



Ekonomická  
fakulta  
Faculty  
of Economics

Jihočeská univerzita  
v Českých Budějovicích  
University of South Bohemia  
in České Budějovice

# Complementary Papers and Book of Abstracts of the 10th International Scientific Conference INPROFORUM 2016





# Complementary Papers and Book of Abstracts of the 9th International Scientific Conference INPROFORUM 2016

Threatened Europe? Socio-Economic and Environmental Changes

2016



University of South Bohemia in České Budějovice  
Faculty of Economics

České Budějovice, November 3 – 4, 2016

**Complementary Papers and Book of Abstracts  
of the 10th International Scientific Conference INPROFORUM 2016**  
*Threatened Europe? Socio-Economic and Environmental Changes*

November 3 – 4, 2016, České Budějovice

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Supported by Ministry of Education, Youth and Sports of the Czech Republic.

Publication was not subjected to a language check.

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## Stress in the workplace as an integral part of working life?

Markéta Adamová

**Abstract:** *In the current rapid and turbulent world, it is essential for enterprises to adapt to external changes quickly and flexibly and even to actively anticipate them. However all these pressures in the discontinuous environment may signify a brunt on not only organization, but also on the employees within the organization, which could subsequently have a negative impact on their work performance. A key success factor and competitive advantage can be only executive and satisfied employees, so it is appropriate for the company to be actively engaged in this issue. This paper discusses work-related stress and its possible impact on work performance of employees in selected organizations. The aim was found out a current state in the workplaces and subsequently suggested a proposal for change the status quo. A questionnaire survey was used. Respondents were employees of retail stores, whose are in daily contact with customers. The questionnaire was focused on the evaluation stress factors in the workplace by the employees themselves, as well as on the possible effect of work stress on their work performance (especially in relation to customers) and their willingness to undergo training or seminar on stress management. The questionnaire partially deals with pathological conditions in the workplace, for example: mobbing, bossing and sexual harassment in the workplace. In conclusion we can say that work stress affects the operation of organizations at all their levels.*

**Key words:** Work-related Stress · Stress Factor · Employees · Work Performance · Satisfaction of Employees · Contact with Customers · Stress Management

**JEL Classification:** M12 · M10 · M14

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## Residents' Attitudes of Project Impacts in the South Bohemia Region

Gabriela Antošová, Helmuth Yesid Arias Gómez, René Wokoun

**Abstract:** *Regional policy focuses on the less developed regions as part of accelerating traditional regional development, and we have seen some positive and negative impacts resulting from the implemented projects in the South Bohemia region. This article aims to explore the implemented projects funded by European regional financial resources and their impacts, appreciated by residents and stakeholders in the selected three municipalities of the South Bohemia region. The theoretical background of the article provides introduction to the usage of European funds during the period of 2007-2016 in general and in relatively less developed peripheral areas of the South Bohemia region, adjacent to the Czech-Austrian frontier. The proposed factor analysis uses a standardized questionnaire related to impacts on local development caused by finalized projects in the period of 2013-2016, taken by the residents. Results contain information about satisfactory local development with the interregional impact and the attitudes of local residents observed in September 2016. The significant role of tourism and local business is evident in three attractive destinations of the South Bohemia region, which is also evident in the interregional context of a sustainable rural development according the benefits from the results of the implemented projects. This article reveals findings in the border areas of the Jindřichův Hradec district and these findings introduce an adjacent local model (after "the Iron Curtain" ideology national policy) as a model of regional success on the Czech-Austrian frontier.*

**Key words:** South Bohemia region · exploratory factor analysis · attitudes · residents · local development

**JEL Classification:** R58 · C18 · F63

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## Click Stream Data Analysis for Online Fraud Detection in E-Commerce

Ladislav Beranek, Václav Nýdl, Radim Remeš

**Abstract:** *Web services became the integration part of our life at the present time including advertisement on various web pages. Many e-commerce companies generate advertisement revenue by selling clicks (it is known as Pay-Per-Click model). In this model, e-commerce company is paid for each time an advertisement link on its website is clicked leading to the sponsoring company's content. However, some of these companies inflate the number of clicks their sites generate. Generation of such invalid clicks either by humans or software with the intention to get fraudulently money is known as click fraud. In this article we show how the click fraud can be unmasked using various time features (e.g., period of the day and the day of the week when a user's (that is identified by his IP address) clicking occur). We combine several different time features into a timeprint. We use machine learning methods in a number of experiments to get an understanding of to what extent time prints can be used for identifying click fraud. The obtained results show that timeprints indeed can be a useful tool for the improvement of the quality of click fraud analysis.*

**Key words:** E-commerce · Click stream analysis · Data integration · Fraud detection

**JEL Classification:** C63 · M31

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/814>

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## Carefully Surfing on the Counterwave of Corporate Globalitarization/Industry 4.0

