family, and friends.

The principles of accessibility and satisfaction of special educational needs of persons with functional disabilities have become the cornerstone of inclusive education. Now the educational system is based

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on the principle of ensuring the fundamental right of children to be trained in secondary schools at the place of residence with the appropriate psychological, educational, corrective and rehabilitative support.

The analysis of works of contemporary Ukrainian scholars indicates significant interest of researchers to the theme. Scientists have analysed various aspects of integration of persons with disabilities in the educational environment: social, psycho-educational support and assistance of such individuals in the process of education (I. Zvereva, Y. Bohinska, N. Golovko, I. Ivanova, Y. Kazakova, O. Kuprieieva, L. Shipitsyna, I. Loshakova, M. Tavakalova, I. Tsymbaliuk et al.); social rehabilitation, as part of the integration process (M. Czaikovsky, N. Morova); features of the relationship between students without limited functionality and students with limited functionality, socio-psychological aspects of integration (T. Dobrovolska, N. Shabalina, T. Komar, W. Mayboroda et al.); social and pedagogical work with children and students (O. Bezpalko, I. Zvereva, A.Kapska, G. Laktionova); their socialization (J. Rogalska, S. Savchenko); the content and direction of social work (V. Beh, I. Lerner, M. Lukashevych, I. Myhovych, O. Pesotska, V. Polischuk, T. Semyhina); how to work with different groups of people in different societies (O. Vakulenko, O. Karpukhin, N. Komarova, I. Trubavina); integration of persons with disabilities into society in social (I. Katkova, V. Kuznietsov, S. Sarycheva, O. Chaban, T. Yaraia) and psychosocial (O. Asmolov, I. Rasiuk, M. Semaho, O. Usanova) aspects; characterization of technologies of social and educational work (Yu. Bohinska, R. Vainola, L. Zavadska, N. Zaveryko, et al.); the study of the peculiarities of the process of teaching students with special needs (V. Zasenko, I. Ivanova, K.Kolchenko, P.Talanchuk, S. Yablochnikov).

However, despite a large number of scientific papers in the field of inclusive education, the problem of definition of the basic concepts of modern inclusive education paradigm still needs special attention and further research work.

Thus, the purpose of the article is to define the basic concepts of the inclusive education, their models and ways of implementation.

RESEARCH

In scientific discourse the term "inclusion" is used alongside with the terms "integration", "habilitation", "adaptation" and the complementary antonyms "segregation" and "exclusion". Implementation and types of inclusion are important concepts in the introduction of inclusion into social and educational sphere.

After the establishment of democratic systems in most western countries in the field of sociology the key paradigms have changed. In the 80-ies of the XX-th century, the ideas that have spread in other European countries (such as antithetical concepts of "exclusion" and "inclusion"), replaced the traditional but outdated notions of "poverty", "exclusion from society" and "abundance", "social inclusion".

The European Union began to develop new concepts (exclusion – inclusion) as a basis of solution of social problems, diseases and poverty. Unlike previous simplistic concepts of "poverty", "exclusion" and "abundance", "social inclusion", new multidimensional concepts focused on a wide range of problems including not only the vital needs of specific segments of society, but also philosophical, social and political position of groups of population and the position of authorities to them have appeared.

According to I.R. Rossikhina, the undifferentiated or overlapping concepts associated, firstly, with the usage of the concept of inclusion in the metalanguages of various sciences and in sociological practice, and secondly, with the fact that the concept of inclusion is often reduced to the educational problems of children with disabilities are the main problems of pedagogical and sociological discourses on inclusion.

In fact, this term is the key to a new social and educational policy, which involves reformation of society, which would strongly support the diversity (physical, cultural, racial, etc.) of the members of social relations and the educational process as well. Inclusive education is the first step of broader forms of integration of people with different physical, financial and social opportunities into a full life: "The aim

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of inclusive education is to eliminate social exclusion, resulting from negative attitudes to diversity, from the point of view of race, social status, ethnicity, religion, gender or ability. The starting point of this notion is belief that education is one of the fundamental human rights and the foundation of a just society".

An important issue is the correlation between the concepts of inclusion and integration, which are often used in scientific and practical discourse either as synonymous or opposite categories. By the definition of V. Yarska, the term social inclusion is the notion of a democratic society in which the inclusion of an individual or a group of individuals into a broad society aims at involving them into the whole cultural process. Instead, the definition of integration by Stuttgart professionals G. Endruvait and G. Trommsdorf who rely on the structural and functional concept of T. Parson is the most complete. The philosophical concept of integration according to T. Parson has two definitions:

a) the process of adapting the system to the environment;

b) the attempt of balancing the system with the help of its constituents.

Thus, the German researchers focus on the sociological meaning of the term integration. According to it integration is the inclusion of the new elements in the system. After the inclusion these elements acquire the properties of the system and do not differ from the others.

So terminologically, the concept inclusion is a narrow and one-sided process with a semantic meaning "extraneous", while integration is a two-way process in the dyad "element – system" and thus more natural. I.R. Rossikhina in this regard stresses that inclusion is a process that occurs with individuals or social groups, and integration takes place in a society: "The integration may due to inclusion but not vice versa. This means that social inclusion is a relatively subordinate notion regarding to the social integration".

The term "social exclusion" as opposite and yet complementary to the concept of "inclusion" became widespread in the political and scientific environment of the UK. It is the concept of social exclusion of certain segments of the population. A.A. Litvinova, summarizing the views of Giddens, indicates that exclusion is a mechanism for separation of groups from the general social flux that threatens social solidarity and extends in the range of hierarchy from the top ("elite, voluntary self exclusion") to the base – cultural and structural exclusion of the lower strata of population.

The term "social exclusion" is associated with the concept of "segregation" (the opposite – "desegregation"). In accordance with the provisions of Salamanska declaration, segregation is the result of differences between people concerning their individual potential, gender, racial, cultural and religious differences. That does not allow people to be fully involved in social groups during the educational process. The researchers who base their ideas on the generalizations of N. Luhmann indicate that inclusion and exclusion are the forms of integration in today's society: "The worst possible scenario is "that the society of the next century will take the mat code inclusion / exclusion. This would mean that some people are personalities and others – only individuals; some will be included in the functional systems, while others will be excluded from them, being Creatures who are trying to survive until tomorrow. Care and neglect will be on the opposite sides of the border, and a close connection of exclusion and free link of inclusion will delineate doom and luck and the two forms of integration will be completed: negative integration of exclusion and positive integration of inclusion".

Adjacent concepts of inclusion as noted by M.N. Malofieiev, R.P. Domenshtein and L. M Shipitsyna are habilitation and adaptation. They are explained as intermediates and processes of actual integration of people with disabilities in society. Unlike rehabilitation, habilitation is creating new opportunities in a society that would enable the personality to be realized. As a result of oriented pedagogy the personality is to engage those properties and functions that are naturally inherent in a person without disabilities.

Adaptation and adaptive learning as concepts related to inclusion were initiated in the works of A. Disterveg and J.A. Komensky as a pedagogical implementation of natural feasibility of a human.

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These concepts are developed in the context of this problem by Russian scientists O.A. Tikhonova, A.S. Hranytska, E.A. Yamburg and others and are considered as active interaction of a child with environment in a way that the child achieves his maximum self-identity. The environment is adjusted to knowledge, skills and abilities of a student. Integration is the final step in the processes of habilitation and adaptation when man and society are mutually adapted to each other, society provides all necessary facilities and individuals fully realize their intellectual and emotional potentials. Another key issue related to the introduction of inclusion is implementation and its mechanisms. The basic contradiction is to determine the mechanisms for the implementation of inclusive education and integrated socialization of citizens with disabilities. Synergistically, these mechanisms have to include educational reforms, legal support and policy of the Governments.

The discussion of government officials and theorists of the educational sector in the UK as a country that stands at the forefront of reforms in the area of inclusion can serve as an example for solving the problem. The study of these principles reveals that the UK government "considers the problem of inclusive education mainly in the specifics of functioning of school. Accordingly, the responsibility for solving the problem lies with the teachers". Teachers report that this approach is somewhat simplistic: "A number of obstacles to the effective implementation of inclusion in practice relates not only to the government and local authorities activities but to school work as well".

Government activities in the implementation of inclusion in the British educational system is a political process: "The British government has shown that the problem of inclusion is a political issue". Another source indicates, "At a certain level it is a key component of the government's planning".

Between 2000 and 2013, the UK Government develops the policy of implementation of the inclusion of a top-down implementation basis. This approach has led to many barriers that prevented children with special needs to receive education in secondary schools. At the beginning of the XXI century, the Labour government regarded inclusion as "ensuring a situation, where educational conditions offered to children the opportunity to discover their full potential".

However, in practice, government initiatives of inclusion of all children in the general system remained unfulfilled. This is evidenced, in particular, in the report of Minister of Education D. Blunkett concerning the assessment of the National Curriculum of 2000. "... Education of children with disabilities ...is vitally necessary in establishing a fully inclusive society ... We owe it to ... all children to develop their full potential and create the conditions for their active civil position and economic contribution on their part" [D.Blunkett 2003].

As you can see, D. Blunkett is considering inclusion in terms of economic benefits. Inclusion of this approach provides for "equal opportunities for all" (a route to equality of opportunity for all) by supporting" a productive economy and sustainable development" (a productive economy and sustainable development).

English teacher, specialist on inclusion A. Hodkinson believes this interpretation of inclusion cynical: "Educational policy according to this approach does not care about personal potential and is based on functional motivation [D. Blunkett 2003].

The study of the mentioned problems reveals that the second obstacle to the successful implementation of inclusion is the curriculum and approaches to learning that are promoted by the government within the British education system.

By implementing personal approach to education, the government attempted to introduce an inclusive component. However, this approach is not consistent with other approaches, such as, for example, selective education which was declared in the Government's information document or national curriculum or strategic directions in British education which primarily aimed at teaching literacy and the ability to count.

British teachers believe that rather than promote inclusion, the executive branch is doing its best to convince the public that schools in the UK are not able to practice implementation of the basic principles of inclusion. National curriculum and strategies are a "straitjacket" that only hinders the implementation of inclusion.

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Former Education Minister of Great Britain at one time stated "... we must do much more to help children with special educational needs to achieve maximum success. In particular, we must help them to get over the difficulties in schools" [Charles Clarke, 2004].

J. Allan believes that by this statement the government clearly recognized the fact that "the implementation of inclusion rests on the shoulders of schools by introducing a reporting system (a regime of accountability)".

Researchers consider that a regime of accountability should be regarded as one of the major obstacles facing the implementation of inclusive education. Reputation and funding of British schools depends primarily on learning outcomes.

According to British teachers, the main danger lies right here. By including factors of inclusion to the academic accountability of schools, the latter will do everything possible to prevent children's education whose low educational achievements and behaviour can reduce academic performance. In addition, experts believe that government activity is insufficient for successful implementation of inclusion. On the one hand, the "officials have committed to the implementation of inclusive component and increase of the number of children with disabilities in general education schools". On the other – stopped "full inclusion". J. Todd believes that the British government thus stands for "selective inclusion" (inclusion by choice). The idea of "selective inclusion" dominates in the research works of English teachers, where it is proved that there is a certain percentage of children with disabilities who do not want to study in general secondary schools. M.Varnock and R.Baiers believe that narrow specialization of schools should be viewed as a "more productive and creative interpretation of the ideal of inclusive education for all".

So, at the end of XX – the beginning of XXI century the change of the key social paradigms took place. That brought to life the concepts of "exclusion" and "inclusion", which replaced the old "poverty", "exclusion from society" and "abundance", "social inclusion" respectively. The key terms of pedagogical and sociological discourse are the concepts of integration and inclusion, which often do not differ and are combined. Inclusive education is the initial stage of broader forms of integration of people with different physical, financial and social opportunities. The concepts of inclusion and integration are related as partial and general. Social exclusion is a type of social policy, which is a component of an outdated paradigm and implies a special status of people with disabilities, which leads to segregation – social differences between people with different individual abilities, gender, racial, cultural or any other specifics. Inclusion and exclusion are the forms of different concepts of integration according to the principle of inclusion/exclusion. The concepts of habilitation and adaptation are intermediate social differences between people with different individual abilities, gender, racial, cultural, or other characteristics. The concepts habilitation and adaptation are intermediate processes of integration itself.

CONCLUSION

Habilitation is the process of creating opportunities in the community for the implementation of an individual, whereas adaptation is an active human interaction with the environment, so that both man and environment achieve balance and self-identity. The concept of implementation combines the mechanisms for the introduction of educational and social reforms, legal support and government policy. Important destabilizing factors are obstacles to implementation. For example, in the UK implementation of inclusion is based on the "top-down", principle and leads to a series of contradictions: the discrepancy between inclusion and curriculum, blocking real steps on the part of the executive power, implementation of inclusion by the efforts of schools, spread of "selective inclusion". We view a study of psychological and mental, social and organizational conditions of implementation of inclusive education in higher education systems of the European Union countries as prospects for further research.

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HISTORY HAS VERIFIED THE POWER OF INFORMATION AND KNOWLEDGE

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ABSTRACT

The quality of strategic decisions, whether those of individuals or organizations and their results, significantly affect their personal lives, prosperity and future economic results. In the knowledge-based economy the principles of business are changing significantly. These are increasingly based on knowledge and intellectual work. Intellectual capital of the company becomes the most important. The information and knowledge are key factors of success and are the major source of competitive advantage. With vigorous advent of ICT technologies in all fields of human activities, which are thus continuously affected, it is necessary to take decisions and to promptly respond to opportunities / threats. They are identified as a continuous assessment of external and internal company environment by quality monitoring system, that in principle are not only ICT technologies, but mostly their quality content. This means quality information. ICT are now a necessary instrument - but they are still an instrument.

Contribution also includes the historical context of the development of information processing in the Czech Republic and Slovakia in the last quarter of a century in the business scene.

KEY WORDS

information, knowledge, business, corporate culture, competitive advantage, ICT technology, Corporate Social Responsibility

INTRODUCTION – LOOKING AT THE HISTORY

After great social and political changes that have occurred in Czechoslovakia after November 17, 1989 followed changes in the whole economy and society passed from a planned socialistic economy to the market economy. New conditions for the opening of the markets necessitated new insights in management at the micro level of new and existing enterprises and restructuralized companies to best respond to the opportunities and threats that have started to bring open markets and gradually the new information technologies.

In the internal large and medium-sized enterprises, which existed for decades, regardless of the political establishment, the department scientific-technical and economic information (Vedecko-technické a ekonomické informácie - VTEI) became a natural place for the creation and development of new marketing and related activities, which flexibly responded on dynamically changing external environment and in the planned economy were not significant. So it was especially in large chemical enterprises in the Czech Republic and Slovakia, as were Slovnaft in Bratislava, Unipetrol in Prague and Chemosvit in Svit. It was unprecedented, as enthusiastic workers of these companies - Maria Dologová of Slovnaft, Peter Dudek of Unipetrol and Anna Diačiková of Chemosvit - collaborated on a professional and friendly base and scrolled through information activities with their colleagues to the top international level. They implemented the original developed projects of information and knowledge services and

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marketing, which eventually proved to be very successful and involved in the major strategic projects of these companies.

Prague successful company Albertina icome Praha (AiP) after the Velvet Revolution (November 1989) has been organizing for over 20 years once a year an international conference on professional information resources on the University of Economics in Prague. Within this conference had profiled special section focused on corporate information and that nearly 10 years was part of this major event with the support of management AiP, especially by Vladimír Karen. Coordinating of conference content and moderating during its term were replaced by M. Dologová and A. Diačiková. This act was adopted by the professional public very positive and brought a lot of useful inspirations from domestic (Slovakia and Czech Republic) and international scene.

About the original system of processing and using information in Chemosvit, who at that time was unique not only in Slovakia and the Czech Republic but also in Europe and overseas wrote the acclaimed American expert Marydee Ojala (Ojala, 2004): „I was particularly glad to hear Anna Diacikova on International Conference Online Information in London (2004). She speaks about the competencies sherequire so therself and her staff at Slovakia's Chemosvit. The things they can accomplish with only a 5 person department! So impressive! She talked about doing things that many other information professionals only think about doing, well may be some don't even think about it. As a practical follow-on to the more philosophical comments of Janice Lachance (chief executive of the Special Libraries Association in USA and a former Director - appointed by President Bill Clinton - of the U.S. Office of Personnel Management), it made for a very effective track on topics relevant to information professionals."

The main activities of the information (VTEI) department were the creation of information management, development of information services and early computerization of services. They were processed and published professional and highly specialized periodicals for managers and specialists, initially in printed form, later on diskettes, which are personally distributed to interested parties with the appropriate training and education. In this way, users of information services were prepared for the future of new information service data transfer via high-speed optical fiber lines, which began around the company premises built in 1996.

Today, at the time of smartphones it is funny, but in 1997 was the new technique as multimedia workplace a quite sensation for company employees. In the library was established a workplace with modern multimedia PC computer, floppy and CD ROM drives, with headphones, microphone, and especially internet. Employees of this service used on a wide scale. Initially made even waiting list, were time constraints and the library was opened in extended operation. Many workers came to a company before, respectively after their work shift and visited the library and were grateful for the leadership of a such service. It was a period of enthusiasm, loyalty of employees to their company, which was part of its culture. And this period, and the atmosphere in the company were no longer far to create a knowledge management system, which is possible with hindsight to state.

VTEI department or later, the Information department, respectively a Strategic information service department that provides continuously developed, complement, respectively blunt the information services, as sensitively reflect changes in the external environment of the company. Services of the department and its variety of activities already were a very colourful and employees to learn all about the library increments, the results of foreign business trips, translation of the relevant activities of the company and its technology, corporate and special literature, professional events organized in any given year and any further news, in the special newsletters. Workplace constantly improved their information output reflecting time and its special marketing studies have become part of the strategic decision-making processes.

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HUMAN ORIENTED INFORMATION SYSTEM AND CORPORATE SOCIAL RESPONSIBILITY

The end of the first decade of the 21st century, however, signalised that the interest of employees of classical library services decreases. And **so** with the advent of electronic communication and the internet, changes occurred in the library. Golden age, when the library had to establish extended opening hours to satisfy for interested readers are already gone. The situation is similar to that in developed countries. The fund of books is being updated continuously as well as journals, but basically to a much lesser extent. The library is used after 2011 only after telephone contact of the reader/customer, but what is important reports and studies from Information Centre are still part of the decision-making processes in the holding company. They serve as radar monitoring of the external environment in terms of new technologies, products and services, management methods, opportunities, threats and so one and together in cooperation with company specialists they are able to assess and propose new projects in the company. The theory that verifies every day practice, argues for the existence of that information centres in companies, as companies are genuine and dedicated and because they know their information needs the best estimate own employees. Outputs in the form of reports have their specific customers in the company who use them professionally. It is the result of many years of systematic work in the collection, sorting and critical recovery information from various information sources. Sophisticated services are characterized by a constant increase the value added, for example:

- providing information in context,
- elaborate of coherent mono-thematic reports, or
- by providing relevant information, address, time and propose alternative solutions with indicating their impacts.

On the other hand, the Czech and Slovak companies have large reserves in the using of information in their shares. The information has the price only if is used in practice. Building an information system that enables it to provide the right information at the right time to the right people in the right form for the correct use of the contexts in the current business area considered to be one of the basic conditions for economic prosperity and competitiveness. The viability of the concept of knowledge management is underlining via its unusual history. The history of development of knowledge management is interesting that initially developed the practice of knowledge sharing for improving the performance of companies, particularly in the USA and then responded academia, underlining prof. Zelený (Zelený, 2001) from Forheim University in New York and therefore the concept has good prospects for practical implementation.