Werner Breede

**Abstract:** *An inevitable previous knowledge of selected 'crash landings' in countless European societal sectors for critically handling my topic flows into the 'hot spots' as under: The agro-industrial mergers (eg Bayer/Monsanto); IS-terror in Belgium, France, Germany for ex.; Small&Medium Farm grabbing; TTIP/CETA; NSA global surveillance; debt and credit crunches in times of destructive neo-liberalism; Russia's aggressive politics from Ukraine via Central Europe to Near East (Siria especially); China's trade dumping politics in the EU (steel above all); global finance manipulations through corporate banks, investment funds, insurance companies (Luxleaks scandal); European Central Bank (ECB) and its politics of the cheap money, auto-destruction tendencies in the EU (eg Brexit); radioactive waste storage and brown coal quarrying (Czech LEAG in the German Lausitz region); state of emergency in France; SWEET WATER DISSIPATION through intensive livestock farming; massive tax avoidance.*

*Contrary to these staggering crisis performances in a large 'amphitheatre', my CHAUTAUQUA - a sort of traveling tent show - takes place in a small ring of manageable size. A ring of hopefully - but probably only 'rudimentally'- realizable ideas for a crisis management in firms, organisations a.s.o. Such an advance comprises among others short definitions like globalitarization, glocalization, mega-machine. It extends further to 2 pragmatic models of quality management; an example of an energy-sufficient village near Berlin and the question how to futurize a company's etc. intellectual capital for durable, value-added production, risk provision and engaged co-workers.*

**Key words:** Globalization · TTIP/CETA · Industry 4.0

**JEL Classification:** F60

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## Internal Audit and its Role in evaluating the Risk of Financial Statement Manipulation in the Area of Costs, based on a Case Study of a Chosen Accounting Unit

Zita Drábková, Zdenka Volkánová

**Abstract:** *The basic purpose of accounting statements is to accurately and truthfully show reality. For most interested parties, accounting data is one of the essential sources of information about a company. Financial statements are also the fundamental source of information for managers and Corporate Governance for company management. The risk of deceptive account reporting or “improving” financial results has been confirmed by many instances of international research done by large auditing companies, and also relates to subjects based in the Czech Republic. The reasons for using dishonest techniques, creative accounting, and deceptive reporting could be many, for example the necessity of reaching specific figures and criteria for parent companies, creditors, and banks. Internal audits and internal control systems should detect creative accounting methods that are far from accurate and truthful, together with accounting fraud, and at the same time prevent companies from acting accordingly. This contribution analyses accounting unit cost which has been causing accounting loss and poor financial health of chosen trade corporations for a long time. At the same time it evaluates specific findings in the area of spending efficiency in connection with revenues. Furthermore, the contribution summarizes aspects of using creative accounting techniques in the area of costs, and the impact of changes in their management including impacts on the efficiency of internal audits and set accounting units control systems.*

**Key words:** Risk of accounting statements manipulation · Internal control system · Internal audit

**JEL Classification:** G32 · M41 · M42

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/850>

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## Adjusted Net Savings in the Countries of the European Union

Magdaléna Drastichová

**Abstract:** *Sustainable development (SD) is an overarching objective of the European Union (EU) enshrined in its primary law, governing all the EU's policies and activities. Adjusted Net Saving (ANS) as a macro level index of SD was used to evaluate SD in the EU countries and additional four developed countries for the purpose of comparisons. ANS was assessed according to the ANS ratio in % of GNI and the ANS per capita. Moreover, the ANS component indicators were investigated to complete the evaluation. Although the results differ between countries according to the applied ANS indicator, Norway has shown high levels of both ANS indicators. Although this country showed the highest sum of the negative ANS components after subtracting the positive component, it was evaluated as the best performing economy according to the combination of the monitored indicators. On the other hand, Greece is evaluated as the unsustainable country having shown negative ANS since 2008. Romania and Lithuania showed the significant improvements and moved from the unsustainable territory. The ANS of the monitored countries has significantly been affected by the economic crisis.*

**Key words:** Adjusted Net Savings (ANS) · European Union (EU) · Sustainable Development (SD)

**JEL Classification:** Q51 · F56

**URL:** <http://iproforum.ef.jcu.cz/INP2016/paper/view/813>

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## Impacts of Corporate Social Responsibility Elements on Policy of Net Working Capital Management with respect to Business Performance in the Czech Republic

Roman Dubový, Zdeněk Motlíček

**Abstract:** *The issue of asset and capital structure management in the corporations is, similarly to the issue of implementation of corporate social responsibility elements in the form of environmental management and occupational safety, a significant topic in the corporate environment of non-financial character in pursuance of gaining competitive advantage in the global marketplace. The question remains to what extent these two factors are involved in the determination of the economic performance of the company. Common base of both research topics is their high attractivity for entrepreneurs, combined with inadequate number of empirical experience in corporate practice. The basis of the research is modelling the impact of the implementation of environmental management and occupational safety on the performance of businesses and the management of net working capital. Subsequently, the secondary effects on the riskiness of financial structure of companies surveyed, are examined, which is an important factor in investors' assessments. The paper presents empirical research that aims to quantify the links between environmental management, occupational safety and management of net working capital and subsequently quantify their impact on corporate economic performance, represented by the economic value added (EVA), all with regards to feedback connections. A prerequisite for modelling was a multivariate regression model whose explanatory variables were the assets structure, the capital structure and the ownership of certification standards OHSAS 18001 and ISO 14001. The model has been applied to a group of large companies based in the Czech Republic, operating in the automotive sector. As part of the results a positive influence of the ownership of certification standards on EVA performance has been expected.*

**Key words:** Corporate social responsibility · Net working capital · Economic performance

**JEL Classification:** M21

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/817>

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## Barriers of inter-municipal cooperation in the regions of the South Bohemian Region as seen by municipalities in 2004 – 2014