Knowledge is in people's minds and are not easily transferable to others, which in turn put them in easy reach properly chosen technology. How it will be achieved in the company's willingness to share knowledge closely related to employee loyalty to the company, the corporate culture and not the culture of a particular nation. Traditional control-command system is not effective (Diačiková, 2001). Work effectively with information in the company, therefore, have knowledge of how to use them does not mean that they must be a huge amount. It is important to know how to get the information and the knowledge that are scattered around the company competitive advantage, which is not easy. An individual can use his knowledge ever since their is still available. But for companies with hundreds or thousands of employees it is a problem (Marek, 2006). I tis not possible commanding people to share their knowledge, but we can manage the environment in which knowledge can create, discover, capture, share, extract, validate, transmit, receive, edit and apply. And it is the role of corporate culture that sharing barriers (technological barriers, business processes, human behaviour) is eliminate that knowledge can flow freely (Collison, Parcel 2005, Vymětal 2001) and meaningful information was used in implementing its strategy. And with this is fulfil the philosophy of corporate social responsibility.

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CONCLUSION

If a business entity wants to successfully compete in the globalized competitive environment of the information / knowledge society must be have strategy in the processing and management of information / knowledge. The information strategy of the organization determines the basic directions of building the flow of information and knowledge in the company so that the processed information to serve managers to effective and successful decision making with risk elimination. Therefore, information strategy should include:

- reasons to build a knowledge system and identification of targets in line with the strategy,
- specification of the key information
  - ⇒ for assessing the state of the market, i.e. market trends, market size, attractiveness, products / services on the market,
  - ⇒ the analysis of customer portfolio; existing and potential customers, incl. lost,
  - ⇒ internal analysis of available resources,
  - ⇒ analysis of the product portfolio (whole life cycle)
  - ⇒ of the company's market position, position to competition; competitive intelligence, benchmarking,
  - ⇒ analysis of suppliers portfolio,
  - ⇒ STEEP factors affecting the external scene of the company,
- overview and definition of the standards that the company plans to apply to build the information system,
- the volume of funds and other resources allocated to the company for realisation of information strategy,
- the development of an information system in the medium and long term; information system must support company strategy,
- principles for evaluating the effectiveness of information and knowledge strategy and information system (Diačiková, 2007).

An important aspect to note is competent in the company that the information - communication technologies are obviously synonymous with the information society, but at the same time with their content, i.e. information. One without the other there are in the present ICT world determined to extinct, like the dinosaurs before 65 Million years.

Long-standing practice has been proven close link between knowledge management that has a positive impact on the quality of research and development, which results their customers appreciate with loyalty and faithfulness. Such a system of business entity would not be sustainable without applying the principles of corporate social responsibility.

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KNOWLEDGE MANAGEMENT USING BUSINESS RULES

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ABSTRACT

In today's rapidly changing market environment, almost every company has to be able to quickly adjust its business strategy. Simultaneously, it can be observed a faster growth of requirements on knowledge management. Alongside the knowledge bases for collection the knowledge in unstructured form, for many applications, it is usable to formulate the knowledge for decisions and checks in a structured form. This requirements can be fully satisfied with adoption of the business rules approach. Business rules is a name for relatively big group of specifications and techniques. They are suitable to complement the process modeling of enterprises. The defined rules can be comprehensible for humans (managers, domain experts etc.) as for inference engines. Creation of business rule sets is a way of creation a structured knowledge base. In this paper, there is summarized information about opportunity of collection and management of knowledge using the business rule approach. The mentioned knowledge have been learned not only on theoretical basis but also using the experiences of the rule experts. The research in the field of business rules is currently on a crossroad, because still more experts think, that business rules may be closer to the prime role of expert systems. It can be stated that business rules can be successfully used also for solving of tasks with an acceptable degree of uncertainty. Such tasks can be found mainly in the field of marketing activities or client ratings.

KEY WORDS

Business rules, knowledge management, data mining, rule learning, knowledge base.

INTRODUCTION

In conjunction with the development of the new economy occurred in the last century, there is a significant increase of the impact of knowledge on the prosperity of businesses. The main production factors are not only the labor, land and capital, but also the currently "most important" factor - knowledge. The methods and tools of knowledge management have been developing for really long years. In the presence, many enterprises know that the knowledge have to be collected, managed and effectively re-used. Concurrently, it is almost clear, that the employees cannot be absolutely replaced by an information (expert) system.

In the course of exploitation of "enormously smart" expert system it was designed a user friendly way of processing of the business knowledge saved in a form of rules. It was the birth of business rules and business rules management systems.

Business rules are simple structured rules. They can be used for exchange of the knowledge between employees and event between businesses, but they can be also used for automatic application of restrictions, actions, reactions etc. However, it is necessary to mention, that "business rules" is not a name of one specification or standard. It is rather a group of specifications and an enterprise modeling method.

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Management of knowledge using business rules has developed since 80s, but it is still not possible to say, that it is used in the most of companies, which can profit from its application. In this paper, there are summarized the basic insights about possibilities of business rules and its usage in the real world applications. The findings also come from the experiences of the rule experts, collected during interviews and within using a questionnaire for the participants of the conference RuleML 2015.

KNOWLEDGE WITHIN COMPANIES

As mentioned in the previous paragraphs, the knowledge is very important for the most effective life of business companies and even of non-profit organizations. In connection with the transformation from "traditional" to "information" companies, all organizations have to deal with knowledge of their employees and collect it into a *knowledge base*. Optimally, it should be realized with a suitable support of the information system. (Veber, et al., 2009) It can be talk about the *knowledge management*. The mission of the knowledge management is the externalization of the "internal knowledge of the company". This knowledge can be found in the minds of the employees, in a tacit form. For sharing between individual employees, the knowledge has to be transformed into the *explicit form.* For the best market share, the company should share the knowledge of employees and combine it with the actual data saved in the information system.

From the perspective of the form of knowledge and the knowledge management, the externalized (explicit) knowledge can be saved and management using two different ways. On the one side, there are knowledge bases of unstructured or semi-structured partial knowledge. This knowledge can be effectively managed within a wiki system, web content management system or articles connected with a mind map. On the other side, there are structured forms of knowledge – *ontologies*, optionally in conjunction with *rules*.

For the comprehensive support for management of the business processes, it is useful to combine both – structured and unstructured – expression forms of the internal, business knowledge. In many cases, companies prefer the unstructured or semi-structured form of knowledge expressions, when starting with using of knowledge management. The unstructured form (plain or hypertext articles, comments, e-mail with advices etc.) are closer to the natural talk between the interested employees.

In the case of implementation of a new version of the information system, it is necessary to use these unstructured expressions of knowledge and combine it with temporarily collected knowledge gained from interviews with selected employees and with the knowledge found in the source code of the previous version of the implementation. From the perspective of the "classical" methodologies for implementation of an information system, this collection and completion of knowledge is a substantial part of the detail analysis, before real coding of the application. (Voříšek, 2008) Subsequently, the knowledge is used for the design and implementation of the source code. Also the knowledge is "hard-coded" in the applications. This process of collection of knowledge and subsequent implementation is ingrained and very often (even usually) used, but in today's rapidly changing environment, it is not very effective. The business logic coded is not easy adjustable, the changes are long lasting and expensive. This problem can be partially solved using agile development methodologies, but only in the possibility of a progressive refinement of requirements and partial rules of behavior. In order to create a flexible and sustainable implementation of an information system, the business logic, defined using the shared knowledge, gained from the business employees, should be separated from the source code of applications. It is suitable to use a term dictionary (ontology, terms enumerations an so on) and rules for definition of individual decisions, checks and derivation from terms. The role of such rules can be excellently fulfilled using business rules.

BUSINESS RULES – WHAT THEY REALLY ARE?

The term "business rules" is a name of relatively big group of specifications and standards of rules and also an approach to modelling of enterprises. The basic idea behind the creation of business rules is: *„Rules build on facts, and facts build on terms."* (Ross, 2003) From the perspective of modeling, this

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business rules are suitable method for extension of the currently usually used approach of modeling of the business processes. In business rules, the main questions are "Why?", "What?" and "How?" should be performed a concrete business activity. All the collected answers should transformed into form of simple, clear and human friendly rules.

The main assumptions for the effectively usage of business rules were defined in the "The Business Rules Manifesto" by the Business Rules Group. (2003) The business rules were developed from the best practices of the expert systems, but the target of their application was absolutely other. The business rules should not be used for building of complex knowledge bases for standalone solving of business problems or giving of expert answers. They should be used for management of really defined rules, applied in the business. However, nowadays, the business rules are used also for collection of knowledge from the employees and for solving of problems with a certain level of uncertainty.

SPECIFICATIONS OF BUSINESS RULES

Because the term "business rules" refers to a "modeling concept" rather one specific standard, for usage of business rules in a practical use case, it is necessary to explore existing specifications and formats, test relevant software components and select a concrete specification. Currently, there are many specifications of business rules. These specifications are not fully compatible and mutually convertible. In terms of the types of business rules it is possible to distinguish declarative, repression, derivation and action/reaction rules. Not all specifications support all these rule types.

Another selection criterion is proposed purpose of the created knowledge base in form of business rules. In case if the knowledge should be primary used by humans (members of the company management, domain experts etc.) it is suitable to select a specification of business rules, which is based on the natural language. A suitable example is the specification *Semantics of business vocabulary and rules – SBVR*. (Object Management Group, 2015) However, a big advantage of business rules is the possibility of a simple connection of rules into the models of processes and simple automatic evaluation and enforcement of the rules. For this purpose, it is preferable to use a technically more focused specification – *RuleML*, *Drools DRL*, *Jess* etc.

The third important criterion of selection should be the compatibility of the software component for support of the specification in combination with the existing software components, already used in the company. Most specifications are supported with software component written in Java or .NET. Based on the search and on the practical testing, it is possible to say, that in terms of functionality, the most commonly used components are mutually similar. Equally they are similar regardless the usage license or price. The differences are mainly in the commercial support added to the available software components and packages.

Business rules are always build over a unified terms dictionary. This dictionary should be shared between all departments of the company. (Ross, 2003) Depending on the selected specification, the role of the terms dictionary can be fulfilled using a business ontology, database columns or specifically created dictionary. Of these options the ontologies have gained in popularity recently. Their creation and deployment can be observed in private companies also in the public administration. (Dudáš, et al., 2013)

LEARNING OF BUSINESS RULES?

For the real, practical implementation of the knowledge base in form of business rules it is necessary to achieve the sufficient complexity of the saved knowledge. It is usually necessary to manage and use tens to hundreds of individual rules. Manually creation of a big knowledge base is really challenging to the ability of domain experts and managers of the company. For this reason, the possibilities of (semi-)automatic learning of business rules has been a relevant topic of research in the recent years. Ways of obtaining of business rules:

manual input by human – domain expert

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- traditional way of obtaining of business rules
- best control of business rules
- time consuming
- the risk of non-inclusion of all necessary business rules

automated identification of business rules in unstructured texts, ontologies and processes

- combination of automatically identified rules with manual control
- current research topis – see (Sharma, et al., 2014), (Bernotaityte, et al., 2013) (Sellner, et al., 2011)

learning of business rules from historical data

- many comments about the appropriateness
- dependent on the quality of data and ability of the data mining expert
- currently only one existing implementation – component RuleLearner in the system OpenRules (http://openrules.com) , but it is not distributed. It is available only for experts from the company OpenRules, Inc.

In relation with the development of business rules, however, was one very important question: "What should be defined in the form of business rules?" On the basis of available publications and also on the basis of the realized interviews, it is possible to identify two groups of experts on the problematic of business rules.

The first group believes, that business rules should cover only the knowledge, which is really written in the existing corporate standards and determinations of the key managers. This ensures the absolutely reliability of the defined business rules. It is not possible to contest them and there exists a clear responsibility for the conclusions. With this 100% reliability, business rules have enforced in the real applications - compared to experts systems, which are substantially the past. Most supporters of this group are in the American group of researchers, standing behind the emergence of the first standards of business rules.

The members of the second group believe, that business rules can also play the role of "small expert system". Respectively it can be said that business rules can slowly go back to fulfilment of the main goal of expert systems. Business rules should not play the role of absolutely all-embracing decision and directional system. But it is however possible to use partial rule sets with a partial uncertainty. For example, Business rules can be used for example for decisions on the creditworthiness of the clients when applying for loans. The appropriate decision can be influenced by statistical data gained using data mining techniques. To deal with similar classification tasks it is appropriate to use data mining models transformed into form of subset of business rules. (Kliegr, et al., 2014)

REAL POTENTIAL OF BUSINESS RULES – EXPERT OPINIONS

Are the business rules actually used? Is it possible to gain business rules from the historical data of the company? And is it suitable? What types of companies could have the greatest benefit from adoption of the business rule approach? Obtaining answers to these questions is not quite a simple matter. To solve it, the author realized a questionnaire and some interviews with the rule experts.

The respondents of the prepared questionnaire were the participants of the conference RuleML 2015. This conference is one of the most important platforms for sharing knowledge in the field of application, design and usage of the rule systems and specifications. The responders have answered a set of questions about the applicability and the frequency of use of business rules, also as questions about the possibility of learning of business rules from the historical data. Simultaneously, there were some questions for checking the erudition of the respondents.

There are some interesting findings obtained from the answers. 60% of respondents think, that the business rule approach is used only in 30% (or less) of companies, which could have profit from the adoption of it. No experts also believe that the level of adoption of the business rule approach is higher than 70% of companies, which could profit of it. In terms of the research of methods of obtaining of business rules (other than manual input), the most of expert think, that it would be appropriate to have a method of semi-automatic learning of business rules. However, more than a half of the experts believe,

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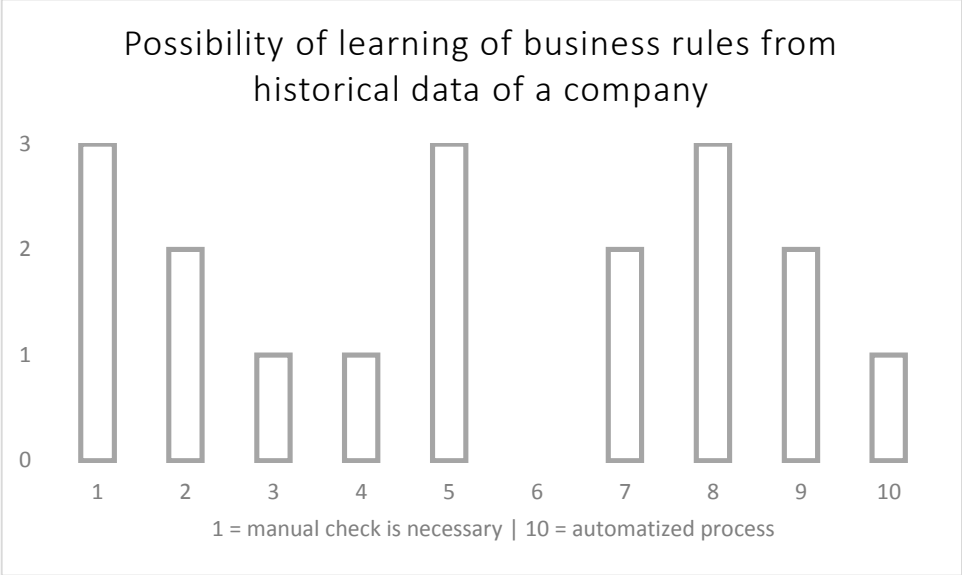
that it is necessary to realize the manual check of the learned rules. In terms of the use of historical business data for the learning of business rules, the experts are not unanimous. Essentially, they are separated into two groups of relatively equal size.

Within the questionnaire and the interview, the experts were also asked about the most important problems associated with the learning of business rules from historical data. The biggest, most important problem is the quality and size of the historical data. The companies often believe, that they have good and relevant data, but the experts have too often solve the problems with the historical continuity in the rows saved in one dataset and problems associated with incompleteness of the data. Another problem is a large number of the learned rules.



Graph 1 – Possibility of automatic learning of business rules from the historical data

The possibility of (semi-)automatic learning of business rules is suitable for solving of complex "classification" or "recommender" decisions. Suitable areas of implementation of this functionality can be found in the field of marketing (recommending of goods for individual customers, determining the appropriateness of sending of an e-mail) or in the field of reviews and checks of clients of financial institutions and insurance companies. Financial institutions and insurance companies, together with the institutions of government, are the best adopters of the business rule approach. They have really big amount of rules that must be checked and used for operational decisions on the daily basis.

From the perspective of knowledge management the experts have been asked for the potential of usage of business rules for creation of knowledge bases. If the business rules are saved in a form, which is comprehensible for the non-expert users, then it is possible to say, that a set of business rules is a good way for sharing of knowledge. It is definitely easier to use a structured set of business rules for solving of decision tasks, than the need to obtain these "rules" from documents in an unstructured form for realization of decisions of the individual employees. In terms of clarity for new employees, it is suitable to have the rules annotated with notes for the human users. Another suitable way is a connection between business rules and a base of knowledge written in an unstructured form. The connection could be based on one shared ontology. In this case, the classes and instances from the ontology should be used in the business rules. Simultaneously, the ontology plays the role of "navigation network" in the knowledge system for the unstructured knowledge expressions.

CONCLUSION

Business rules represent an interesting approach to modeling of enterprises. It is appropriate to combine this approach with process modeling of enterprises, mainly in the field of financial institutions, insurance companies also as in the field of state and local government. However, the adoption of the business rule

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approach could be a benefit for enterprises in another market fields. Working examples can be found in the determination of prices for different groups of customers. Based on the feedback from the experts it should be mentioned that using of business rules could be a benefit for more companies. The benefit will be in the possibility of operational update of decision rules. Thus, the companies could respond the changes on the market more flexibly.

For companies that use business rules, it is appropriate to try methods of semi-automatic learning of the rules from the historical data. This learning is really suitable for solving of classification tasks.

The author of this paper is interested in possibility of semi-automatic learning of business rules using data mining of association rules. In the future work in this area it will be suitable to promote the usage of this business rule learning technique.

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SYSTEMS THINKING DURING THE CONSTRUCTION OF PHOTOVOLTAIC POWER PLANTS

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ABSTRACT

Intensive development of industry and individual interests increased demands on energy consumption. The other side of this problem is environmental protection so as to not create sources of energy extraction emissions endangering people's lives. In this context, they take a systematic approach to application design, implementation and impacts of operating photovoltaic power plants in an important place in the market mechanism. It shows the impact of policy decisions on the issue without a rigorous systematic approach.

KEY WORDS

System approach, solar power station.

INTRODUCTION

Systematic approach to solving technical problems is involving not only the realization of system but also estimation of their impact on the practical implementation of economic, environmental and social thinking. In the context of increasing complexity of systems, difficulty of their realization as well as technological possibilities, the systematic approach is becoming topical. Recently there may be mentioned more examples of the positive results of systemic approach to solving problems but also several wrong decisions, unfortunately, on a high political level.

In this article we will focus on analysing one of the areas of electrical engineering, which is being professionally addressed in the Institute of Aurel Stodola. For the humanity it is currently crucial to ensure enough energy for people's lives and for production. There are two parallel paths. To reduce the energy intensity of processes or to start taking advantage of clean energy sources. The contribution will concentrate on the second option that is mostly about alternative energy sources. There are many discussions nowadays about renewable sources of energy particularly connected to photovoltaic water and wind fuelled power plants. Here it should be noted that this is not a clean renewable source of energy because for the operation of these power plants using the energy of the sun, whether direct or indirect solar heating of matter. The sun as an energy source utilizes a form of thermonuclear transformation of matter, which is finite. It is anticipated that this process will stop in about 5 to 7,000,000,000 years. Therefore it is difficult to talk about renewable energy.

Let's examine substance of the implementation of photovoltaic power plants and their impact on economic and social processes in the Czech Republic. A similar situation occurred also in Slovakia.

PHOTOVOLTAIC POWER PLANTS

For clarification ideas about the photovoltaic power plant it is necessary to adduce its basic principle. A photovoltaic panel is the basis of every solar power plant that converts the energy of sunlight directly into electricity. It is based on the principle of semiconductor devices that emit free electrons while being

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illuminated. Energy output, which is applicable in practice, can be obtained with sufficient number of elementary cells.

It is evident that amount of energy depends on the intensity of solar radiation, the efficiency of converting light energy (ranging up to 20%) and the time duration of the sun. The intensity and length of sunshine is influenced by the seasons and weather conditions. For our conditions, it is possible to count with an average time of five hours of sunshine per day. Another fundamental problem which affects the use of photovoltaic power plants for everyday usage is the emergence of direct electrical current on photovoltaic cells. For distribution electricity in the public network is necessary to use a DC inverter on AC voltage. Before connecting to the distribution network frequency and phase of the generated voltage have to be the same as in the public network.

Small island systems do not have this problem, because each one is a separate power circuit with a separate unit. But there arises a problem how to ensure energy in the absence of sunlight. Therefore, they are mainly used in storage batteries, which supply electricity during troubled periods of time. The analysis of such a system was conducted in (Exnar, 2015).

In Figure 1 is listed a basic diagram of realization of photovoltaic power plants.

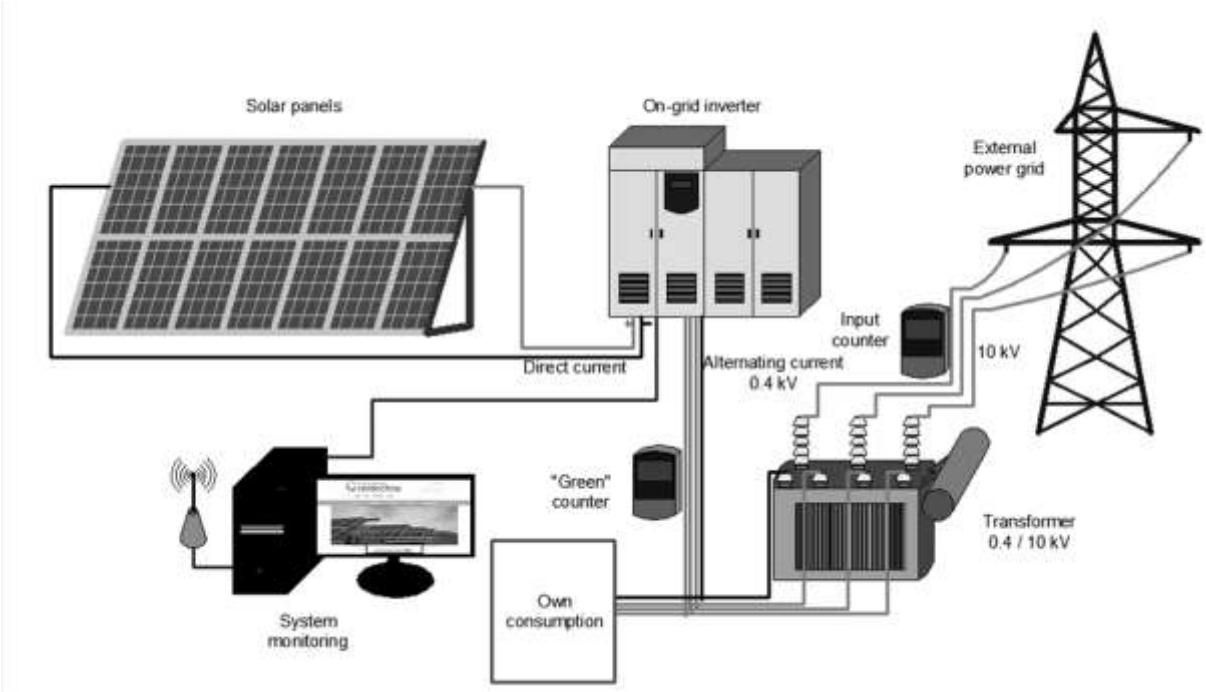

Figure 1 Typical structure of grid PV power plant (Rentechno, 2015)

The technical solution is not complicated. Its implementation is relatively simple and available components are industrially produced in large quantities.

APPLICATION OF PHOTOVOLTAIC POWER PLANTS

With increasing consumption of electric energy in the context of limited conventional energy sources such as coal, natural gas and crude oil it is necessary to seek and use other energy sources. This led the European Union institutions to actively support alternative energy sources. On this level the works plan for renewable energy sources issued by the Commission on 10 January 2007 under the title „Renewable Energy Road Map. Renewable energies in the 21st century: building a more sustainable future" was created. The Road Map sets out the Commission's long-term strategy for renewable energy in the European Union (EU). The aim of this strategy is to enable the EU to meet the twin objectives of increasing security of energy supply and reducing greenhouse gas emissions. An assessment of the share of renewable energy in the energy mix and the progress made in the last 10 years shows that more and

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better use could be made of renewables. In the Road Map, the Commission proposes setting a mandatory target of 20% for renewable energy's share of energy consumption in the EU by 2020 and a mandatory minimum target of 10% for biofuels. It also proposes creating a new legislative framework to enhance the promotion and use of renewable energy. It also proposes the creation of a new legal framework to enhance the promotion and use of renewable energy sources. (EU, 2007).

„Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity from renewable energy sources in the internal electricity market". The Directive follows up the 1997 White Paper on renewable energy sources which set a target of 12% of gross inland energy consumption from renewables for the EU-15 by 2010, of which electricity would represent 22.1%. With the 2004 enlargement, the EU's overall objective became 21%. The Directive also constitutes an essential part of the package of measures needed to comply with the commitments made by the EU under the Kyoto Protocol on the reduction of greenhouse gas emissions. (EU, 2011)

Based on these guidelines, the government of the Czech Republic and Slovakia established programs to support alternative energy sources (Kerebel, 2015). It was decided to subsidize the purchase prices of energy and thus creation of an interesting environment for business. This supported a rapid development in the area of photovoltaic power plants. The costs of their construction consist essentially of the price of photovoltaic panels, components for realization of the power plant, the price of land on which they built, a security and control system and its own construction costs. The relatively long lifetime of photovoltaic panels (estimated lifespan is at least 15 years) in connection with the subsidized purchase price of energy from these plants guarantees fast return on investment and the possibility of substantial profit. In doing so the costs of operating a power plant of this type are very low. These circumstances led to an enormous development of photovoltaic power plants (Figure 2).

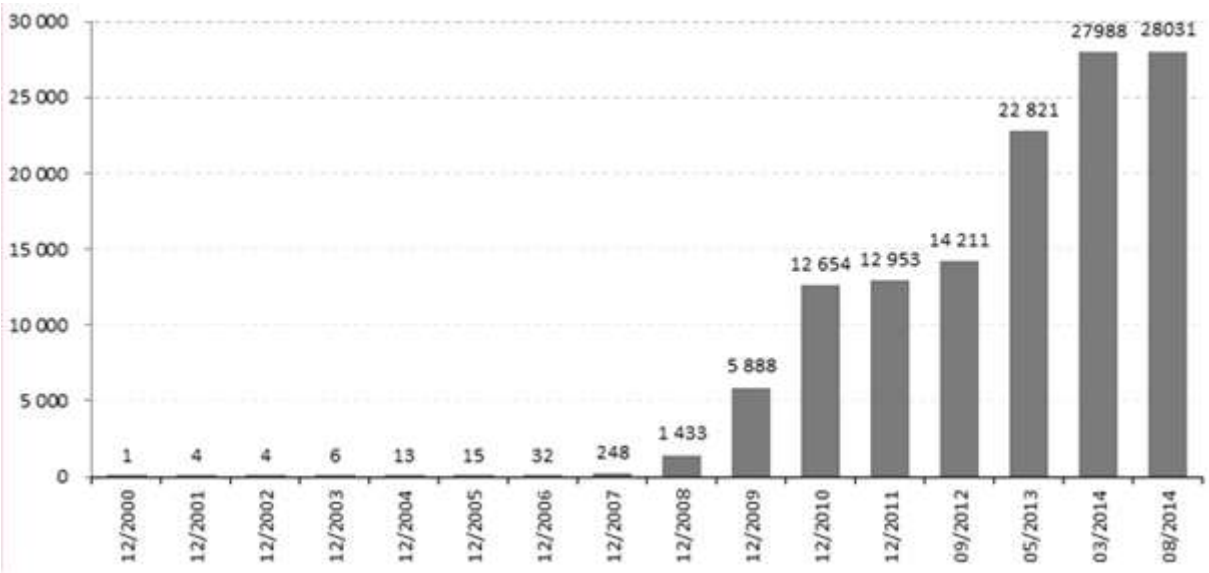

Figure 2: The number of photovoltaic power plants in the Czech Republic [in pieces]

Positive effort on an energy source that does not pollute the environment had in an environment of market mechanism impact on increasing demands for subsidies from the state. These subsidies were reflected in the final electricity prices that negatively influenced the market environment.

There was an uncontrolled development in the field of photovoltaic power plants, which also brought a range of negative manifestations. Besides the increase in energy prices the construction of photovoltaic power plants on land did not require additional costs for construction. They were generally flat land with a high credit rating of agricultural land. From an ecological, agricultural and aesthetic point of view, the created buildings have very problematic character (Illustrative image 3).

Among the negative impacts also we include the impact on energy transmission system. It is the irregularity of electricity production which de pends on the weather, which affects the intensity of solar radiation and thus the performance of these plants. As the weather can change during the day then a big

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outage of power may significantly affect the power grid. Steam or nuclear power plants have a start-up work with a large time delay and therefore must be ready to power plant with rapid start (for example pumped storage power plant).

Figure 3: Implemented photovoltaic power plant

Negative influences, especially from an economic point of view, can be considered influencing of price of energy in the form of subsidies by the state and subsequent reflection of this subsidy in the final price of electricity. Rapid return on investment in the construction of photovoltaic power plants and expected high profits has led to an uncontrolled increase in building of power plants in unsuitable places. The consequences of this situation were extremely burdened state budget and increase in the final electricity price. It was necessary to adopt the solution for restrictive measures. The measures taken are reflected in the decline of installed capacity (Figure 4). After intensive development in 2009 and 2010 the business community has lost interest in this area.

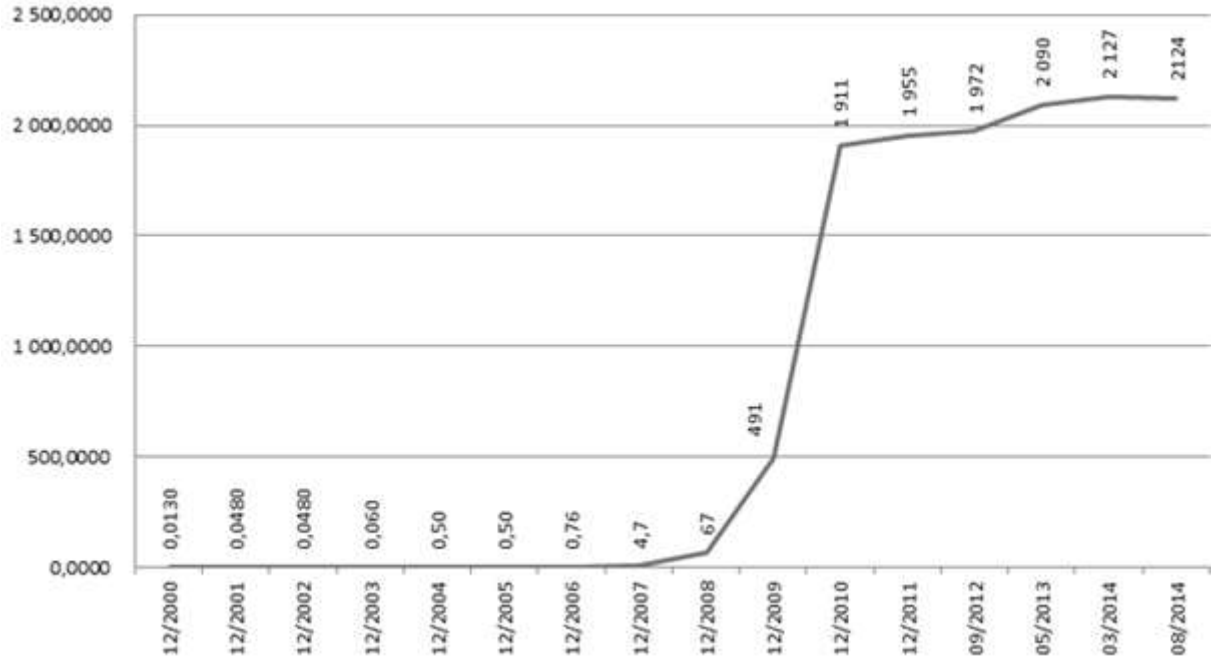

Figure 4: Device of photovoltaic power plant in the Czech Republic [in MW]

The reason was the reduction of subsidies; this implies a reduction in purchase prices of electrical energy from photovoltaic sources. This has the effect on a reduction in annual income and the extension of payback period. The result is a lack of profitability, resulting in a lack of interest in further development

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in this area. Significant manifestation of this process is shown in the number of photovoltaic power plants with an output of more than 1 MW (Figure 5)

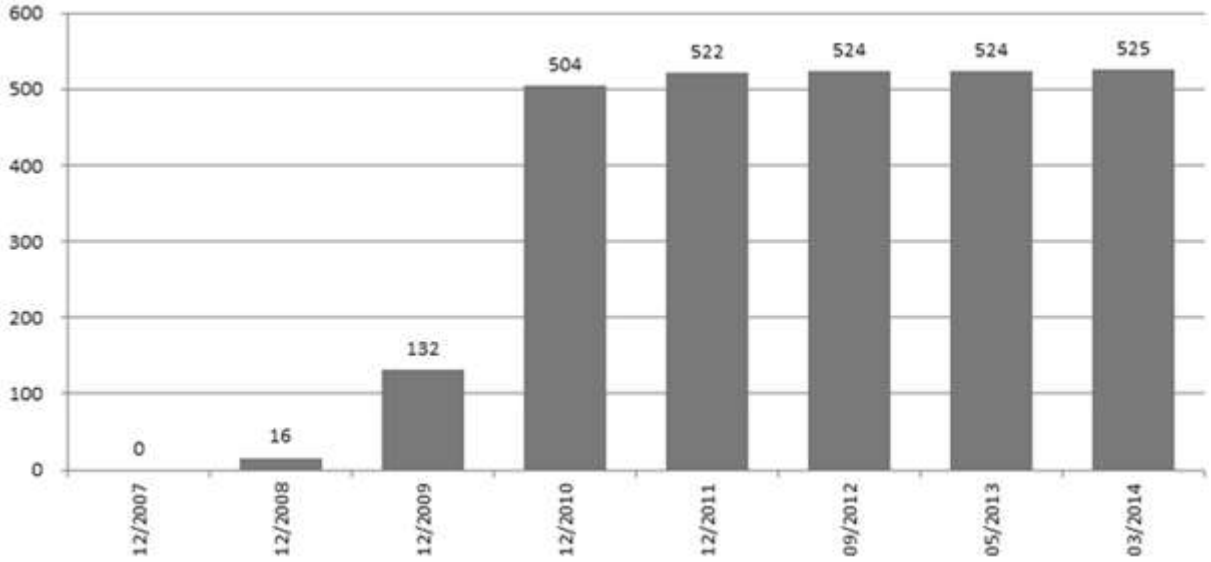

Figure 5: Photovoltaic power plants with an output power greater than 1 MW

CONCLUSION

Statistics show on incompetence of decisions realized / taken in this area. They are the consequence of a lack of systematic approach to solving the problem of photovoltaic power plants. The consequences of the measures adopted were not analyzed and the political decision, albeit in the right direction, did not have corresponding measures. The result is uneven development, which will also be reflected in the future when the service life of photovoltaic power plants built between 2009 and 2010 ends.

Nowadays, the government policy is oriented on small photovoltaic plants on the roofs of buildings instead of giant projects. However, the major problem - complicated legislation which poses difficulties in implementation of the network connection, remains unresolved. There is a need to simplify the rules for the operation of these small energy sources.

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IMPORTANCE OF KNOWLEDGE FOR CRITICAL THINKING

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ABSTRACT

Critical thinking can be considered as principled approach to create own attitudes and opinions. It turns out that receiving information passively without their analysis does not allow in the current information environment to create own opinion independent of external influences. It turns out that receiving information passively without their analysis does not allow own opinions to be created independent of external influences in the current information environment. Critical and systems thinking in human life has fundamental importance in creating new values. This paper points to the fact that the person who does not have wide knowledge base, fails in the decision making (inaccuracies) or creates faulty conclusions. A significant influence has critical thinking in relation to tackling the particular situation. In the process of finding the optimal solution is necessary to use analysis skills and their appropriate combination to create new solutions. Significant position in the process of developing knowledge has education. One of the pillars of education is educational system, which must allow students to obtain both general and professional knowledge. A student who obtained wide overview has the potential to make the right decisions, be creative. Creative acts require a creative personality.

KEY WORDS

Critical thinking, knowledge, education

INTRODUCTION

Contemporary society solves number of problems whose common denominators are the information boom causing rapid changes in the society and the chaos in people's thinking. A large amount of information supplying enormous amount of data influence the individuals from various sides. A person as an individual is unable to process and credibly evaluate such a data flow so that he can make his own opinion. Therefore, we let us be influenced by the data already processed, embedded and prepared in a particular context, acting for us as information. This, however, poses a serious problem, which consists in the fact that data prepared in advance are adjusted by a specific template, according to the vision of the commentator, in order to influence our opinion. An individual can create professional opinion given the volume of knowledge in the various scientific disciplines only to a limited set of data. Normally this is an area in which he is an expert. It is necessary to be able to differentiate and to recognize credibility of the data encountered in order to create a professional world outlook. The main role in this process represents critical thinking. It is a tool for assessing the credibility of data and methods of analysis in order to create individual's own opinion (Koukolík, 2010).

Critical thinking becomes a crucial thought process for an individual in a situation when he must evaluate a range of information. From this perspective, we consider this definition of critical thinking as a one of the best:" The assertions are statements that we adopt as a true or as a false. Critical thinking is

carefully-considered decision on whether we accept or reject the argument/assertion or waive opinion

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about it. Critical thinking also includes a degree of certainty with which we accept or reject the claim /assertion (Koukolík, 2010).

It is inevitable to approach the data with great caution and with certainty that the issue will be discussed from the same perspective during the debate. One problem can be analysed from different perspectives, but then the conclusions drawn in respect of the problem can be greatly different. In assessing the data we need to take into account whether they are facts or opinions. The rule says that when it comes to subjective opinion, it is a matter of taste or preference. The statement is objective and concerns the fact, when it can decide whether the statement is true or false.