Jiří Dušek

**Abstract:** *In the past few years several research projects focused on the barriers of inter-municipal cooperation were carried out in the Czech Republic and abroad. As the research results reflect the respective local and regional specifics, the results and conclusions are diametrically different, depending on particular conditions in the respective country.*

*The presented work focuses on the issues of barriers of inter-municipal cooperation as seen by the individual South-Bohemian municipalities. After the introductory theoretical part the results of a questionnaire survey focused on the analysis of selected issues of municipalities and towns in the South Bohemian Region are presented and discussed. The questionnaire survey was first done in 2004 and repeated ten years later in 2014 with the goal of comparing and mapping the changes in the attitude of South Bohemian municipalities as regards public administration, transport and other areas of interest. In the conclusion the results are interpreted as regards the development of opinions of the respective municipalities on the respective problematic areas and also in the context of changes that were implemented in area of public administration in the past few years.*

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**Key words:** South Bohemian Region · inter-municipal cooperation · municipality · region · regional development

**JEL Classification:** O180

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/825>

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## **New teaching Trends in the Field of Trade and Tourism**

Radim Dušek, Jan Šalamoun

**Abstract:** *The aim of this paper is to describe an application of the project-based learning method, which was implemented to Management of Commerce study programme in the academic year 2015/16, and to define course's processes that should be improved to ensure a higher level of students competencies. A suitable method of such key competencies development can be an implementation and wider use of project-based learning methods. This approach can be characterized by creating the students' research teams to work individually on long-term projects, which are connected to business practice and that are designed to solve problems.*

*Based on implementation of the project-based learning methods on the Faculty of Economics, the University of South Bohemia in České Budějovice in recent years, the Department of Trade and Tourism created and started own subject called Specialization project in the academic year 2015/16. The purpose was to integrate and develop competencies of every student through working on projects in the areas of trade, marketing and tourism. All projects were specified by particular companies, which expected students' relevant recommendations for solving concrete problems.*

**Key words:** Competency · Project-based learning methods · Tourism · Trade

**JEL Classification:** A22 · I21

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/829>

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## **Business in Waste Treatment**

Ivana Faltová Leitmanová, Filip Petrách, Jaroslav Šetek, Jiří Alina

**Abstract:** *Waste seem to be one of the major phenomena of 21. century, mainly due to the growing consumption in the broadest sense. The waste must be collected, sorted, processed and as small as possible to store. Submitted paper focuses on activities in branch of waste treatment (including collecting, sorting proceeding waste) except dangerous waste. The amount and structure of this waste can be considered as fundamental factors influencing the business in this area, as well as factors of economic, administrative and environmental.*

**Key words:** Waste treatment · Business

**JEL Classification:** D22 · Q53 · M21

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/835>

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## Transformation of an Association into an Institute

Zuzana Frantíková

**Abstract:** *The paper focuses on the changes in the area of legal persons brought by the new Czech Civil Code. The new Civil Code recognizes three types of legal persons: corporations, foundations, and institutes. The process of transformation is aimed at the societies that were founded according to Act No. 83/1990 Coll., on association of citizens, as amended, and which became associations by the Civil Code since its effectiveness, i. e. on January 1, 2014. Associations founded according to the New Civil Code cannot be transformed into institutes. The form of an institute is suitable for associations where no member basis is present or ones where its members are at the same time also its employees. With regards to the association, the law recognizes two types of transformation, that is – voluntary, and obligatory. The obligatory transformation was done by the Civil Code when societies became associations, however, the voluntary transformation can be done sustaining on the decision of the supreme body. The society could be turned into an institute or into a social cooperative. The transformation process does not have any support in the legal regulation – that is why there are so many questions to be answered and interpreted.*

**Key words:** Institutes Transformation of Legal Form Association · Association Law

**JEL Classification:** K1 · K13

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/843>

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## Supplier Evaluation System in the Management of Quality

Jindřich Fuka, Dagmar Bednářová, Otto Martinek

**Abstract:** *The right choice of suppliers is one of the key roles of management. For securing the quality of products is important to have effective processes and also good resources from suppliers. Supplier evaluation system represents an effective tool for eliminating inappropriate choices of suppliers. Inappropriate supplier would bring to the company not only additional costs but also bad reputation amongst customers.*

*Assessment of supplier evaluation system was carried out in a medium-sized engineering company. Preliminary evaluation of the supplier provides information on whether the supplier is able to meet specific requirements. Ongoing evaluation of suppliers provides information about their current level of fulfilling specific requirements for their deliveries.*

*For the selected company were created following suggestions that should make supplier evaluation system more efficient: Evaluation of suppliers(More categories for suppliers according to the results of their evaluation), Preliminary evaluation of suppliers(Require supply samples before selecting the supplier, Always visit the supplier during the evaluation audit), Ongoing evaluation of suppliers, Carry out continuous assessment on a quarterly basis and take into account the development during the year, Conclude an agreement with suppliers about the level of quality and assign greater weight to the quality.*

**Key words:** Supplier evaluation system · Quality management · Suppliers · Quality

**JEL Classification:** M0

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/808>

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## Accounting Data of ERP Systems and Spatial Autocorrelation Analysis

Petr Hanzal

**Abstract:** *This paper is seen as a contribution to the field of enterprise resource planning systems (ERP) and their application in spatial autocorrelation. The main objective is to demonstrate the possibility of using accounting data of enterprise information systems for regional statistics, identifying spatial autocorrelation of economic activities, through a set of accounting data obtained from enterprises. The theoretical framework provides a theoretical basis for the definition spatial statistics evaluation and indicators of economic activity. Interpretation of statistical methods are then used in the practical part, derived from accounting data of enterprise resource planning systems, 30 randomly selected enterprises with nationwide coverage in ČR, regardless of the branch structure.*

**Key words:** ERP – Enterprise Resource Planning Systems · Regional economic activities · Accounting data · Spatial autocorrelation

**JEL Classification:** C02 · E03 · C88

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/827>

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## CSR in the Context of Sustainable Development

Darja Holátová, Vlasta Doležalová

**Abstract:** *European Union trends towards sustainable development are increasingly applied to the corporate sector in the form of his social engagement and social responsibility. In the corporate sector, we are talking about corporate social responsibility. This philosophy integrates into business not only economic issues but also social and environmental ones trying to find balance between corporate profitability and responsibility. Corporate Social Responsibility is a business strategy. The brand value and reputation are increasingly seen as a company's most valuable assets, CSR can build the loyalty and trust that ensure a bright the sustainable development and future for corporate. By integrating CSR into corporate strategy and into business as core value, you are not only making a significant contribution to a better society. Corporations themselves visible, create your image and thus fight for their position, sustainable development and on the market. This fact is aware not only large corporations, but also small and medium sized enterprises and therefore social responsibility involved in their activities more frequently.*

**Keywords:** Corporate Social Responsibility (CSR) · Sustainable development · SMEs.

**JEL:** L20 · M12 · M14

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/812>

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## Sustainability and Sustainable Development of Non-profit Organizations

Dita Hommerová

**Abstract:** *This paper deals with current worldwide concepts of the pillars of sustainable development with respect to activities of non-profit organizations. There is a large number of theories, approaches and concepts of sustainable development. The overall success of non-profit organizations, characterized by their development and sustainability, is also contributed to by a targeted effort to achieve sustainable development, utilizing the social, economic as well as environmental essence of the inner workings of society. An organization which in the long term is sustainable from the economic, environmental and social points of view generates an added value for society in terms of sustainable development by conducting its activities and at the same time ensures its strong position in the market and success in a competitive market environment. Due to their fundamental nature, non-profit organizations are engaged in just about all the mutations of the concept of sustainable development and through their activities cover a wide range of sustainable development needs. Sustainable development is a response to the need of human society to develop qualitatively rather than quantitatively and in line with limitations arising from our environment.*

**Key words:** Sustainability · Sustainable development · Success of non-profit organizations · Growth of a non-profit organization

**JEL Classification:** M29

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/795>

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## The Bookkeeping of Enterprising Natural Persons

Irena Honková, Michal Kuběnka, Zdeněk Brodský, Simona Činčalová

**Abstract:** *This paper deals with the form of bookkeeping that enterprising natural persons (individuals) use, and with searching of dependency between the form of bookkeeping and the field in which the enterprising natural person operates. From February to June 2015 there was a questionnaire survey conducted, which was attended by 749 respondents. The preference of particular forms of bookkeeping was revealed through the Friedman test. It has been found that the most common method of bookkeeping of enterprising natural persons are tax records, while a substantial proportion also has a double-entry bookkeeping. Surprisingly, the least used method is the simple evidence of income and subsequent determination of the income tax base of natural persons using lump-sum expenses. After the survey and statistical evaluation there was an argument within discussion on results that the lump-sum expenses have been currently used for tax optimization rather than for reduction of the administrative burden and thus, for the primary evidence purposes. As for the researched dependence between the form of bookkeeping and the selected business field, this dependence has been statistically validated by the test of independence. In the discussion of the results there are fields listed according to the most common form of bookkeeping.*

**Key words:** Bookkeeping · Enterprising natural persons · Tax records · Lump-sum expense · Field of activity · CZ-NACE

**JEL Classification:** M41

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/793>

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## A Note on Optimization under Uncertainty: Comparing Probabilistically Constrained and Robust Optimization Methodology

Michal Houda

**Abstract:** *Dealing with optimization problems, data entering the optimization process are usually of uncertain nature. There are several approaches to deal with data uncertainty, starting with classical sensitivity analysis and/or parametric programming. In this paper, we concentrate on two specific approaches, namely on chance constrained (stochastic) and robust optimization. Chance (probabilistically) constrained optimization is based on the assumption that underlying uncertainty is driven by a probability distribution, that is, considered as a random vector. On the other hand, robust optimization deals with the situation in which uncertainty is given only by a membership of the uncertain factor to an explicitly defined set. We compare these two approaches with respect to the behavior of optimal values and optimal solution sets and discuss the drawbacks of each of two approaches on an illustrative example.*

**Key words:** Stochastic Optimization · Chance Constrained Optimization · Robust Optimization

**JEL Classification:** C44 · C61

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/832>

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## Control Methods for Detection and Identification of Fraud in Accounting