The antithesis of fact is "factoid", the data that resemble a fact. Factoid data are intentionally distorted so as to correspond to the political tendencies of certain influential groups in the society. We encounter this issue daily in television, radio and newspapers. Many of them do not distinguish between news and commentary. News should be the facts and nothing but the facts. They should be full, open and free of bias. Commentaries are opinions that are regulated by a specific template. Miserable news casts selects and adjusts the facts and even mingles with their commentaries and presents this mixture to the listeners or the readers. The purpose is bringing to the mind of an individual propagandistically desirable feeling and make the individual think those "facts" are of his own opinion. Here it should be noted that people are equal but their opinions are not. There are opinions highly professional but also false, misleading, stupid and also socially highly dangerous ones.

In this context the use of critical thinking is one of the fundamental procedures for creating own opinions based on facts. Critical thinking skills are biologically conditioned. According to the definition, only people are capable of critical thinking. Critical thinking requires human genetic data and human brain. Critical thinking can be understood as a kind of decision-making. It depends on the control of brain function, memory, and level of education, oriented attention and intelligence. People must learn to think critically. Learning should begin already at preschool age. It should be noted that the critical thinking it is not a state but a process that needs to be preserved and developed. Self-aware people are working on developing of critical thinking throughout the life.

APPLICATION OF THE CRITICAL THINKING

Critical thinking is not only the process of creating own opinions based on own knowledge and information but can be extended to data processing, aimed at creating a decision for solving the actual situation. Particular situation is solved on the basis of information obtained with our senses and on knowledge (experience) gained during our life and also by working and learning in the school (Fig.1) The volume of knowledge is not stable and during person's life is changing. New knowledge is being extended but there is also a process of forgetting. The analysis of the situation is performed on the basis of knowledge and current information obtained through the senses. If the incompleteness of the data is found out during the analysis, the system operator is used and the missing data are added through a source of information. The source of the data can be encyclopaedia, specialized literature, internet, ...

Success of analysis of the situation and finding a solution is conditioned by procedures of critical thinking, based on a comprehensive and objective assessment of available data and their mutual interaction. In this context, it is necessary to underline the direct correlation between the volume (completeness) and data by creating the objective view, which makes an optimal solution to the situation. The process of creating opinion is based on our knowledge that directly influences the achievement of a solution. The right decision depends on whether we will use important data unloaded for background noise information or data belonging to the group factoids. A person acquires knowledge from the birth. We learn gradually from elementary knowledge, to knowledge enabling scientific discoveries. A brain, on the basis of combining ability, foreseeing ability, and imagination, can create such links, which lead to the creation of opinion, new information and solving situations. To what extent we manage to solve the situation depends just and only on how we evaluate and create links between data. A procedure to do it precisely describes the principle of critical thinking. An essential in the whole system of solution to the situation is the amount of data (knowledge) that allow making the right decision. In this context, some politicians can be mentioned, who are able to serve any function and are confident about their

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knowledge to cope with it. Decisions taken by these politicians are far from critical thinking, because they consider only one interest aspect of the issue. The results are far reaching irreversible damages and losses, such as the introduction of inappropriate or discrediting of functioning system –to repeal and to replace it with another that has a worse performance than the previous one.

Knowledge is generally derived from the educational attainment. Where there are some of the data unaware, it is possible to supplement them by additional studies. Based on the analysis (Fig. 1),it seems necessary to supplement the data in the form of acquiring new information. We have the possibility to use the system operator and to acquire the necessary data from the sources of information through one from the senses. But there is a little problem. We must recognize which information we need and know where to find them. A general overview, which helps us to discover what information we need and where to find them, can be applied here.

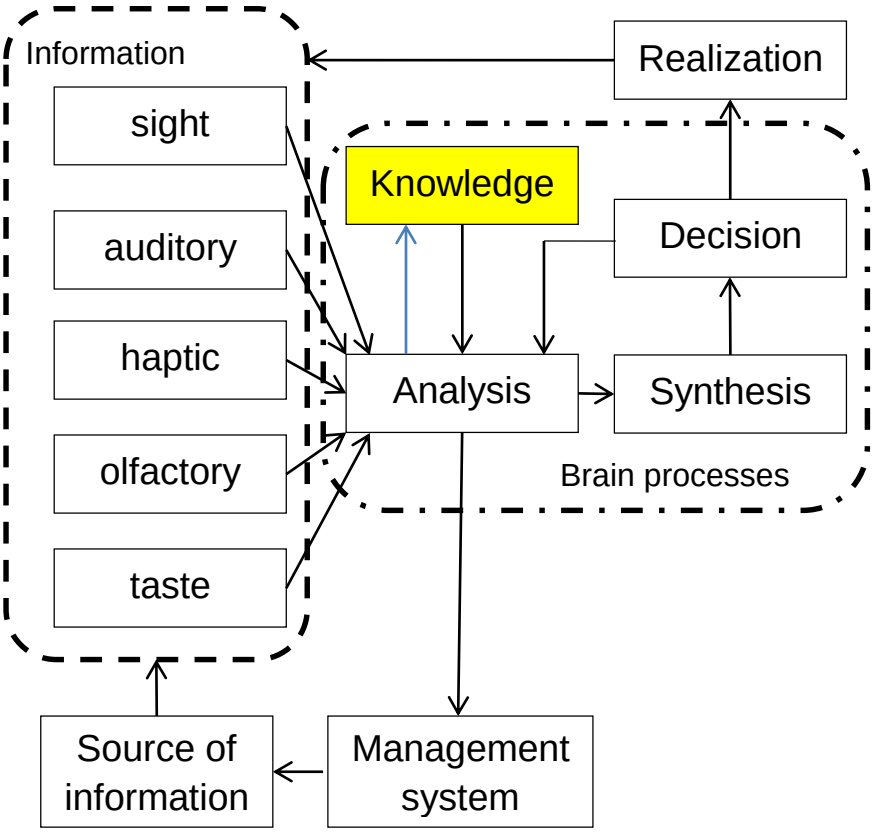

Figure 1: The basic processes of critical thinking

The analysis is of data leads to the synthesis and creation of the decision. This decision is again analysed and the consequences of the simulated decisions are again compared with knowledge. It is not possible strictly insist on the process, because some situations require the cooperation of several people with the support of computer equipment but the essence of the principle is maintained. Thus formed decisions and reassessment is followed by the realization which can be single or gradual. The results of the implementation and information about the activities of the new system are detected by our sensory organs and reassessed (analysis) whether they meet to the original intent. Modification of the system can be based on the conclusions of the analysis.

This can be considered a principle of the critical (systemic) thinking that needs to be learnt. People creating new systems and managing groups of other people should master the critical thinking. This group of people has generally a university education, which should be a precondition for a correct application of the process.

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CREATION AND DEVELOPMENT OFCRITICALTHINKINGAT UNIVERSITIES

The need to teach students to think critically stems from the points given above in the article. To be able to fulfil this requirement, it is necessary for the teacher to master this skill, know the laws and rules. The critical thinking is developed and encouraged in certain subjects such as mathematics and physics. Mathematics and the critical thinking have a number of common principles based on scientific approach to problem solving. Mathematics learns to generalize, to find a solution, but general education is required for critical thinking. Thereto merging methods of analytical thinking, approach to solving the problem with the knowledge of general orientation that allows understanding the broader context. This shows the need to draft study programs so as to contain vocational subjects as well as a general subjects. At present, unfortunately we encounter in connection with the distribution of study at the three-level education with a tendency to educate specialist for a particular sector. In his practice can achieve significant successes, but from the perspective integration into society will have a number of problems with the correct interpretation of information and creating their own attitude towards them. It is usually reflected back on his professional activities.

University students are largely determined by virtual world of Internet. In all subjects of the study program are turning to the internet and through search engines obtain the necessary information. They rely on the fact that all you need to find in the virtual world of the Internet. The truth is that human works analytically and therefore needs a certain amount of data, knowledge which will accompany him in the complex levels abstract thinking. Then insufficient volume of knowledge, conditional on statement "Everything I need I find on the Internet" does not recognize the different aspects of the problem and the relationships between them. They cannot solve a critical topic and its context, clearly and unequivocally express themselves propose new solutions in broad contexts (Krejčí, 2011).

Pedagogues have a great responsibility to teach the students not only the subject but primarily to give them the freedom in their work to experience laurels of victory, but also undergo the consequences of irresponsibility. The difference between the responsibility of the student and the teacher should be noted here. A student can be hardly compelled to be responsible for something about what he cannot decide or choose. Teachers, who have completed a course in critical thinking, influence the overall atmosphere in study groups, which is different compared to those in which critical thinking principles have not been applied. The student who exactly knows the rules, his rights and obligations, himself participates in solving the tasks, learns to find and formulate rules is usually more successful. The role of the teacher is not only in providing expert education but mainly in making an effort to involve students in the process of creation, activities and problem solving. Teaching would therefore not just be a process of transferring the facts, but the process of creating student's own opinions, attitudes. The student should get the interpretation of problem which also includes teacher's opinions and take a stand and have own opinion about the issue of lecturing. It is important that the facts were given complete and free of bias.

TEACHING IN TECHNICAL STUDY PROGRAMMES

The study programs in the higher education such as natural, social, economic and law sciences, services, humanities and arts, education and training are closely connected with the economy. The economy can be considered an integral part of the politics. In this interconnection, comments, opinions, attitudes which reflect the current economic and social situation will appear in the teaching of subjects. Sources of information are news reports in the form of audio-visual or printed version, which includes comments and attitudes of editors. That information contains the subjective opinion or attitude which is generally in line with government policy.

This affects teachers and students in creating their own views on the particular issue. Here starts the role of the critical thinking, which is based on wide general knowledge. In this group would be required to teach students to have critical attitude to information obtained from the media and to differentiate facts, annotated information and shared data.

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On the contrary, students of technical specialization, information technology, healthcare, technology, manufacturing and communications, in their studies deal with the issues which are determined by natural laws, theorems and rules. They represent a certain amount of permanently valid data which cannot be misrepresented but only commented. But on the other side, these study programs lack representation of social science, philosophical, economic, legal subjects that complement the general knowledge required for critical thinking.

CONCLUSION

The knowledge of critically-thinking people is as a rule extensive, interdisciplinary and open-minded. Critically thinking individual is usually rational. He knows that in the view of complexity of the world rationality is limited and knowledge is incomplete and open. Cognition represents a lifelong process. Original sources of information are used, not the secondary ones. Firstly, the facts are determined and afterwards they are named. Also the accurate language is used. The mental strategy of critically thinking people is open. They learn long how to examine the phenomena without anger and passion. Of course, critical thinking is hard work which means for people a lifetime commitment. From this perspective, for teaching at the university there are missing elements that would make it possible to understand critical thinking
as a base of the system view on the situations with which future graduate will meets. In this context it should be noted that critical thinking is a process, a procedure to access the information that students need to learn. If the young generation manages to apply the methods of critical thinking in the future the status of teachers during their education will be indisputable. If the teacher has to teach this skill, he must master it firstly himself. He must be aware of the fundamental principles which are desirable to incorporate into the regular teaching.

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SOCIO-TECHNICAL TOOLBOX IN ORGANIZATIONAL PRACTICE

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ABSTRACT

The paper is related to problematics of specific methodologies which are trying to comply with the social factor. System thinking - the particular discipline of system theory - has a number of methodologies which are evolving from the sixties. The organizational environment is still quickly changing and the necessity to adapt that methodologies is crucial. The paper shows one of the approach, which seems to be very useful in nowadays organizational analysis. IT is adaptable to both sides as social and technological factor. The Socio-Technical toolbox which is related to Contextual System Inquiry, which forces both sides to adapt a specific situation in organization. One side is the analyst who is applying the tools and the other side is the organization as its individuals and their intentions and needs in context of particular organization. This methodology seems to be very beneficial to both sides and could help to deal with unstable environment of the organization. The author Antonin Rosicky had a specific viewpoint on the problematic of system thinking and organizational change within social systems. Therefore, the paper contains several of his comments and ideas to support the importance of the Sociotechnical toolbox.

KEY WORDS

System methodologies, toolbox, systemic approach, socio-technical toolbox, system thinking.

CONTEXT

The paper is focusing on the topic of Information system design respecting the specificity of man. On the one hand, we have information about soft system methodologies and on the other hand, there are exact models and technologies. The era of complex systems with the label "information society" or "global world" is still actual. The complex systems create many problems, which are unpredictable and both managers and employees have to deal with them on a regular basis. Historically there have been three approaches how to solve this problem. First is a technocratic point of view; the believe is that everything will be solved by technologies. The second approach, the soft system methodologies, deal with social factor in organizations. The last approach is the combination of both and is looking for synergies by using soft system methods and using ICT. (Rosický, 2001)

In such a complex system as organization is, we have to take into account both of them. Both for managers and for employees it could be hard to understand and be able to use both soft and hard skills. Despite, it is a necessity to be successful in our competitive environment.

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There are several methodologies and toolboxes which help to combine the knowledge of both of them. For example Soft system methodology, Client Led Design, ETHICS or Socio-technical toolbox.

INTRODUCTION

The necessity of specific toolbox as a recipe for making changes in organizations is unexceptional. Toolbox indicates a structured system of methods and tools, which lead skilled user to make better changes in particular organization. Important is, that we have to concentrate on the context of the organization and any kind of tools cannot help us while we are not trying to understand the business of organization, the corporate culture and knowledge and skills of their employees. (Bateson, 1991; Bednar and Welch, 2014)

OVERVIEW OF EVOLUTION IN THE AREA OF SYSTEM THINKING

System Dynamics (SD) – founded in 1965 by J.W Forrester. Methodology for mathematical modeling of behavior in organizations. SD deals with complex problems using flows and stocks in particular parts of system and its relationships. (Mildeová, 2008)

Soft System Methodology (SSM) – founded in 1969 by P. Checkland. The methodology related to soft problems in process modeling and organizational practice. The methodology helps to define problems, prepare model of that situation and define possible changes. (Checkland, 1999)

Viable Systems Model (VSM) – founded in 1972 by S. Beer. (Beer, 1972). A cybernetic view of systems, which are recursive and can be modeled by cybernetic description due to level of system hierarchy. (Beer, 1982)

Critical Systems Heuristics (CSH) – founded in 1983 by W. Ulrich. Methodology related to systems boundary questions which leads to identifying of invalid judgements in organizations than it was expected. (Ulrich, 2005)

Client Led Design (CLD)– founded in 1993 by F. Stowell. Methodology focused on systemic and contextual problem analysis of clients and employees in organizations. It also includes a toolbox and techniques for problem definition. (Stowell; West, 1994)

ETHICS – founded in 1995 by E. Mumford. The methodology suggested that problems related with implementation of information systems are not only due to technology, but more often due to social factor in organizations. (Mumford, 1996)

Contextual Systems Inquiry – e.g. Socio-Technical toolbox founded in 2014 by Bednar, Sadok and Shiderova. The contextual system inquiry is complex from the agents' point of view. Socio-technical analysis is based on know-how of employees and also their desires of heart not only skills and knowledge. (Bednar and Welch, 2014; Bednar, Sadok, Shiderova, 2014)

SOCIO-TECHNICAL TOOLBOX

The socio-technical toolbox was developed by the great system scientist Peter Bednar, who combined methods and techniques from another socio-technical methodologies. The final toolbox was proven by practice in different type of organizations. The toolbox was used by more than 200 organizations with different type of business and size of the organization. (Bednar, Sadok, Shiderova, 2014). The relevance of used methods is great thanks to possibilities of contextual inquiry. The set of methods which will be used really depends only on the system analyst and of course mainly on the organization needs.

AREAS

The toolbox is divided into 8 different system areas. In the toolbox, there are available 27 analytical tools and more than 30 templates for organization analysis. The areas of toolbox are consistent to realize complex system analysis. Areas of toolbox as follows (Bednar; Sadok, 2015):

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1) **System change analysis** – definition of problem situations in work system, organizational needs and future benefits of reorganization of work system. It consist of boundary analysis and analyzing current and future system. Used methods for example are brainstorming, mind maps, holistic Multi-Criteria Benefit Analysis, Interaction Analysis, Analysis of System Sustainability etc.

   Rosicky published several papers on the topic of problem definition in an organization. The definition of problem is moreover than only task, open question or some difficulty. It contains all mentioned situations, but it´s closely linked to human knowledge and intentions. If we are talking about a problem, it is the difference between the actual and required state. The searching for a problem solution is crucial. If we have found a solution than we are talking about the definite task and if the solution works, we can use it repeatedly for similar situations. (Rosicky, 2009)

2) **System Structure Definition –** this area helps to identify key objectives, tasks and information needs. The most important is analysis of information needs. There are defined 4 categories of information: operating information, co-ordination information, development information, control information. The outcome analysis is Coordination of Objectives-Tasks-Information Needs, which provides the picture of the system structure.

3) **System Purpose –** defined by efficiency needs in specific organizations. It is the weak point of the system, where problems can arise. It is connected with knowledge, psychological tendencies of employees or managers, IS and Cyber-Security problems, etc. Used analysis are e.g. Analyzing of Efficiency Needs, Job Satisfaction Needs, Knowledge & Psychological Contract, Support and Control & Task Contract, etc.

   Rosicky also used to work with the terms "intentionality" and "abstraction", which were connected to the human knowledge and his understanding of the world. Or the organization where the man is working. The biggest problem is the distinction between the human knowledge and organizational knowledge. When talking about knowing, it´s all the time connected with a particular human. In an organization, knowledge is based in an active system, that is built as the sum of all employees' knowledge. The organization uses fragments of human knowledge as procedures, processes, rules, practices, workflows, models, etc. The mix of used methods constitutes the organizational system in particular levels. (Rosicky, 2003)

4) **System Perspectives –** finding of possible future changes in the next five years. The changes are related to technologies, regulatory, economical, social and organizational issues. There is used future analysis of the desired parts.

   The perspective of the system is influenced by employee's fluctuation, intentions, contentment, complexity of processes and self-organization. (Rosický, 2007) Rosicky also often accented the Bloom taxonomy with three defined categories of knowing in organization: **Cognitive**, linked to natural language; **Psycho-motor** representing physical abilities and skills and **Affective**, that is connected to human values and attitudes. There are possibilities to find the links between e. g. communication and reflex movements. We can often face the problem that employees are not able to define the information needs. They are used to use tools for handling information (with at least some knowledge embedded) and they are losing their own perspective upon the information they get or need. (Rosicky, 2011)

5) **System Priorities –** setting of specific efficiency and job satisfaction needs and also social goals. The aim is to find a possible redesign of work-flow and usage of available technologies. One part is the awareness of specific wishes and priorities of all group incorporated to changes of new work system. There are also external needs and goals such as suppliers and customers. Used methods are Specification, Resolutions and Conclusion of Socio-Technical Goals.

   There is a problem with the distinction betwen grouping of people in the organization. Due to social cybernetics (cybernetics of second order), each human is system – observer, who works as individual. In the analysis we are usually not able to adapt to priorities and wishes of all individuals and by grouping them, we are still losing some information. The question is, if this information is also that important, while it's connected only to one person. If there are so many individual

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requirements, it is possible, that in the organization something could be ignored for a specific purpose. (Rosický, 2009)

6) **Desirable System –** this area helps with designing of new work system from the organizational and technological point of view. It shows new possibilities of organizing the human activity system to achieve the defined efficiency and satisfaction of involved participants of organization. The technological part shows possible changes on the side of software, hardware and user interfaces. Important is to find solutions in social systems and only limited solution in technologies, which is basically connected with higher financial investments. The main method is Analysis of Objectives to be achieved by organization to fulfill Efficiency & Social Goals.

   Thanks to globalization, we have been affected by a certain limitation due to standardization of processes and also technologies. The information system (as the whole) comprises communication, information, knowledge, relationships, technologies etc. To fulfill the business requirements we need only part of the whole. The rest has been embedded in an informal information system, that is also very important. The formal and informal information system should be balanced in order to have content and satisfied employees and customers. (Rosický, 2004)

7) **System Action –** list of particular changes to be done to fulfill the requirements of the area of Desirable System. There is important analysis of Organizational and Technical Possibilities.

   Possibilities and capacities of the system are in direct link with the humans in organization and also the technologies used. We could prepare brilliant analysis of the system as whole with the detailed analysis of wishes and ideas of employees and the technology possibilities, but if we are thinking about the implementation, there will be probably many problems. The first line of problems are managers who have their own perspectives and the second are the employees within their complex environment. Every change needs to be approved by management line, the employees' line should understand and be confident with the change and of course it must work with for customers and their requirements. (Rosický, 2009)

8) **System for Evaluation and Engagement –** implementation of changes brings some problems, e.g. we are not able to say if the new work system will fulfill our requirements for social and technological requirement unless it is fully implemented. Also the implementation itself could bring out some new problems that could be omitted. There are several analyses which help with the final process of evaluation, e.g. Implementation Diagnosis, Benefit Management Objectives and Plan, Evaluation and Self Reflective Element, etc.

UTILIZATION

The range of utilization of the toolbox is wide. As the toolbox provides complex system analysis, it is possible to use it in organizations with less than 5 employees and also in corporate organizations with more than 200 employees. The result will differ due to needs of organization and of course while we take into account the social factor it could quickly change in one year, one month or maybe in one week. The results are also dependent on the role of the system analyst. In the end, the system analyst is the person who picks the methods and templates to use and also if we do the same analysis with two different people, we would probably get different results. This toolbox is independent of the business sector. The organizations involved in research (Bednar, Sadok, Shiderova, 2014) agreed, that the analysis helped them to understand better their business from the operational and strategic point of view.

CONCLUSION

In such a type of an analysis the critical thinking about the problems and used methods has its valid point. The problem with the individual knowledge is not only the issue of standardized organizational information systems, but also with the amount of shared data and information helping to growing uncertainty. The human activity is still evolving and the system approach has one of the main goals to facilitate the human activities to increase efficiency of such activities. (Rosicky, 2001)

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Each area has its own methods, questions and aims to claim. The toolbox is prepared for the analyst to go into organization and start with the system analysis. The structure is intuitive and provides a description and advices. Within the toolbox, there are available some templates to fill in to go through the desired area. It´s not strictly established what the particular sequence of the used methods is, because it could differ from organization to organization. This is the role of the good system analyst to think about the organization and use methods to gain the best from the organizational system and also from social and technological factor. (Bednar; Sadok, 2015) Thanks to application of socio-technical toolbox it is obvious, that the socio-technical practice is still very important and that the methodologies used before (such as ETHICS by Mumford or Soft System Methodologies by Checkland) are still important. Nevertheless, we need to do some changes and update our very fast changing and complex environment. (Bednar, Sadok, Shiderova, 2014).

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ONLINE MARKETING MANAGEMENT ACCORDING TO PROCESSING OF INTERNAL AND EXTERNAL INFORMATION

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ABSTRACT

The aim of this paper is to introduce and compare selected approaches that are useful for the management of online marketing. At first, there are presented two views of the information, based on which a marketing decision-making can be performed. There are also presented three approaches which can be used by retail companies engaged in e-commerce. It is the Customer lifetime value, Method for selecting optimal portfolio of online marketing tools, and Using of business rules to better addressing e-commerce customer. Usefulness of these approaches with respect to different companies is also discussed. On the basis of selected characteristics, these approaches are compared. Companies that would like to implement some of these approaches can choose those ones which are most suitable for them.

KEY WORDS

Online marketing management, processing of information, analysis, decision.

INTRODUCTION

In the last two decades, there is a shift of attention from marketing in the physical environment to the online marketing and its management. This shift has caused mainly positive acceptance of new information and communication technologies (ICT) at the global level of society. Virtualization of society caused that commercial companies either supplement their marketing activities in the physical environment of those taking place in the ICT-mediated environment (also online environment or cyberspace), or marketing activities in this ICT-mediated environment have become carriers for their business (i.e. Internet companies).

These changes are also related to new possibilities in the field of marketing activities because the activities in the online environment are mediated by ICT; thus, there are more recordable, representable and processable. From the perspective of companies, we can talk about the internal and external environments, where the companies and their marketing specialists acquire data and information, based on which they are able to make decisions about marketing activities. In this paper, we introduce a source of data or information that companies can process in order to improve their decision-making capabilities, which leads to more effective management of online marketing activities. We will also focus on various approaches of processing this information in terms of selected characteristics (company size, technological capabilities, know-how of employees, company turnover etc.). Three selected approaches, which can be applicable in online marketing management, will be briefly described here.

We build on our own research project, which was realized in 2014 and 2015. It focused both on creating our own artefacts, and on exploratory research on competitive environment of Czech Internet companies. This contribution is based on outcomes of the research project realized by a research team

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of doctoral students in the internal grant at the University of Economics which is called *Innovative view of customer value and other factors influencing marketing management*. As a conclusion to the previous research, the paper summarizes recommendations for Czech companies based on selected characteristics of individual approaches and in terms of deployment options of selected approaches to online marketing management.

INTERNAL AND EXTERNAL INFORMATION FOR PROCESSING

For people, the information is a basis for decision-making and thus also for the management of social and socio-technical systems. Working with information is limited. "Information is like time that has always been passing away. Either it becomes a piece of knowledge in our heads or exformation that passes us." (Řezníček, 2015, p. 24) In this paper we consider information to be some data, which can be interpreted by people (e.g. Czech written commentary), and similarly, to be computer-processable data that are enriched with meaning in any form (e.g. database).

There have been already pointed out different views of companies on the external and internal environment which are a source of information for management of online marketing activities. External information may be both in a form of a proper marketing research and an automatically processed content. An example of such research could be a demographic survey, which can be used for targeted online advertising (Stříteský & Stříteský, 2014), whereas an automatically processable content can include unstructured data which have an assigned meaning (Šperková, 2014; Pavlíček & Novák, 2015). It is necessary to pre-process unstructured data prior to automated processing and in order to find meaning in them (i.e. using the NPL dictionaries and converge them to partially structured data) for further analysis, e.g. for determining opinions of service users (Petz et al., 2014). Besides the research, which is focused on support of the decision-making by a marketing specialist, there is research focused on marketing processes and management approaches. In respect of this, there are particularly descriptive and exploratory researches such as (Smutný, 2015), where the author deals with approaches of Czech small and medium-sized companies to management of their online marketing activities.

Internal information is directly acquired information from and about (potential) customers, which is collected by companies and saved into their systems and databases. It is both a customer's personal information and information about their interaction within individual services. To present an example, it can be information sent directly by a customer (e.g. when purchasing) or clickstream data about user's interaction in provided internet-based service (e.g. clicks and paths within the website of e-shop) – see (Zouharová, 2013; Wilson, 2010). Data stored this way may be further processed by methods such as data mining (Deng et al., 2011).

Processing of such information also brings ethical issues associated with economic behavior of a company and conditions of cyberspace (Sigmund, 2013), which may culminate in privacy suppression of an individual. This problem is metaphorically dealt by Constant Dullaart (2015) in his concept of Balkonism. The balcony of the apartment is considered to be a private and safe place, but in fact a given person is exposed there to the outside world, but the person does not know that he or she is pursued by other subjects. Such usability and exploitability of information (digital tracks) about people does not concern only marketing, but also other areas such as human resources (Böhmová & Malinová, 2013) and relationships in an organization.

SELECTED APPROACHES TO MANAGEMENT OF ONLINE MARKETING ACTIVITIES BASED ON INTERNAL AND EXTERNAL DATA

In a context of our research project, we examined the possibilities of using data or information about customers and their behavior to support the decision-making by marketing specialists about marketing activities. The original exploratory research (Smutný, 2015) on approach of small and medium

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businesses to online marketing management was focused on the Czech Republic. It showed that majority of companies do not use any metrics, approaches, methods or frameworks to manage online marketing activities. Therefore, our objective was to suggest the approaches that could be useful for variously-oriented companies operating in this environment. In this paper, we briefly introduce three approaches to online marketing management, which we examined in relation to their applicability by companies in the Czech Republic.

CUSTOMER LIFETIME VALUE IN E-COMMERCE

Considering the long-term trend in marketing which is now supposed to focus primarily on maintaining and customer satisfaction, companies are moving away from functional or product approach to marketing. Along with the development of ICT, companies worldwide seek to use available customer data as their competitive advantage. For this reason, companies use relevant models or approaches to process these data and to use them further according to their business goals. One of the used approaches is Customer Lifetime Value (CLV) - which is frequently used for customer segmentation. The sum of all individual customers CLV (Customer Equity) is also used for financial evaluation of companies (Vraná & Jašek, 2015).

Practically, the disadvantage of this approach is a large number of different models that can be used in different types of business. In our research, we decided to compare various CLV models applicable to ecommerce (non-contractual, non-membership, always-a-share, continuous, and variable-spending environment) – see e.g. (Jašek & Vraná, 2014). Precisely, the opportunity to compare the predictive ability and quality of selected CLV models based on statistical metrics can satisfy the needs of companies that decide which model will be the best for their e-commerce.

Towards the applicability of these models, for example in the practice of e-shops in the Czech Republic, it must be noted that the application of the model itself is not technologically demanding (the majority of eshops have all necessary data already available). The difficulty of implementation of these models into practice is particularly related to the limits of employees´ knowledge, because CLV are mathematical models, and there are no preformed all-in-one solutions. Our study suggests that using a properly implemented CLV model for customer segmentation could streamline spending on marketing activities, especially in medium and large e-shops. In other words, based on segmentation, the most appropriate group will be addressed; thus, this approach will lead to reduction of costs.

METHOD FOR SELECTING OPTIMAL PORTFOLIO OF ONLINE MARKETING TOOLS

We focused on the use of external information to design a method that would process an interaction of subjects (especially people) in an online environment which are relevant to individual online tools that a company would like to use at a marketing campaign. According to an explorative research (Smutný, 2015), most companies rely only on individual subjective assessment of the suitability of various online tools by marketing specialist. Our goal was to offer a method which would support decision-making of marketing specialist, and in the same time it would be based on the available subjective and objective information.

The proposed method combines basic approaches to management in a form of Deming cycle with optimization capabilities of genetic algorithm. On this basis, we selected the best portfolio of tools from the default mix of tools suitable for the marketing campaign. A conceptual proposal of this approach was introduced in the paper (Smutný & Vojíř, 2015). Using this method, or by putting it into another marketing framework, which is used for the management of online marketing, the competitiveness of the company is increased, because marketing specialists do not build their decisions only on a subjective insight.

THE USE OF BUSINESS RULES TO BETTER ADDRESSING E-SHOP CUSTOMER

The last approach presented in this paper focuses again on the use of business rules for customer segmentation for the purpose of additional addressing – e.g. emailing campaign targeted at end customers. Internal information about customers and their purchases are used for this purpose. These

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data are mined to obtain association rules in order to find mutual relations between different items that are offered by an eshop. Association rules are further converted into a business rules format (Vojíř, 2015). Based on these rules (e.g. if a customer bought a stroller, so it is advisable to offer him a child alarm), an e-shop can address customers who bought specific products with offers to buy other products, which are based on previous experience with other customers. Therefore, relevance of the offered range of products and emphasis on addressing individual customers are key issues.

This area is currently not satisfactorily solved, because simple algorithms based on the supply relationship of already purchased product and its accessories, or on popular categories of goods that the customer often buys are mainly used there. The proposed innovation will keep (almost personal) relationships with customers by giving them the relevant goods offers.

DISCUSSION AND CONCLUSION

All three proposed approaches are focused on retail business and management of online marketing activities. Besides these approaches, also (visual) representation of the acquired pieces of knowledge from such processed internal and external information is equally important in business – see (Čermák & Řezníček, 2014). For a marketing specialist, it is important to be able to incorporate these findings into his or her knowledge framework, and use them in his or her decision making. Now, we move our attention further to individual approaches and discuss their suitability for use in the retail business of (Internet) companies in the Czech Republic.

CLV is suitable for medium and large e-shops, ideally FMCG. On other hand, this approach may be too sophisticated for small e-shops. The disadvantage is the implementation itself, which is more difficult for expertise workers. Mainly internal structured data or customer information are used nowadays for the calculation of CLV. Appropriate involvement of pre-processed external unstructured data, which will be processed to external information (data supplied with meanings), will be a challenge for future research. The main issue, however, is the assignment of this external information to individual customers, i.e. to internal information stored in the database of a company. Enrichment of current models for this external information can bring new predictive possibilities, including new segmentation options, which could include even those ones who buy small amounts with a positive interaction – see also the article (Haenlein, Kaplan & Schoder, 2006).

Approaches	The size of the e-shop (goods turnover)	Technological demands	Demands on the know-how of workers	Evaluation of internal information	Evaluation of external information
Customer lifetime value in e-commerce	Medium and large	Low	Higher	Yes	No
Method for selecting optimal portfolio of online marketing tools	Small and medium	Low	Medium	Yes	Yes
The use of business rules for better addressing e-shop customer	Without limits	Medium or higher	Medium	Yes	No

Table 1 – Overview of appropriateness of different approaches according to selected characteristics. Source: Author

The method for selecting an optimal portfolio of online marketing tools is focused on small and medium businesses. Demands on know-how of marketing specialists are medium, because of using a genetic algorithm. The particular disadvantage is a strong dependence on a human element (initial evaluation of tools). For this purpose, the proposed method offers its own knowledge base that is useful for evaluating the interaction of environment's subjects. On the other hand, internal and external available information can be used, because the data are interpreted by people and directly used for evaluation.

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The last approach is about using business rules which are related to the processing of internal information. This approach is more demanding in terms of know-how of the employees and requirements on technologies, because it uses advanced processing techniques. Although this approach is limited to business-like, on the other hand, it is universal in terms of implementation in any e-shop. It should be added that this approach and CLV approach are based on evaluation of historical data or internal information about customer behavior.

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SYSTEM APPROACH TO INCREASING SAFETY OF ROAD TRAFFIC

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ABSTRACT

This paper deals with a systematic approach to increase traffic safety using modern information technology. Potential data sources are described together with a chosen sample of potential attributes suitable for modeling of dangerous situations. Possible methods for creation of clusters of traffic accidents are outlined and used in a conceptual model of an early warning system about traffic accidents.

KEY WORDS

Road traffic safety, traffic accident, cluster analysis, data mining.

INTRODUCTION

As was already stated in our previous paper (Lamr & Skrbek, 2015) there has been a permanent increase in the amount of traffic accidents since 2011. The police have repeatedly tried to find suitable methods to increase road traffic safety. These methods include, but are not limited to an increased number of police controls, increased penalizations, utilization of a penalty point system and an overall increase of regional and state-wide traffic police operations. Despite all these precautions which aim to eliminate the amount of traffic accidents and injuries, the number of traffic accidents, serious injuries and deaths keeps increasing. The police investigated 16 000 traffic accidents during the holiday in 2015. Except for 150 deaths, more than 500 severe injuries were recorded and the overall damage costs increased. 70 people were killed on roads in august 2014, which is 12 more compared to 2014 (ČTK, 2015). The Ministry of Transport plans to increase sanctions for certain traffic offences even though it was shown that this approach only helps in the short term. (ČTK, 2015). This is a necessary course of action, however, not all road users will obey the new rules and regulations and they do not realize the danger of their behavior. If these people could be warned in time with a high reliability of the warning it is probable that at least a part of them would take the warning into consideration. We assume that the possibility to inform drivers about locations of possible dangers can significantly improve the current situation.

Our recent projects are focused on finding a system solution, which would contribute to reduction of the number of traffic accidents. Unfortunately, this number is constantly growing together with material damage, injuries, and deaths. We try to connect advanced approaches from the field of data mining with progressive methods of vital information transfer and distribution. We aim to identify problems and problematic locations and connect them to other aspects of traffic accidents, such as weather, road conditions, day of the week and others.

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POTENTIAL DATA SOURCES

The Ministry of Transport provides a database of traffic accidents which took place in the Czech Republic as a part of a project called "Unified Traffic Map" (UTM) since 2006. This project is available online at http://www.jdvm.cz. Because of this project it is possible to find accident data online, to obtain a detailed list of parameters for a given accident and to plot it on a map.

Police of the Czech Republic also regularly create accident statistics which are available online. (Policie ČR, 2015). These statistics are, however, only a simple projection of accident parameters to charts and tables. Usually it is a representation of an examined value in a given period and its comparison to a previous period. To be specific, these can represent numbers of accidents each day, numbers of accidents in accordance with their culprits, numbers of accidents in accordance with accident types in each month, main causes of accidents, numbers of accidents in counties in specific periods and others. This data is available in a PDF format and gives a basic overview of traffic accidents.

Because the data is only available in a PDF format from the Ministry of Transport, it is necessary to download it from the web and convert it to a more suitable format. Another option would be acquiring the data in a suitable format directly from the Police of the Czech Republic. More than 600 000 thousand records can be obtained from the UTM project, each containing 44 attributes. Table 1 shows only selected attributes from such data set. An example is assigned to each attribute for better clarity.

Attribute	Record (example)
Accident Location	Prague (capital city)
Accident Date	1.1.2013
Day of the Week	Monday
Accident time	19:00
Accident caused by	Motorized vehicle driver
Alcohol	Yes, blood alcohol content < 0,99 ‰
People Killed	0
Heavily Injured	0
Cause of Accident	Improper turning or reversing
Road Surface condition	Wet surface
Visibility	Nighttime, visibility not reduced by weather conditions
Technical Road Condition	Good, free of defects

Table 1 – Selected illustrative attribute set of a traffic accident record (Authors, 2015)

Another significant and non-negligible source of information for prediction models could be traffic accident databases of insurance companies. It is generally known that a traffic accident record is made after each traffic accident, while this record is identical for all insurance companies. Further information is collected by employers of insurance companies during their communication with clients. Utilization of this information source is hindered by its availability, because it can be considered an intellectual property of a private company and it would be necessary to remove personal information from the data by the company prior to its use.

CLUSTER ANALYSIS AS TOOL FOR FINDING CONNECTIONS BETWEEN TRAFFIC ACCIDENTS

Cluster analysis (CA) is a method that makes it possible to find accidents with similar properties. As its name suggests, this method (which is also used out of data mining) creates clusters in input data. A cluster can be defined as a set of objects with similar properties.

Most algorithms of cluster analysis usually try to represent object properties (attributes) using numbers and it is therefore necessary to transform categorical and dichotomous attributes to numbers in a suitable

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way. This transformation must be applied to most attributes of data obtained from the Ministry of Transport, because most of the attributes is categorical data.