Marcela Hradecká

**Abstract:** *Detection of creativity, misstatements and fraud in business corporations can be performed in many ways. These always have the common feature and that is the human factor "creativity". Behavioral effects have implications for human decision-making, as well for defects in behavior. In the context of corporate organizational structure it is appropriate to establish an internal audit department, respective, controlling department, whose focus is the application of control methods for the prevention of irregularities and fraud in accounting, but also the creation and setting higher goals of strategic business corporations.*

*Inspection activity is performed by financial and non-financial methods. In recent years, great emphasis is placed on environmental management of business corporations, which are reflected into the accounts, "environmental accounting". This paper focuses on the possibility of linking environmental strategic objectives of the firm implemented through methods Balance Scorecard and balance model DMFCA as a way to use environmental cost for inspection accounts of business corporations.*

**Key words:** Fraud · Control Method · Balanced Scorecard · Environment Management · Environment Accounting

**JEL Classification:** M2 · M41 · M42

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/844>

## New Institutions of Civil Law in Practice

Rudolf Hrubý

**Abstract:** *In this contribution the author focuses on some of the key changes that were brought to the Czech civil law by a comprehensive recodification of substantive private law. Special attention is given to a restored legal instrument brought into the Czech legal system by the New Civil Code called tenancy, which is a legal relationship where the tenant has beside the right of use also usufructuary right. Considerations are not limited to changes in the relative property rights, i.e. already mentioned tenancy, but it also deals with the changes in the area of absolute property rights.*

**Key words:** Real property · Ownership rights · The new Civil Code · Possession · Usucaption · Pre-emption right

**JEL Classification:** K1

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/841>

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## Fiscal Responsiveness to Public Debt under Fiscal Decentralization

Milan Jílek

**Abstract:** *The paper deals with the fiscal responsiveness of general government to public debt in EU countries within the period from 1995 to 2014. The responsiveness of general government primary balances and primary expenditure to several variables is analyzed using panel data. The main focus is on the fiscal decentralization effect on the fiscal behavior of general government with the main hypothesis that the higher fiscal centralization (lower decentralization) allows the central government to exert more control over the general government budget and therefore enables it to enforce fiscal sustainability.*

**Key words:** Fiscal Reaction Function · Primary Government Balance · Primary Government Expenditure · Fiscal Decentralization · European Union

**JEL Classification:** E62 · H62 · H72

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## Approximation of a Planar B-Spline Curve by Polygonal Trail with Special Characteristics

Miloš Kaňka

**Abstract:** *When using the output data from CAD systems, the curve is often described in a so-called "spline" format. The regulation of a cutting, respectively other machine requires, that the input data are given in a form of a sequence of linear segments with prescribed maximal difference to the real curve, expressed in the "spline" format. Specifically, we are talking about replacing the given planar B-spline curve by polygonal trail with tops on this curve. We are doing this by a way when the distance between the individual linear segments of the trail and to those linear segments corresponding parallel tangent of the curve is less than or equal to the given positive  $\varepsilon$ . The requirement of a construction like this is motivated by the fact that during the cutting process by a laser, respectively a water beam, the polygonal trail is easier to track than the whole curve.*

*A company MIR in Eskede, Sweden, which was the ordering party of this task, had chosen from a set of different types of planar B-spline curves the following three mostly used ones, the so-called clamped, opened and closed ones. The positive result of solving this task become used in a regulation system AMOS, which is a component of one laser-cutting machine in a company Skanpak, Czech Republic.*

**Key words:** Planar B-spline curves · the types of planar B-spline curves · approximation of B-spline curves by a polygonal trail · Cox – de Boor's formula

**JEL Classification:** G10 · G63 · C65

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/826>

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## On Utility Function for Money

Jana Klicnarová

**Abstract:** *It is well-known, that in decision analysis, it is worth to use utility function. It is a way how to make a better individual decision than in case without application of utility function. In this paper we present a way how to construct a utility function for money and how to use it for a solution of St. Petersburg paradox.*

**Key words:** St. Petersburg paradox · Utility function for money · Expected profit

**JEL Classification:** C44 · D80

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/797>

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## Comparison of Multi-Output Frontier Models: Application to Slovak Agriculture

Bohuš Kollár, Zlata Sojková

**Abstract:** *In this paper the multiple output distance function is used to investigate the technical efficiency of the Slovak agricultural subjects. The main aim of this paper is to compare the results of two chosen stochastic frontier models, namely ratio model and ray model. Furthermore, the effect of Common Agricultural Policy subsidies on the efficiency of farms is estimated. The technical efficiency is studied on the balanced panel data consisting of 308 agricultural subjects for the 7 periods of years 2007-2013. The data is drawn from the Information Sheets of the Ministry of Agriculture and Rural Development of Slovak Republic. The applied distance functions eliminate the main disadvantage of the stochastic frontier analysis. Hence, allowing for the multiple outputs in the analysis. In this paper, there are two outputs considered, namely animal breeding revenues and crop production revenues. The main findings of this paper are similar to the results of previous research. There is a high degree of correlation between the models' estimated efficiencies. The correlation coefficients range from 0.71 to 0.82 for the studied period. Furthermore, the pairwise comparison of the efficiency scores proves no significant difference between the models' estimations. Considering the effect of the subsidies on the efficiency of farms, both models prove the statistically significant impact of the non-investment subsidies. The considered ratio model and ray model not only give similar efficiency estimates, but also similar interpretation of the chosen variables.*

**Key words:** Agriculture · Efficiency · Multiple Output · Ratio Model · Ray Model · Stochastic Frontier Analysis · Subsidies

**JEL Classification:** C33 · C52 · H21 · Q14

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/824>

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## The Development of Agricultural Production and Factors Affecting Operating Economic Results of Farms in the Period 2000 – 2015

Daniel Kopta, Jana Lososová, Radek Zdeněk

**Abstract:** *The article deals with the development of agricultural production and operating factors affecting economic results in the period 2000 – 2015. Regarding the particularities of 2015 (drought, slumps in milk prices) the conclusion contains an analysis of economic results of this year. The source of data for evaluation is authors' own selective research into production and economic indicators of farms having been carried out at USB since 1996. The study uses the classification of farms according to the portion of land area in LFA to total farmland used. In 2015 there was a drop in profitability in comparison with the previous year. The research revealed that the volume and structure of costs remained roughly at the level of 2014, the main cause of this being the drop in yields. This drop in production value resulted from both the decrease of natural yields (especially in crop production) and the decrease of exercise prices at stable volume of natural yields (concerns livestock production). The impact of the drop of realization prices was more striking.*

**Key words:** Profit/loss · Profitability · Labour productivity · Subsidies

**JEL Classification:** Q12 · Q13 · Q14

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/798>

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## Measuring quality of life in EU capitals

Tetiana Korovchenko

**Abstract:** *This paper focuses on research of theoretical foundations of the concept of quality of life and comparison of quality of life in some of the capitals of Europe using selected indicators which characterize as closely as possible the quality of life of society. The emphasis is placed on the fact that the final outcome of the quality of life research should cover the situation in all aspects of life of individuals and society as a whole.*

*The purpose is to compare the conclusions of the objective and subjective approaches in order to assess the quality of life at the level of European capitals. By using selected indicators obtained with respect to Eurobarometer data analysis, the aim of this analysis is to assess and compare the characteristics of the quality of life of European capitals. Methods used for this include system approach, statistics method (data collection), methods of correlation and cluster analysis.*

*This article explored the status and perception of factors affecting the quality of life of citizens as a result of statistical studies of European capitals, developed on the basis of the Eurobarometer survey data. Possibilities of the quality of life measurement often offer a huge number of indicators. We outline the existing approaches for its measurement and at the same time we establish that only general enquiries are not sufficient. Therefore, two approaches have been used during the research - objective and subjective. This made it possible to assess the quality of life of the population at all levels.*

**Key words:** Quality of life · Flash eurobarometer · Objectivist and subjectivist approaches · Groups of countries · Capitals

**JEL Classification:** I31 · R58 · O21

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/815>

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## Dilemmas of using the Quality of Life's Concept for Region's Socioeconomic Development

Jan Mandys, Martin Šanda, Tetiana Korovchenko

**Abstract:** *Socio-economic development of the region is not derived only from the performance of the local economy and riches of inhabitants. In an effort to achieve equilibrium of the social society, regional management is facing numerous obstacles. The main obstacle is finding the method of measuring the degree of satisfying the needs of inhabitants, citizens. One of the way for retrospective evaluation of effectivity and effectiveness measures, which are promoting the development of region, is using of concept of quality of life. In the following text are briefly described the basic dilemmas in definition of quality of life. Then weaknesses of individual procedures are discussed in the examples of specific measurements. The result is a reasoning - how to measure quality of life so as to deliver the expected results for the needs of regional management? The primary issue in our considerations is the minimum number of publicly available data on the subjective quality of life. We consider objective indicators simplistic and often misleading (in relation to an abstract concept to most definitions of quality of life). Because the subject of interest of this concept is the man, we have to look for the intersection of these two approaches. Another important question is to use data obtained by regional management in decision making and very definition of the expectations of the regional management of these data.*

**Key words:** Quality of Life · Public Policy · Region · Socio-economic Development

**JEL Classification:** C69 · H79 · H83 · I31 · O21 · R59

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/820>

## Crisis Management and Human Resources

Miroslav Němec, Darja Holátová

**Abstract:** *The objective of this research is to analyse the situation in terms of economic, legal, organizational and human resources aspect by available scientific methods and using the knowledge of the relevant literature, then determine critical points and limits and summarize the research results. Next task is to label and describe the expected outcomes and recommendations for further development of the road management on the Czech Republic. This idea will be extended in an article intended to be published in the Inproforum 2016 collection of papers and amended in the following discussions.*

**Key words:** Management · Crisis Management · Human Resources Management · Road Management

**JEL Classification:** L20 · M12

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/803>

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## Labour Productivity Growth of SMEs in Food Industry and Financing Sources

Martina Novotná, Tomáš Volek

**Abstract:** *The basis for the growth of enterprises competitiveness are innovative activities leading to increasing of quality produced goods and services and labour productivity. Small and medium enterprises must use external financial sources to finance the economics growth of enterprises. The aim of this paper is to assess the development of labour productivity in relation to sources of funding of small and medium-sized enterprises in the food industry. It was found that small and medium-sized enterprises use from halt to finance of investment activities leading to the growth of labour productivity external financial resources. The importance of these resources has declined during the monitored period. Enterprise analysis showed that companies with above-average labour productivity using less external financial resources.*