Attributes entering cluster analysis should also be standardized in a specific way - for example to prevent an attribute with higher values to easily dominate other attributes. Such dominance of some attributes over others would significantly distort similarity evaluation. Approaches preventing these problems are called attribute standardization and one method of achieving it can be described by formula:

$$y_j^i = \frac{x_j^i - \bar{x}_j}{s_j}$$

where y_j^i denotes a standardised *j*-th attribute

of *i*-th object

x_j^i denotes a *j*-th attribute of original value, related to *i*-th object

$\bar{x}_j$ is the mean value of j-th attribute for all objects:

$$\bar{x}_j - \frac{1}{n}\sum_{i=1}^{n} x_j^i$$

s_j denotes the standard deviation of j attribute over all objects

$$s_j = \sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(x_j^i - \bar{x}_j\right)^2}$$

The core issues of cluster analysis are, however, methods of attribute similarity evaluation. There are many methods to express similarity and none of them can be considered universal and applicable to all types of tasks. To give an example we can mention evaluation using object association coefficient or various metrics, such as Euclidean, Manhattan or Chebyshev.

Clustering methods can be divided to hierarchical and non-hierarchical. Hierarchical methods can be divided further to agglomerative (nearest-neighbor method, farthest neighbor method, centroid-based clustering) and divisive (e.g. MacNaughton-Smith).

Agglomerative methods are based on clusters containing only one object. Divisive methods, on the other hand, begin with a single cluster containing all objects. Each cluster divides in two during each decomposition, while decomposing continues until the number of clusters is equal to the number of objects.

Hierarchical structure of partitioning is not applied during non-hierarchical clustering. Methods of nonhierarchical clustering evaluate the quality of object distribution to clusters and this distribution can be modified if necessary. Decomposition quality functional is used for optimal distribution of clusters and their objects. This functional is based on localization of positions where object extrema occur. Non-hierarchical clustering methods can be also divided into two distinct variations. In the first one the number of clusters remains constant, while in the other one the number of clusters is optimized. K-Means algorithm is an example of a method where the number of clusters remains constant. (Řezanková, Húsek, & Snášel, 2009)

One of the first objectives of a research over accident data is data cleansing and standardization, followed by selection of a suitable algorithm for clustering of similar accidents. Clusters created in this process will be further utilized in an accident early warning system.

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UTILIZING CLUSTER ANALYSIS RESULTS IN AN EARLY WARNING SYSTEM ABOUT A HIGH RISK OF TRAFFIC ACCIDENT

As was already described in (Lamr & Skrbek, 2015) this concept can be simply explained as a complex system which uses suitable models to predict accident risk in real time based on current vehicle location and other attributes. This early warning system about a high risk of traffic accident consists of two parts (control part and user part). A scheme showing the most important parts of the system is shown in Figure 1.

The control part of the system collects processes and distributes traffic accident data. Another task of the control part is a creation and distribution of prediction models. The database of traffic accident itself is a part of the control part. This database is automatically filled with accident data published at www.jdvm.cz. The data is extracted from public sources using suitable scripts and then transformed to be saved into the internal relational database itself. The internal database serves as a data source for traffic accident clusters for accidents with similar attributes.

The user part of the system evaluates actual situation in real time and informs the driver about a high risk of traffic accident in a suitable way. The user part can be realized either by a special device in the vehicle (client) which is connected to the vehicle through a standardized connector, or it can be a part of a cell phone or a navigational unit. The prediction of accident risk is carried out in real time, while the client evaluates the risk based on actual time, location, road condition, vehicle condition, weather and other attributes which reflect the situation. Most of such information is readily available in modern vehicles from various present sensors. The device in the vehicle compares the actual situation with prediction results and if there is a high level of similarity between the situation and prediction, the driver is warned. (Lamr & Skrbek, 2015) The driver is warned if there were multiple accidents under similar conditions on a given location.

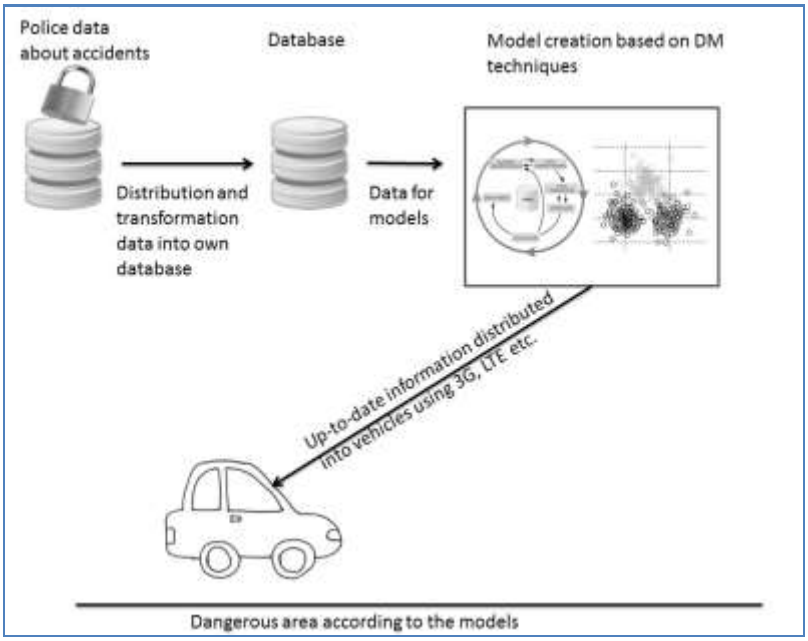

Figure 1. - Warning the driver in real time and place (Lamr & Skrbek, 2015)

It is necessary to determine how the control part should communicate with the client part in order to make the system efficient. Until now we have considered three possible methods of operation.

The first approach (Option A) assumes, that so called "Heat Maps" will be created and built into the base map in the device. These heat maps represent "hot spots" where multiple similar accidents happened. Analysis of such clusters should show, if there are common criteria for such clusters, for example time of the year, i.e. month, day time, temperature or other weather conditions. If an effect of

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some of the attributes is connected to a given location the cluster will be represented as a single point with specific properties. If a specific characteristic is not found for a given location, the cluster is labeled generally as a "location of frequent traffic accidents". The device in the vehicle monitors the movement of the vehicle in real time and if the vehicle is approaching a cluster representing a location of frequent traffic accidents the driver is warned about the fact. If the vehicle is approaching a location with specific conditions tied to the cluster the device compares these conditions with actual data and warns the driver about a high risk of traffic accident, because multiple accidents occurred at that location under similar conditions. It would be necessary to update the whole base map in the device regularly with generated clusters, but the device itself would not have to be online constantly to operate properly.

The second approach (Option B) uses the control part as a powerful database of traffic accident clusters and more operations are transferred to the client in user part. Unnecessary attributes for predictions would be removed from the database after thorough analysis, which would reduce the amount of accident data transferred to the client. Clusters in the control part would be created based solely on the amounts of traffic accidents and their geographical coordinates. The device in the vehicle would monitor the movement of the vehicle similarly to Option A but the client would download accident data for locations in the vicinity of the vehicle only. Each downloaded cluster would be tested according to the time of the year i.e. month, date, time, weather conditions and accident cause (for example: not keeping a safe distance behind other vehicles). This approach would not require regular massive base map updates for the client, because this data would not be stored in the device – only short-term data would be downloaded. The disadvantage of this approach is the necessity of constant internet connection of the client, which might pose a problem in locations with no signal. Hardware requirements on the client would also be higher, because the specificity tests (for example accidents that happened during a heavy rain at a nearby location) would take place in the device in real time.

The third approach (Option C) could be a combination of the first two. Similarly to option A, the control part would contain a database of general clusters formed according to the number of accidents at a given location as well as specific clusters tied to specific attributes. Data downloading would work similarly to option B, which means that only data necessary for actual prediction in the vicinity of the vehicle would be downloaded.

Only an in-depth analysis of traffic accident data obtained from the unified traffic map and further testing will suggest which of these three operational modes is the most suitable for real application.

CONCLUSION

The principle of an early warning system which was outlined in this paper should contribute to a system solution of prevention of frequent traffic accidents, which pose a significant life and property loss in the Czech Republic every year. This conceptual suggestion is in its early stages of development and at this moment we focus mainly on data preparation. The advantage of this system compared to other approaches is that it does not aim to solve consequences of crisis situations, such as eCall and RDS-TMC, but tries to actively prevent dangerous situations from happening.

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SOCIAL RESPONSIBILITY OF THE BANKS IN THE CZECH REPUBLIC OF THE YEAR 2015

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ABSTRACT

This paper deals with the updating of issue of the topics of social responsibility in the banking sector in the Czech Republic past the year 2015 and its comparison with the previous year 2014. Using the recommendations of the internationally recognized ISO 26000 standard [1] the basic aim of the author was in the subject area of social responsibility to process the data for the year 2015 and then compare these data with the previous year 2014 and also on the basis of this comparison perform the basic evaluation.

The author of this contribution also continue on his earlier analysis that was performed in 2014 and whose conclusions have been published in the article "Social responsibility of the banks in the Czech Republic" [2] in the System approaches'14 conference. Data and conclusions from the above mentioned article the author used for comparison against the current state in the subject area.

During processing of the topic author used methods of collecting, analyzing and comparing of relevant information that is available on the given area. For surveyed banks were used primarily the information that these banks publish within their websites as last year.

KEY WORDS

social responsibility, organizational governance, human rights, labour practices, the environment, fair operating practices, consumer issues, community involvement and development

PREAMBLE

In the current time begin to be more important for different types of organizations also the essential role of its social engagement. This phenomenon is currently not avoid to banking environment, banks. A socially responsible bank should keep to its responsibility especially in the economic, social and environmental areas. Economic area is characterized by terms such as rejection of corruption, transparency, good relations with customers, shareholders, business partners, or the protection of intellectual property. Social area may be represented by the concepts of philanthropy, communication with the owners (stakeholders), strict respect for human rights and respect for labor standards. And finally the environmental area represented for example by friendly products, environmental policy and protection of natural resources. The application of the above mentioned concepts into the practice in accordance with the ethical beliefs of management and employees may bring to the bank itself sustainable competitive advantage and as such can fulfill even the matter of the social responsibility. The positive point is that this role being aware of banks themselves.

The subject of this paper is the analysis of the state of individual themes of social responsibility in the czech banking sector reflecting the year 2015 and their comparison with the year of 2014.

For the purposes of this research the author used the non-binding rules of the international standard ISO

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26000 - guidance on social responsibility of organizations, that's applied to the czech banking sector. The concluded analysis was focusing on all banks operating in the czech market, ie. 45 subjects in 2014 and 46 new entities for the year 2015. For this purpose the author used a list of individual banks, which is loosely available on the website of the Czech National Bank.

The research was also based on the analysis and comparison of obtained data for the period of the year 2014 and 2015 into the primary seven topics that the ISO standard 26000 for the area of social responsibility defines: organizational governance, human rights, labour practices, the environment, fair operating practices, consumer issues, community involvement and development.

Each of the above mentioned topics by the ISO 26000 also includes specific sub-questions, which the author compared with actual data and with the information provided on the websites of banks in the area of corporate social responsibility for the year 2015. If a concrete bank on its website presented its involvement in the sub-question, than received for this activity one point, if not, received a zero. The totals for each subquestions are then converted into a percentage. The results thus obtained for the year 2015 the author compared with the previous data of the year 2014. The structure of the paper correspond with the one given topic and its division into various sub-questions, which fully correspond with the structure of ISO 26000 standard.

STATE OF SOCIAL RESPONSIBILITY IN BANKS IN THE CZECH REPUBLIC FOR THE YEAR 2015

The below mentioned text has been fully dedicated to the conclusions of the analysis, that has been executed at October 2015 and than to the comparison of in its including data about the implementation of social responsibility in the banking sector in the Czech Republic with the data from the previous year 2014 in given area. The structure of individual themes is based on the structure according to ISO 26000 standard.

ORGANIZATIONAL GOVERNANCE

The first compared topic was the issue of organizational governance as a system for decision-making and implementation of key decisions in the area of social responsibility. Compared to the year 2014, when the introduction of individual themes of social responsibility chose 19 banks from 45 (in percentage 42.22 % of all banks) arrived in the year of 2015 to increase of this number to 27 banks of 46. Overall in the year of 2015 apply the issue of corporate social responsibility to 58.70 % of the banks. This result underscores the willingness of banks entirely be socially responsible and on the based on it can be expected further growth in this area into the future.

HUMAN RIGHTS

The second compared area was in line with the recommendations of ISO standard 26000 the human rights issues, which affects mainly the following points: due diligence, human rights risk situation, avoidance of complicity, resolving grievances, discrimination and vulnerable groups, civil and political rights and fundamental rights at work. The proportional representation of the given subject in overall of the corporate responsibility is for reseach years following - 2014 : 2015; 21.14 % : 19.25 %.

DUE DILIGENCE

In the context of social responsibility among the proper care that the organization conscientiously and methodically considering the actual and potential negative impacts of their activities and manage them so as to minimize or eliminate the risk of social harm or damage to the environment, including the non-violation of human rights. Compared to the year 2014 occurred in this area in the year 2015 there is no change in the original state, but from an overall perspective view of the growing number of the banks

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which are active in general in the issue of corporate responsibility, decrease the share of amounting to 42.11 % from the year 2014 to the current 29.63 %.

HUMAN RIGHTS RISK SITUATION

Situations that threaten human rights are in particular those activities, which can have a negative impact on children, addressing corruption, use of the supply chain in accordance with the law, ensuring the safety and protection of property. Like in the previous case there was no change in the subject area, including the overall impact on the proportion of this topic to others topics, ie. decrease of 26.32 % from the year 2014 to 18.52 % by the year 2015.

AVOIDANCE OF COMPLICITY

Topic of avoid complicity, when the bank can not commit willful violations or aiding human rights abuses, whether on its own benefit, or silent complicity remained on the track for the year 2015 any changes to and it were given again because no disengagement of the banks in this researched area.

RESOLVING GRIEVANCES

Among resolving complaints include in particular the following attributes: legitimacy, accessibility, predictability, fairness, consistency with rights and transparency. Resolving grievances remains for banks still dominant theme and despite to the decline from the value of the year 2014 in 73.68 % to 51.85 % for the year 2015.

DISCRIMINATION AND VULNERABLE GROUPS

The discrimination, there is when they are chosen certain individuals or certain groups so that they are denied equal treatment or opportunities as others and when this selection is based on prejudice and not on a legitimate reason. The basic attributes of forms of discrimination are race, skin color, gender, age, nationality or national, ethnic or social origin, caste, marital status, sexual orientation, health status, such as HIV positivity, political affiliation. In this area by the year 2015 come of the banks' exposures about plus 15.38 %, but from an overall perspective, the share of this issue on the social commitment drop in from the values of the year 2014 - 68.42 % to 55.56 % in the year 2015.

CIVIL AND POLITICAL RIGHTS

In the banking environment there is particularly the right to personal safety and also freedom of opinion and freedom of expression, the right to protection against unlawful interference with his privacy, family, home or correspondence, right to privacy, access to public services and the right to participation in elections. In the area of civil and political rights in the year of 2015 also nothing has changed, beyond the overall decline of the share of this issue from 36.84 % from the year 2014 to 25.93 % of the year 2015 under the social responsibility topics.

ECONOMIC, SOCIAL AND CULTURAL RIGHTS

This theme of the social responsibility in the bank's environment includes non-discriminatory access to health care, education, work, food, religion and culture, and genuine opportunities to participate without discrimination in decisionmaking. The importance of this issue in the year of 2015 grew by plus 12.50 %, but again in terms of total exposure decreased from the value 42.11 % of 2014 to 33.33 % behind the year 2015.

FUNDAMENTAL RIGHTS AT WORK

Fundamental rights at work based on the recommendations of the International Labour Organisation (ILO) and includes in particular areas: freedom of association and the effective recognition of the right to collective bargaining, the elimination of all forms of forced or involuntary labor, effective abolition of child labor and elimination of discrimination at work. With the growing number of banks involved with the issue of fundamental rights at work donated for the year 2015 by 12.50 % more banks than in the previous year 2014. Overall, however, decreased from 42.11 % to 33.33 %.

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LABOUR PRACTICES

The third compared sphere consisted of the basic practices of banks in the area of labor relations. There is one all policies and practices relating to the work carried out within the Bank or on its behalf. This area includes issues of employment and labor relations, working conditions and social protection, social dialogue, occupational safety and health and human resources development and training in the workplace. The proportional representation of the given subject in overall of the corporate responsibility is for reseach years following - 2014 : 2015; 19.79 % : 24.13 %.

EMPLOYMENT AND EMPLOYMENT RELATIONSHIPS

Creation of employment and labor relations are crucial for banks, because it addresses both the obligations of employees and employers, and as such, then form the basis for the successful operation and management of the bank. In this area there is a confirmation of the great attention that to this topic banks devote, this area increase up to 50% and then the overall also increased of its share on the total of areas from 52.63 % into the year 2014 to 55.56 % past the year 2015.

CONDITIONS OF WORK AND SOCIAL PROTECTION

The content of this topic is part of the bank to secure the basic working conditions for its employees (working hours, rest periods, holidays, reconciling work and family life, etc.), including social protection in cases of injury at work, sickness, maternity, parenthood, old age, unemployment, disability or any other financial hardship. In this area, as in the previous issue occurred to the increase on almost of half in banks' exposures, ie. 45.45 %; so overall, then also increase the level of importance from the year 2014 - 57.89 % to 59.26 by the year 2015.

SOCIAL DIALOGUE

The social dialogue between employers and employees within the banks leads to a better understanding of both sides and also creates the basic conditions for the prosperity of the bank itself. From the perspective of the bank's exposure occurred during the year of 2015 an increase to 41.67 %, but generally have slightly worsened to 62.96 % compared to 63.16 % behind the year 2014.

HEALTH AND SAFETY AT WORK

The next important issue for banks is in the implementation of social responsibility complications of internal processes to ensure the health and safety of employees. Responsible practices of the bank to protect the health and safety can reduce overall costs, improve morale and increase productivity. In this area there has been a significant increase in the banks' exposures about 50 %, then the overall 52.63 % from the year 2014 increase to 55.56 % on the year 2015.

HUMAN DEVELOPMENT AND TRAINING IN THE WORKPLACE

In the area of human resources development and training in the workplace banks are interested in facilitating the education, training and lifelong learning for employees. Basic benefits for banks in the implementation of this process, are motivation, effectiveness, productivity and overall employee performance. Involvement of the banks into this topic still reaches high values of 77.78 %, however against the 84.21 % from the year 2014 a slight decline, but this issue alone achieved an increase of more than a third at 31.25 %.

THE ENVIRONMENT

Another compared theme was the environment. Banks are actively involved in environmental protection. Specific topics are pollution prevention, sustainable resource use, climate change mitigation and adaptation to climate change and protecting the environment, biodiversity and restoration of natural habitats. The proportional representation of the given subject in overall of the corporate responsibility is for research years following - 2014 : 2015 10.73 % 9.77 %.

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PREVENTION OF POLLUTION

Banks are actively involved mainly in the areas of its immediate effects on the environment, ie. in the areas of prevention of pollution including emissions to air, emissions to water, production of solid and liquid waste and other pollution from its activities, products and services . This area is highly encouraged by the banks during the year of 2015, and at the level of 40.74 % from the 52.63 % in the year 2014. Overall, there was an increase in pollution prevention for the year 2015 about 10 %.

SUSTAINABLE RESOURCE USE

Banks in this area focus on the sustainable use of resources, particularly more responsible use of electricity, fuel, raw material processed materials, land and water, and by combining or replacing non-renewable resources with renewable resources. Sustainable use of resources continuously to play an important role into the banks, underscoring cover the exposure in this area and increase about 12.50 %, although the overall share fell down from 42.11 % to 33.33 %.