**Key words:** Labour productivity · SMEs · Value added · Indebtedness

**JEL Classification:** D22 · M21 · L66

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/837>

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## Personal experience with the MOOC's and some reasonings about possible use of these courses in the educational process at the Faculty of Economics

Václav Nýdl

**Abstract:** *MOOC - Massive Open Online Course (tj. Hromadný otevřený online kurz) je označení on-line vzdělávacího kurzu s neomezeným počtem účastníků, ke kterému se přistupuje pomocí webu. V posledních letech došlo k bouřlivému rozvoji tohoto druhu vzdělávání v mezinárodním měřítku. Při některých západních univerzitách vznikla profesionální centra nabízející stovky MOOC kurzů z nejrůznějších oblastí poznání a na různých úrovních náročnosti na studenta. Autor příspěvku absolvoval úspěšně několik těchto kurzů. Shrnuje své poznatky a zkušenosti. Dále se věnuje úvahám o možném přínosu pro studium na Ekonomické fakultě JU v nejbližší budoucnosti.*

**Key words:** MOOC · On-line Education

**JEL Classification:** A22

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## Specifics and Financial Health Assessment in Agriculture

Kristýna Nývltová

**Abstract:** *There are many methods for the financial health assessment of a company; the most utilized include statistical methods that evaluate the business from multiple perspectives simultaneously. Since each model has been formed under different conditions and on a different date, it may not be suitable for the assessment of all businesses. In this article six models are assessed, some designed for the field of agriculture. The selected models are IN99, IN05, the Gurčík-index, the CH-index, the Taffler index and the Řezbová OP model. In the analysis, their reliability in identifying healthy companies and businesses with financial problems are compared.*

*None of the models have achieved good results in both analyses simultaneously, which leads to the question: Why is this so? The cause may be the specifics of agriculture that are not taken into account in the models and thus they can influence the outcome of the assessment. The specifics are the value of the land that is not determined by its quality, but by the locations, the value of the leased land, which is not included in the value of assets, as well as the work of nature, the value of the subsidies, which affects the amount of assets and the net profit or costs of fertilizer, which has an effect even for three years.*

*Is there the ability to include these specifics into some of the methods of assessment and thus achieve greater reliability and the efficiency of allocation not only of private investors' resources but also the subsidies? This will be the subject of the further analysis.*

**Key words:** Financial health assessment · Agriculture · Risk · Explanatory power

**JEL Classification:** M41 · Q1 · G3

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/818>

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## Foodstuffs self-sufficiency of Czech Republic in the Context of Long-term Structural Changes in Primary Agricultural Production

Marie Prášilová, Radka Procházková, Pavla Hošková

**Abstract:** *Farming sector is a significant part of CR national economy. It belongs to sensitive economic areas, since its specifics are directly connected to natural and climate phenomena. Farming sector has accounted for 2.7% only of total employment, however, farmers have been cultivating about 60% of CR territory. The paper analyzes long-term development tendencies of Czech agriculture's efficiency and the impact of these upon self-sufficiency of Czech Republic in basic agricultural commodities production. It is aimed at an analysis of the development of selected natural indicators such as areas sown, crop production, livestock numbers and livestock production. Applying advanced statistical methods the long-term development tendencies have been described and modeled and future development forecasts set up. The solution connects to accessible EuroStat, Czech Statistical Office and CR Ministry of Agriculture data bases. Therefore, the time series have not been limited explicitly. Data analyzed have further on been applied in statistical modeling of the balance of agricultural production and food-stuffs self-sufficiency. Even in spite of the adequate soil-ecological conditions of Czech rural countryside there has not so far been much success registered at the efforts to reverse or at least mitigate the decline of economically demanding commodities' domestic production. The paper examines current self-sufficiency level in traditional commodities of Czech agriculture, regarding possible alternatives connected with the new CAP and with CR Ministry of Agriculture's efforts for sustainable development of farming and countryside and with CR nutrition policy.*

**Key words:** Agriculture CR · Natural indicators · Animal production · Plant production · Self-sufficiency

**JEL classification:** C8 · C22 · Q10

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/810>

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## Green Marketing Practice of Car Producers

Jana Příkrylová, Eva Jaderná

**Abstract:** *The development and maintenance of sustainable business has become an essential part of the aims of car producers, and thus, their Corporate Social Responsibility is strongly connected with the concept of Green Solutions in production. While "Go green" is a popular marketing slogan, it entails a necessity in the cars fleet market. Bijtelling, a special approach to taxation in the Netherlands, represents the market force pushing car producers to design greener vehicles and will make the object of this paper.*

**Key words:** Sustainability · Corporate Social Responsibility · Green Solution · Bijtelling

**JEL Classification:** M39

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/831>

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## Financial Situation of Crop and Animal Farms in Slovakia