CLIMATE CHANGE MITIGATION AND ADAPTATION

This abstract topic, including for example, greenhouse gas emissions have not been greatly accepted by banks or in the course of the year 2015 and were thus to reduce exposures from 5.26 % to 3.70 %.

PROTECTION AND RESTORATION OF THE NATURAL ENVIRONMENT

Banks in this area promote socially responsible actions to protect and restore the natural environment and its ecosystems, especially restoring and creating natural habitats. Here too fell down the overall proportion of banks' exposures for the year 2015 from 68.42 % to 48.15 %.

FAIR OPERATING PRACTICES

Fifth of the search area has become the issue of ethics into the business of banks. Basic area consists of the fight against corruption, responsible political involvement, fair competition, promotion of social responsibility in the value chain, respect for property rights. The proportional representation of the given subject in overall of the corporate responsibility is for research years following - 2014 : 2015 7.71 % 7.47 %.

ANTI–CORRUPTION

Banks focus on identifying the risks of corruption, implement and maintain policies and procedures to prevent corruption and extortion. Other possible areas as support for employee training, tied agents and contractors of corruption. There has been an increase of 14.29 % compared to the year 2014. Overall, the decrease of 36.84 % of the year 2014 to 29.63 % for the year 2015.

RESPONSIBLE POLITICAL INVOLVEMENT

Banks involved in the promotion and development of public policy to be an absolutely transparent and absolutely avoid political influence. With regard to the well-known banks apolitical, this issue is still seen at a low level even in the year 2015 ie. drop down to 3.70 % from 5.26 % by the year 2014.

FAIR COMPETITION

Within the framework of fair competition the banks must operate in accordance with the laws of competition and cooperation with relevant bodies, including the social context in which it operates (eg . the abuse of poverty to achieve an unjustified competitive advantage). In this area there was an increase about 14.29 % past the year 2015. Overall, the share of exposure dropped to 29.63 % from 36.84 % behind the year 2014.

PROMOTING SOCIAL RESPONSIBILITY IN THE SPHERE OF INFLUENCE

Banks consider the impact of the sale of its products and services, including the impact of its activities on the market. Banks are trying to be in the marketing chain responsible for compliance with applicable laws, regulations and its own impacts on society and the environment. Impacts involvement in this area in the year 2015 was no one. Generally, the decrease in share of this issue from 15.79 % to 11.11%.

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RESPECT FOR PROPERTY RIGHTS

The right to own the property is a human right recognized by the Universal declaration of human rights. These rights cover both physical property and intellectual property. Banks in the region implement such policies and practices that promote respect for property rights and traditional knowledge. In the area of respect for property rights there has been a 20% increase of bank´s engagement. The overall proportion then slightly decreased from the value of 26.32 % for the year 2014 to 22.22 % for the year 2015.

CONSUMER ISSUES

This in turn as sixth compared topic is associated with the provision of banking services in the context of protecting the health and safety of consumers. It includes the issue of proper marketing, the provision of relevant and undistorted information and fair contractual practices, health and safety of consumers, sustainable consumption, customer service, support and resolving claims and disputes, protection of personal data and privacy of consumers, access to basic services and education and awareness. The proportional representation of the given subject in overall of the corporate responsibility is for research years following - 2014 : 2015; 16.44 % : 14.08 % .

FAIR MARKETING, INFORMATION AND CONTRACTUAL PRACTICES

Banks are providing clear and sufficient information about prices, terms and costs associated with their services offered (loans, credits and other banking services). This area is also for the year 2015 became completely uninteresting, underscoring the decline from 5.26 % to 3.70 %.

PROTECTING CONSUMERS HEALTH AND SAFETY

Protecting the health and safety of consumers includes providing products that are safe and which in use or consumption do not pose any unacceptable risk to consumers. In this place the banks are focused on the area of vulnerable groups of potential users of their services. In this area occurred during the year 2015 no any movement. The overall share fell down from 31.58 % to 22.22 %.

SUSTAINABLE CONSUMPTION

Sustainable consumption is consumption of products and resources to the extent consistent with sustainable development. Sustainable consumption also encompasses a concern for ethical behavior regarding animal welfare. In this area in to the year 2015 the banks did not carry out any action. The total exposure declined from the level of 15.79 % into the year 2014 to 11.11% of current year.

CONSUMER SERVICE, SUPPORT, AND DISPUTE RESOLUTION

Customer service, support, complaint handling and dispute resolution are the mechanisms that the bank uses to address the needs of consumers after products are purchased and delivered. Such mechanisms include warranties and guarantees, technical support regarding the using as well as the conditions for returning, repairing and maintenance. Customer service still constitute a significant item in the social responsibility of the banks for the year 2015, although there was a slight decline from the level of the year 2014 in 57.89 % to 40.74 % for the year 2015.

CONSUMER DATA PROTECTION AND PRIVACY

Data protection and privacy of consumers has to protect consumers' rights to privacy by limiting the types of information collected and the ways in which this information is collected, used and secured. By the definition, this area is very sensitive monitored by banks. Privacy and consumer privacy for the year 2015 amounted to 33.33 % of commitment, it means decrease from value in 47.37 % of the year 2014.

ACCESS TO ESSENTIAL SERVICES

Banks support projects of different organizations that are focused on securing and respecting the right to satisfaction of basic needs, but also necessary services needed, such as the right to electricity, gas, water or telephone. In terms of access to this essential services the banks for the year 2015 were not involved in any way and overall there was a decline from 57.89 % to 40.74 %.

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EDUCATION AND AWARENESS

Banks support any initiative regarding education and awareness. They focusing on supporting disadvantaged consumers in both rural and urban areas, which in some cases involve low-income consumers and consumers with low, or no literacy. In the area of education and awareness the banks remain behind the expectations and fell down from 42.11 % to 29.63 %.

COMMUNITY INVOLVEMENT AND DEVELOPMENT

The last compared theme of social responsibility is one of the key for the banks. Banks are aware of their position in society and also try in this area to contribute to its development. Cornerstones are forms of community involvement, education and culture, job creation and skills development, technological development and access to technology, creation of wealth and income, health, and social investment. The proportional representation of the given subject in overall of the corporate responsibility is for research years following - 2014 : 2015; 24.16 % : 25.28 % .

COMMUNITY INVOLVEMENT

Community involvement means for the banks not only provide financial assistance but also the active development of various forms of non-profit organizations to support various civic groups. In the area of community involvement has been a fundamental shift up to 66.67 % from 57.89 % and overall generally increased about 63.6 % in this area.

EDUCATION AND CULTURE

In the area of education and culture, banks are one of the leaders, who are doing their utmost to ensure all social and economic development. Culture is an important part of community life and identity of its society, which banks are fully aware. In this area during the year 2015 the banks maintained the growth of 11.76 % it means still high level of commitment in the final amount of 73.37 % for this year compared to 89.47 % from the year 2014.

EMPLOYMENT CREATION AND SKILLS DEVELOPMENT

For the area of job creation and skills development banks are trying to use his position in the overall financial sector, which also means that not only they themselves are the bearers of these opportunities, but may also help in this to other organizations. Overall, there are occurred with respect to the zero involvement of the new incoming banks in this area to drop down from 42.11 % to 29.63 %.

TECHNOLOGY DEVELOPMENT

For the demands of contemporary life is characteristic usíng of information and communication technologies, which are also a valuable basis for many economic activities. Banks in this way contribute to better access to these technologies through training, partnerships and various other events. The proportion of involvement in information technology for the year 2015 decreased from 47.37 % to 33.33 %.

WEALTH AND INCOME CREATION

Banks are one of the main drivers in the creation of wealth in the economy. They participate in the creation and implementation of programs on business development, along with support for the employment of women. Part of this issue is also compliance with tax obligations on the part of banks as a necessary prerequisite to enable governments to generate revenue and use them to solve critical development challenges. The creation of wealth and income was not for the year 2015 somehow favored by the banks and so the result in an overall decrease from 10.53 % to 7.41 %.

HEALTH

Health is an essential component of social life and a recognized human right. For this area banks are doing very well as contributing to health promotion and prevention, including the promotion of public health. In this area the banks recorded significant growth to the level of plus 30 %. Overall, the topic of health still holds for the banks the high level of attention for the year 2015 at 48.15 %, compared to 52.63 % of the year 2014.

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SOCIAL INVESTMENT

In this area the banks involved as investing their own funds to support infrastructure and other programs designed to improve the social aspects of community life such as sanitation, supply of safe drinking water, health, housing and food security. The social conscience of the banks again in the year of 2015 significantly scored with the advent of new banks and this field grew by 26.67 %. And the total share of this commitment still maintains a high value for the year 2015 in 70.37 % against 78.95 % from the year 2014.

CONCLUSION

Based on the above made comparison of the involvement of czech banks into the area of corporate social responsibility for the year 2015 against the year 2014 can be made by author the following key findings:

1. in the area of socially committed banks in the Czech Republic for the year 2015 have rised about 8 new subjects, that bringing the total proportion of committed bank in the Czech Republic to the final 58.70 %,
2. in particular topics of social commitment to strengthen its role at the expense of other topics the community involvement and development and labor practices,
3. in the area of human rights the banks shifted from the resolving complaints to the discrimination and vulnerable groups,
4. in the field of labor practices in 2015, still dominates the human development and training in the workplace,
5. for the environment despite the significant appreciation of the issues of prevention of pollution and sustainable resource use to maintain its first place the protection and restoration of the natural environment,
6. in the fair operating practices despite the significant strengthening of respect for property rights issue have defended their positions the anti-corruption and the fair competition issues,
7. for consumer issue remained even for the year 2015 the key themes of customer service, support and dispute resolution,
8. and finally, at the issue of community involvement and development remained in the year 2015 a key question in education and culture, but for which the banks stood at the same level the question of social investment.

Imaginary list of the most socially responsible bank for the year 2015 compared with year 2014 has not changed and remains the same:

1. Československá obchodní banka a.s.
2. Raiffeisenbank a.s.
3. Komerční banka a.s. a Česká spořitelna a.s.

However, for the aforementioned banks during the year 2015 decreased of total share in any involvement of banks in the area of social responsibility by 5.21 % to finally in 31 %.

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SOCIAL NETWORKS – A TOOL FOR RECRUITMENT FACILITATION

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ABSTRACT

Organizations that strive to be competitive must be able to attract and retain talented employees. In population are not many of them, recruiters must use for finding suitable candidates effective tools eg. social networks. Companies advertise, offer products, communicate with clients and recently even seek employees through social media. Job boards (eg. Jobs.cz in the Czech Republic) now have a significant competitor in the recruitment field - the social networks.

In the USA, the selection of employees through social networks is a common practice because social networks in many cases provide easily and quickly accessible information about the individuals. Online HR programs are already in use which research candidate's social network background and provide recruiters a comprehensive overview about the person. For example, recruiter can input the name or email address into this type of program and after a few seconds have the summary of candidate activity on social media. According to the criteria, recruiters can also find passive candidates via social networks. In the Czech Republic, this is a relatively new channel.

The paper is focused on social networks and their influence on the recruitment process. The aim is to determine whether social networks can be a suitable tool for recruitment in the Czech Republic, as it is the case abroad. The analysis of the occurrence of keywords on Facebook and Twitter was used for the findings. The survey of publicly available information on Facebook profiles was further used.

Research showed that using social networks is appropriate for the recruitment process in the Czech Republic. Although this tool is still in its early stages, the potential is already evident.

KEY WORDS

HR, social networks, recruitment, Facebook, Twitter.

PREFACE

Earlier processes in the interpersonal communication and in the business sector are being complemented by modern tools, recently for example by the social networks. Originally, social networks were the space for interpersonal communication and a place for making new contacts. Today, there is an increased interest in social networking sites by the business sector. Companies advertise themselves via social networks, offer their products, keep in touch with clients and recently also search for new employees. Social networks are becoming an important alternative to the online recruitment through job boards (eg jobs.cz in the Czech Republic).

Social networks are beginning to be used for other purposes than those for which they were originally created. This is typical for Facebook and Twitter. According to Qualman (2011): „Social media platforms like Facebook, YouTube and Twitter changed the way consumers behave, conecting millions of people with the instant communication tool."

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For employers, the hiring of excellent employees is becoming a great challenge. In this respect, there are two important factors - economic and innovative. Due to the economic savings, the global crisis and the pursuit of efficiency, companies are trying to recruit their employees by the most inexpensive method. An important alternative to traditional recruitment (such as the job boards) is to find potential employees by using social networks. The important goal is to save money and time in the selection of employees, but on the other hand, the great interest is, that these savings should not affect the quality of potential employees. Related to that, a cost-effectiveness analysis could be used by the companies to decide if the traditional way of recruitment is still the most efficient, or if there is space for new approaches as are social media.

LinkedIn (2015) has issued global trends forecast for 2015 in recruitment. Among other things, there is the assumption that social networks are more used than ever before, and even the assumption that they will become a key resource. Social media will provide a sufficient number of potential candidates who will also be talented.

The number of people in the labor market is quite large. The current unemployment rate in the Czech Republic is around 5.2% (ČSÚ, 2014), which theoretically means hundreds of thousands of available workers. Unfortunately, the people who possess sufficient training are in short supply. Companies understand that talented employees can be recruited from the ranks of passive candidates[1].

Facebook is the largest social network, with over a billion users, making it world's largest database. In the Czech Republic there are more than 4,1 million users of Facebook. (Allin1social, 2015) Twitter has already surpassed 300,000 users in the Czech Republic in 2015. (Jobspin, 2015)

RESEARCH

Two quantitative research surveys were conducted, with the aim of finding out whether social networks are a suitable tool for recruitment in the Czech Republic.

In the first phase of research, we went through 1400 Facebook profiles of users from different Facebook groups. We were focused on information which is public for other Facebook users (not friends of friends). The data were collected by students engaged in courses focused on New Media and PhD student at KSA Ing. Ludmila Malinova.

They collected publicly available information (age, education, residence, employment, as well as whether they have public photos, posts on the wall, friends list, liked pages/ groups) and stored them in a structured Excel file. The term "publicly" means that the data is available to all Facebook users.

Subsequent research was conducted by collecting data through a web application, which sought chosen keywords that users on social networks used in the search and offering of employment. The automatic collection of keywords by the web application lasted for three months, from March to June. The application was programmed by a student at KSA. The research was conducted only for Facebook and Twitter. Unfortunately, for technical reasons, LinkedIn could not be included. Data collection was anonymous, so we do not possess a more detailed demographic data (age, sex, education, etc.). Study focused only on the Czech Republic, because the keywords were chosen only in the Czech language. Keywords were sought in all cases and persons.

Keywords were divided into three groups. The first group contained only words „work" and „employment". The second group of keywords was focused on finding work. The last group consisted of words related to job offers.

[1] Candidates who do not actively search for a new job. If, however, they got a better job offer, they would probably accept it.

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DISCUSSION

From the previous research, which followed up public profiles on Facebook, it was found that the 62% of users have visible information on their profiles . These people have mainly public information about their education (91.5%), photos (62.5%) and liked pages/groups (61.3%). The least shared information is relationship (29.1%). HR departments are primarily interested in photos and liked pages/groups, from which they can get useful information for the recruitment process. Alternatively, they can make a decision whether to invite the candidate for an interview. Of the total sample, 47% of users from the research publicly show the number of Facebook friends . On average, each user has 399 friends. The standard deviation is 324.4 and median is 327. It presents a normal distribution, as shown in the friend histogram below o. The peak of the normal distribution is between 200 and 400 friends, see Figure 1.

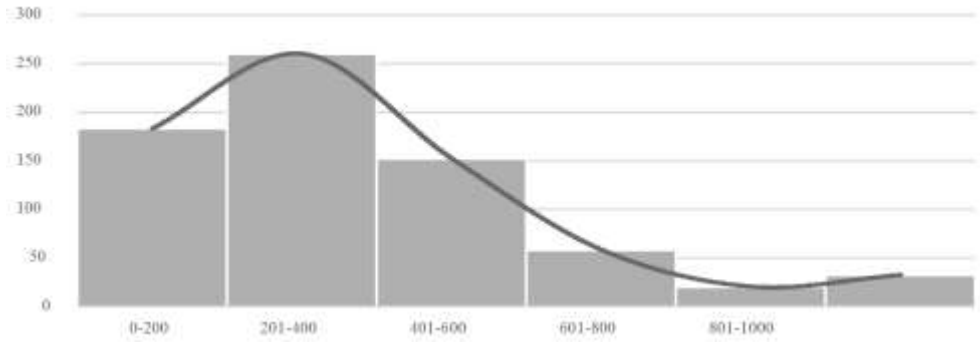

Figure 1: Histogram of the Number of Facebook friends with normal distribution (Bohmova, Malinova, 2013)

Figure 1 shows that HR specialists can see the social surroundings of approximately every second candidate. It is very probable that within the number of "friends" there will be someone from the candidates' current or previous job. HR specialists can use them as a reference for the candidate.

The results of the analysis of keywords are shown in Table 1. Average daily occurrence of keywords from the first group (labor, employment, etc.) on the social networks is 1213 times (Facebook 950 times and Twitter 262 times). On average, in one day job seekers used keyword phrases in search of work 116 times on both social networks. On the other hand, the phrases about job offers from persons and companies looking for new employees occured 68 times on average per day. This means that labor demand is prevailing over labor supply. If we focus on a specific period in which keywords were mostly used, the predominate day is Thursday, followed by the weekend (Saturday and Sunday). From Table 1, it is evident that statistics occurrence words have a slightly increasing trend. The reason may be the approaching end of the school year and thus a growing demand for labor.

Labor supply and labor demand is beginning to shift to social networks, such as in abroad, especially in the USA. In the use of social networks for recruitment Facebook dominates over Twitter. The reason may be a wide variety of users (young/ old, primary/ university education etc.) and a higher number of users.

It follows that it is important for recruiters to shift their attention to social media and to advertise job offers there. Recruiters could get a resume from job seekers through apps, for example in Facebook, where users can directly insert their CV.

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	Twitter	**total**	**Facebook**	**total**
Employment	3576	23613	5160	85582
Job	20037		80422	
Looking for a employment	1725	4037	2829	6477
Looking for a job	2312		3648	
We offer employment	904	2517	990	3563
We offer job	1613		2303	

Table 1: Incidence of keywords on Facebook and Twitter (Authors, 2015)

An analysis of Effectix shows that the number of users of Facebook and Twitter in the Czech Republic is constantly growing. While Facebook presented a sharp increase in early 2010, t was followed by a slowdown, which is becoming increasingly apparent. In comparison with these values Twitter is growing faster. In March 2013 Facebook had 3.8 million monthly active users, of which about 1.8 million users were really active. Twitter had 157,481 users at the beginning of 2013. (E15, 2013)

Social media is a space with great potential for HR. Czech recruiters are beginning to emerge in recent times. This is proven by the results of the study, which was conducted by LMC on a sample of 234 Czech recruiters. According to the study, social networks such as Facebook or LinkedIn are used for business purposes by 24% of the respondents, and by 27% of them only for personal purposes. 44% of the respondents do not use social networks for HR purpose, because they think it is a waste of time. The remaining 11% of respondents are considering the use of social networks in the future. (Jobs.cz, 2010)

CONCLUSION

Social networks don´t serve only for entertainment purposes, they are also used for commercial purposes. This does not only apply for advertising, but also for obtaining information and HR utilization , especially for recruitment.

HR professionals use social networks as a complementary recruitment tool. They are seeking various details of professional and private information of candidates, especially references and work experience.

Social networks registered this trend and skillfully adapted. The largest social networks(Facebook, LinkedIn, and Twitter) have developed new tools for effective connection with the labor market. Facebook is primarily used by HR professionals who want to know more personal information about the candidates, more than from LinkedIn, cover letter or a resume.

Social networks are used as a common resource for finding employees abroad, although it is obvious that in this way it is difficult to search for all types of professions. LinkedIn (2015) has issued global trends forecast for 2015 in recruitment with the assumption that social networks will be more used than ever before, and even will become a key source of information. In the Czech Republic, the usage of social networks for hiring process is at the beginning stages, but their great potential is already evident.

Based on the research and the secondary data obtained, is evident that the increase in the importance of social networks is indisputable. Facebook users carelessly publish a lot of personal information. More than 60% show their photos and around 50% of them have their „walls“ open for all Facebook users. A similar percentage of users show the list of their friends publicly. Words related to the supply and demand for employment are very often used on Facebook and Twitter. On average, the words such as labor, job, etc. occured 1213 times per day in our sample. In conclusion, social media are a suitable supplemental tool for recruitment in the Czech Republic.

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WEB APPLICATION SECURITY: AUDIT TOOLS & LANGUAGES

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ABSTRACT

Testing web application security is an important part of the development web application. Tools and processes for testing the security of web applications and detecting their vulnerabilities experienced development in recent years. Many of these tools and processes depend on the chosen development environment. A crucial factor is the experience of developers, set procedures and control mechanism used in creating web applications. Automated tools are becoming very popular. "Black box" web vulnerability scanners can find security problems such as cross-site scripting, command execution, directory traversal, SQL injection, insecure server configuration and others. Application of these tools requires no wide knowledge about web development technologies. The problem is the interpretation of results and the subsequent repair issue. These tools cannot guarantee the elimination of security risks. Most popular programming languages in web applications are ASP.NET, PHP and JAVA. If we focus on security of the website in terms of programming languages, number of vulnerabilities will be in each language the same. Selecting the programming language does not have a direct impact on security of web applications. Differences in statistics of successful attacks on web applications are caused by a combination of factors for various programming languages.

KEY WORDS

web application, vulnerability, security scanner, security, programming language

INTRODUCTION

Testing web application security is an important part of the development web application. Number of incidents and loosing sensitive information are serious problem. (Open Security Foundation, 2015). Web application security factors are widely tracked and identified. (OWASP, 2013). Tools and processes for testing the security of web applications and detecting their vulnerabilities experienced development in recent years. Many of these tools and processes depend on the chosen development environment. A crucial factor is the experience of developers, set procedures and control mechanisms used in creating web applications. These factors are dependent on the choice of the development environment and the ability of applying guidance. It is interesting to see how the security of web applications depends on the selected programming language, and what progress have automated tools recorded in recent years. If we focus on the security of the website in terms of programming languages, number of vulnerabilities will be in each language the same. Selecting the programming language does not have a direct impact on security of web applications. The differences in statistics of successful attacks on web applications are caused by a combination of factors for various programming languages.

AUTOMATED SECURITY TESTING TOOLS

Tools for safety testing, and identifying weaknesses in web applications can be divided into the following categories: (Galba, 2012)

1) practices recommended by manufacturers and suppliers of web technologies

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2) procedures based on methods of IS audit

3) checklists

4) automated tools

The first two categories of tools include comprehensive methods for ensuring the security of web applications including validated manuals and procedures related to the entire lifecycle of web applications and technological recommendations for infrastructure. (Microsoft, 2011) (IBM, 2102) Categories 3 and 4 include simple procedures applicable and usable to test the safety of a web application before deciding whether to use comprehensive screening of Category 1 or 2.

Automated tools are becoming very popular. "Black box" web vulnerability scanners can find security problems such as cross-site scripting, command execution, directory traversal, SQL injection, insecure server configuration and others. Application of these tools requires no wide knowledge about web development technologies. The problem is the interpretation of results and the subsequent repair issue. 37 web application vulnerability scanners is listed on website (OWASP, 2013). Eight of these scanners are open source and six are free for use with limited capability.

I have not found any serious rating list or test result success of web vulnerability scanners yet. Four web vulnerability scanners were tested. in research (Jason Bau, 2012). Scanners detect between 21% and 32 % of all testing vulnerabilities. The worst results scanners have in "stored" forms of XSS and SQLI with average detection below 10%. This shows that the use of these tools is useful as security indicators that can highlight weakness of web applications. These tools cannot guarantee the elimination of security risks.

PROGRAMMING LANGUAGES

Finding serious statistic data of programming languages use in web application is not easy (TABLE 1).

	(builtwith.com, 2015)	(Whithstsec, 2014)	(w3techs.com, 2015)
APS.NET	48%	36%	16,2%
PHP	51%	16%	81,5%
Ruby on Rails	1%	-	0,6%
JAVA	-	28%	3%

TABLE 1 (source author)

Differences are probably caused by selecting of the data source. We can say that most popular programming languages in web applications is ASP.NET, PHP and JAVA. If we focus on security of the website in terms of programming languages, number of vulnerabilities will be in each language from 10% to 11% (Whithstsec, 2014). Most successful security attacks was on PHP web application. (builtwith.com, 2015). This suggests that the PHP applications have larger security risk. The reason may be the popularity of PHP at freelancer community. Combination of freelancer and PHP leads to roughly 3x higher security risks. (Jason Bau, 2012).

CONLUSION

Web application security issues become the important part of developing process. Selecting the programming language does not have a direct impact on security of web applications. The differences in statistics of successful attacks on web applications are caused by a combination of factors for various programming languages. Each programming language and developing environment have enough resources for building secure applications. Testing vulnerability and finding weakness of application depend on procedures and tools that developers use. Vulnerability scanners are useful tools which can highlight weakness of web applications but cannot guarantee the elimination of most security risks.

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THE USE OF SOCIAL MEDIA IN THE 2015 BRITISH GENERAL ELECTION

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ABSTRACT

The paper discuss the use of social media platforms in British General Elections from systemic point of veiw. Social media platforms are here to stay and directed voters' thoughts and views of certain government policies and respective political parties and their members. Article analyzes primarily Facebook, as it is used by millions of people as a discussion platform every single day. Secondly Twitter and also any other social media platforms such as YouTube and Instagram will be discussed throughout this paper, in order to build a judgement upon how where social media platforms put to good use by all stakeholders involved; namely being; voters; politicians; thought leaders and any other people that harnessed the use of social media as a tool for discussion or cohesion of the general election.

KEY WORDS

social media, 2015, elections, United Kingdom, system approach

INTRODUCTION

Not so long ago back in March of 2015, Ipsos Mori who are the second largest market research company, formed by a merger of Ipsos UK and MORI, two of Britain's leading survey companies in October 2015, reported that 'one third of 18-24-year-olds living in Britain thought social media would influence the way in which they vote'(Willis 2015), considering which party is the best and which party represent themselves the most from a political perspective. So to introduce this paper, I thought it best to primarily focus upon the use of social media from the perspective of the younger generation, who we can mostly agree are the main representatives and main users of social media in today's society and who actually uses social media in many other ways (Boehmova & Malinova 2013).

In addition, the most prolific social media platforms that directed voters' thoughts and views of certain government policies and respective political parties and their members can be seen to be Facebook, primarily as it is used by millions of people as a discussion platform every single day. Secondly Twitter, another discussion platform; where I will be talking about the influential use of hashtags and also prolific tweeter and how these tweeters can become thought leaders concerning specific topics, and how they can relate to thousands if not millions of other tweeters through their influential modes of contact. And also any other social media platforms such as YouTube and Instagram will be discussed throughout this paper, in order to build a judgement upon how where social media platforms put to good use by all stakeholders involved; namely being; voters; politicians; thought leaders and any other people that harnessed the use of social media as a tool for discussion or cohesion of the general election.

Taking into consideration all of the above and the context of what this work will be, conclusion of this paper is specifically which parties gained the most from the use of social media. This will not just take into consideration the amount of likes say the Green Party has on Facebook or the quantity of hashtags that the UKIP Party gained on Twitter. It will also take into account the way in which certain political parties used their own initiative and good will through practice, by harnessing the opportunities that say

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YouTube has; by creating sometimes comical if not policy-specific actions that relate to a certain target audience, which will take us on to the first specific area of discussion concerning social media platforms, which is YouTube.

So why is it that party leaders themselves use Facebook? Is it for self-propaganda of their own political party, or is it to target a wider audience with a means of addressing certain issues? Is it even ethical?(Sigmund 2013) There hasn't been much focus upon such questions, as really everybody uses some form of social media, so why must they be explained. However, Marcus Beard, a political analyst at Brandwatch, an international social intelligence firm had said that "Party leaders can use social media to circumvent traditional media and communicate directly with the public"(Suliman Adela 2015) . So it is obvious that communication, which will definitely work alongside self-propaganda, is the main reason as to why social media platforms are used by party leaders. Whilst the old yet not so outlived methods of public speaking require some gutsy determination, not to mention a good public speaker, social media offer a different way in which party leaders or members can let their voices be heard, and rather directly too.

Furthermore when we discuss the uses of social media platforms by the respected government bodies, it is important to understand who they are targeting and how is it possible to target them. Again, Marcus Beard offers us a light and easy to understand demographic explanation; "56 % of 18-24 year olds spend in excess of six hours online each day, making them a ready audience for online communication" and that "Often young people are caricatured as being apathetic about politics and social media has critical organic less hierarchal new spaces, which political institutions cannot afford to neglect". What we can interpret from this is that the platforms already exist for political activists to make us of, but it is about targeting each age group or voter in a different light, whilst maintaining specific political propaganda. (Smutny et al. 2013)

In a different light, one of the stand out uses of social media this general election was an attempt to attract the attention from non-British people in London during election campaign. The latest impact of social media on the elections has been more tangible with the iconic tourist attraction the London Eye, which faces the Houses of Parliament, lit up each evening in political party colours to reflect the number of times each party is mentioned on Facebook.

YOUTUBE

YouTube is an excellent tool to reach out to potential voters for example, as it almost a face-to-face transaction or way of communicating, and one party that made a prime example of this was the Green Party. Now the Green Party in recent years have become one of the important political parties within the United Kingdom, gaining 16.4% of the vote in May 2015 (Perraudin 2015). The Green Party was always outshone by other major political parties such as the Conservatives, Labour or the Liberal Democrats, and lately they have joined forces with the ever so compromising United Kingdom Independent Party (UKIP). This recent political prominence in my opinion is definitely due to their excellent broadcasting appeals via YouTube. Many political parties in recent years have used YouTube as a way of broadcasting their policies by using their best public speakers and recording at times serious and anticipated videos, but in this specific case of the Green Party, a different approach was opted for; the Green Party decided to change the tune of party political broadcasts by uploading a spoof advert to YouTube portraying the Conservatives, Labour, the Liberal Democrats and UKIP as members of a rather questionable boy band. A much-derided strategy, it still gained more than twice as many views as the Conservatives' similar appeal titles "It's working – don't wreck it", and eight times the number of views achieved by Labour's flagship "Ed Miliband: a portrait"(Willis 2015) .

So consequently, from a comparative perspective one can dually acquire the knowledge taken from the statistics mentioned above that the actual influence a party broadcast through the use of YouTube as a social media platform can most definitely work in the favour of the political party in question. Therefore the growing prominence of the Green Party can be thanks to their different stance to appealing to the masses of Great Britain; a truly inspiring.

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FACEBOOK

The many uses of Facebook are evident to everybody and they need not be explained. Therefore to analyse the way in which Facebook has been harnessed during the general election I can make numerous related points, with some statistics, to give varying analyses' of what political party has gained the most from the use of social media, if any. Firstly as wrote newspaper 'The Independent' we can primarily see who appears to have reached out to the most people concerning the amount of likes for political posts. For instance, UKIP have hammered all the main parties in this category, with an average of 7,000 "likes" for each post on their official Facebook page. Labour trails behind with just 1200, while the Liberal Democrats saw a pitiful average of 250 "likes" per post.(Burrell 2015) So again from a comparative perspective we can see that one party has outshone the other parties with its approach to using Facebook as a platform for social media discussion. Personally I believe this is due to the amount of people who use Facebook, people of all ages, who are attracted to what UKIP stand for, which is very different and far to the right.

The below graphic explains just how much Facebook attention each party has managed to maintain.

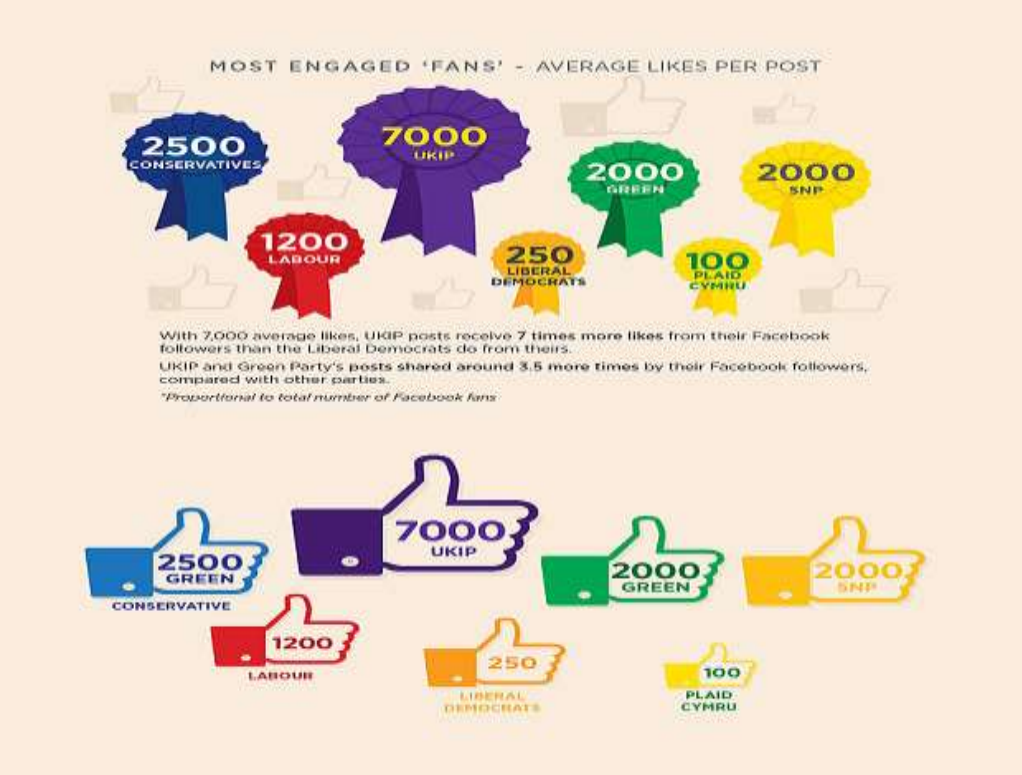

Figure 1: Number of Facebook friends and followers (Rothwell 2015)

To take it to another level and one from the perspective of the wider public, we can see where each party stands from a representative perspective again, but with the amount of likes that each party has itself and for its profile page. Aljazeera news (online) writes about this very correlation, and when we take it into account we can begin to understand which party is best represented by the people on Facebook itself. So on Facebook, the Conservatives had more than 450,000 likes for their page, and the UK Independence party (UKIP) was close behind with more than 445,000, while Labour had about 290,000 likes. (Suliman Adela 2015) Now although these figures literally don't mean anything, they can be used as simple tools of propaganda for each party.

TWITTER

So much like Facebook, the amount of chatter that political parties gained using Twitter was also closely monitored, thus we can see what charismatic leader came out on top with Twitter. For example, the

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major parties have tweeted more than 15,000 times in the campaign. The most active account of all - just by a whisker - is the Liberal Democrats, who tweeted more than 3,200 times in five weeks. The Conservatives were a very close second place with 3,199 tweets between March 30 and May 06 2015. More than 3,200 tweets in over 5 weeks highlights not only how much online credibility that these parties and specifically the Liberal Democrats are trying to attain, but it also underlines how seriously that these parties are now considering the use of social media to be.

The Prime Minister (David Cameron) is a clear winner in the popularity contest on Twitter, with nearly one million followers to Ed Miliband's paltry 460,000. Nick Clegg is a distant third with 230,000 followers - and just ahead of Nigel Farage's 220,000. Welsh dragon Leanne Wood is the most obscure party leader on Twitter, with a comparatively feeble 27,000 followers. We can therefore see that each political leader has and is still trying to convince people to follow them through various different communication techniques as well as tweeting as frequently as possible, as let us not forget that social media is a non-forgiving platforms, as users have the discrepancy to follow and un-follow people day-by-day, as they wish.

The use of social media platforms in this year's general election was very similar to that of the Obama campaign within the United States. The whole idea of using social media is a way to communicate, but also it is a technique to mobilise supporters, getting people getting together and getting them to join up. So throughout the election we can see that each party used social media and the various platforms available to promote their own rhetoric and their various parties.

CONCLUSION

So to conclude, we can analyse which parties had gained the biggest threshold of different social media platforms and then make a comparison between the amounts of votes each party won in correlation. Yet firstly, I think one of the most imperative discussion point that we have to distinguish is that political advertising on television and radio is banned in the UK. But during the general election campaign, parties were placing paid-for political adverts and campaign videos on social media to attract a potential audience of millions. The videos - some of which have been attacked for their negative campaign messages and much like The Green party YouTube broadcast I mentioned above, are not regulated by the broadcast regulators Ofcom and the Advertising Standards Authority. So furthermore social media has become one of the greatest communication tools available to political parties as side stepping from banned campaign slogans that were previously used on the television and radio has had to be maintained in recent years. (Pavlicek 2013)

In evaluation of everything that I have mentioned, we can therefore suggest that from the perspective of Facebook, we can see that the United Kingdom Independence party (UKIP) has won the 'race for likes' category, with their unprecedented score and like for like ratio over its' competitors. Personally I don't really understand why, as UKIP stand for neo-liberalism amongst a mixture of not so attractive policies that would be introduced if they came to power; namely the United Kingdom would slowly and surely become an independent state, out of the reach of the European Union. Not only would such an implication takes its toll on the many industries of the country that are maintained by domestically born workers, but also workers from outside of the United Kingdom who have rightly taken advantage of the relaxed borders that go hand in hand with the 'free movement' policy we know all too well about.

In addition, although the amount of votes won by The Green party is not a fair representation of their excellent voting campaign, they definitely won the vote for originality. With a well strung out comical sketch mimicking other party leaders, the party appear to have taken online communication to another level. It is however a shame to see that The Green party has still not managed to wage a significant political war upon other big political parties. They did however; win the 'Social Media War' from a YouTube perspective.

From a tweeting perspective, the good old-fashioned and rather boring Liberal Democrats won the Twitter war by finding their online feed in the eyes of their vast amount of followers, because of their tweeting strategy by overloading their followers' feeds! But rightly so, average voter would rather

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follow Nick Clegg on Twitter than Ed Miliband for example, who, as being the leader of the labor party, had a PR problem for eating a bacon sandwich while looking like a complete fool, for which social media tore him to pieces and Ed Miliband eating a bacon sandwich became an infamous internet meme. (Wikipedia.com 2015)

So, as a result of social media being ever more useful for political parties and their respected leaders, it will be interesting to witness what further political upsets and carnage will be a resulting impact for those involved. It will be interesting to monitor, if the new Prime Minister himself actually tweets directly from his iphone onto his Twitter profile. If he does, social media may have got in the way of politics slightly, and politics may have become more of a social benefit for its day to day users, and not so much the thought leaders that it creates in the political sphere.

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