Tomáš Rábek, Marián Tóth

**Abstract:** *This paper deal with financial situation of crop and animal production based on an analysis of a unique set of agricultural farms operating in Slovak Republic. Slovakia is perceived as a leader among the European countries due to its size of farms as up to 90 of the utilized agricultural land is farmed by large farms. We can observe the irregular nature of Slovak agriculture, where a minority of farms (14.98%) cultivates the majority (80.23%) of the agricultural land. In our paper farms are divided in our research to two groups (according to the share in sales of crop or animal production) and each is characterized by descriptive statistics for selected ratios of financial analysis. In the long run, crop farms are profitable and profit from crop production is used to cover the losses from animal production. 50% of animal farms with low profitability generate higher loss than the 50% of animal farms with better ROE results. Results also show, that 25% of best performing crop and animal farms are able to generate profit. . In the paper we use the evaluation of indebtedness by using costs of debt capital (CoDC) with basic earning power (BEP) ratio. Costs of debt capital is relatively high. In average only 26.6% of farms satisfies the condition „BEP>CoDC“ and from these are more than 60% crop farm. For these farms we recommend to increase the debt ratio as it will increase the return on equity (ROE).*

**Key words:** Financial situation · Agriculture · Financial analysis

**JEL Classification:** Q14 · Q18

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/846>

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## The Productivity of Organic Farming in Different Agroecological Conditions

Radka Redlichová, Věra Bečvářová, Karel Vinohradský

**Abstract:** *The paper presents the results of organic farming productivity in LFA and non-LFA agricultural conditions in the Czech Republic during the period 2001 – 2015. The methodology of the research is based on the comparison of organic and conventional farms development and contains all the FADN file companies. In the period 2001 – 2015 have the organic farms reached 30 – 40% of the conventional farms agricultural production intensity. In the LFA conditions reach the organic farms around 25 – 30% of conventional farms agricultural productivity, in the less favourable conditions of non-LFA is the ration around 40%. The different level of land usage intensity between organic and conventional farms, as well as natural conditions associated with soil habitats, is involved by 50 – 60% by the different level of material and labour inputs and by 40% the different productivity of these inputs. Organic farms in the Czech Republic, having the half inputs for 1 ha, create the assumptions of lower environmental burden. However, the total labour and material intensity for one production unit is 1,4 – 1,7 times higher, compared to conventional farms, while the energy intensity is higher 1,7 – 1,8 times. These lead to the less favourable ecological footprint, taking the production for one inhabitant into consideration.*

**Key words:** Organic Farming · Agricultural Intensity · Productivity · Material Intensity · Energy Consumption · Ecological Footprint

**JEL Classification:** O13 · Q11 · Q12 · Q13

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/839>

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## Solving Economic Problems by Using OML Modeling Language

Radim Remeš

**Abstract:** *The aim of this article is to introduce an algebraic modeling language called Optimization Modeling Language (OML) to solve economic optimization problems. How to use this language is demonstrated on the example using the methods of mixed linear programming in OML language. The solution is found by using the Microsoft Solver Foundation tool, which can be used for mathematical simulation, optimization, and modeling. The example solution is demonstrated by using the Microsoft Visual Studio programming tool. The benefits of using this tool for mathematics include easy usage and concurrently wide scope of the problems solution.*

**Key words:** Business Analytics · Solver Foundation Services · Optimization Modeling Language · OML · Linear programming · Mixed integer linear programming

**JEL Classification:** C61 · C63

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/855>

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## Two Recursive Partitioning Methods and their Application for Credit Risk Evaluation

Michael Rost, Pavel Tlustý

**Abstract:** *The data mining methods reach a big attention in business application, especially in marketing area. We can say that the primary aim of such methods is to estimate behavior of consumers. As an example we could mention buying behavior, churn management, credit risk evaluation or fraud detection. For these purposes the analytical stuff in big companies usually use machine learning method like classification and regression trees, random forest, support vector machine, Bayesian networks, deep neural network or their combinations. Some of these methods also provides insight into “structure” and provide relative importance of explanatory variables. Such predictive models are nowadays based on huge amount of data. In our paper we are focused on some of above mentioned predictive models which are based on recursively partitioning space. More concretely we employ classification and regression trees (CART) methodology and chi-squared automatic detection (CHAID) for construction of predictive models for credit risk applicant assessment. Our dataset consist of several personal attributes. More concretely, we gathered information about following attributes: age, income, sex, marital status and number of kids, number of card in ownership, mortgage, loan and one dependent variable called “risk for a bank”. This dataset could be characterized as a small random sample from bank institution data warehouse. Data pre-processing and the numerical computation with model building were carried out in MySQL and in the programming language R 3.3.0. and in statistical software IBM SPSS 20.*

**Key words:** Data mining · Predictive modelling · Classification · Credit applicant

**JEL Classification:** G38 · G44 · C88

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/856>

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## Price Chain Analysis at the Market of Poultry Meat and Feed for Poultry

Tamara Rudinskaya, Jiří Pokorný, Pavel Froněk

**Abstract:** *The paper deals with the analysis of price transmission in poultry meat agri-food chain. The analysis is aimed at the determination of relationship between feed wheat, feed corn, feed for poultry and farmers' poultry meat prices in Poland and in the Czech Republic. While there is much emphasis on the area and the production of wheat, milk and pork in the Czech Republic (Syrovatka (2005)), Cechura and Sobrova (2008), Rumankova (2012, 2014), Blazkova and Syrovatka (2012), Dudova and Becvarova (2015), relatively little is known about how price transmission takes place at the domestic poultry market, especially, how prices of feed wheat and corn impact prices of feed for poultry, and, subsequently, prices of poultry meat. VAR model was estimated using monthly prices collected for 2013-2016. Tests on Granger causality for these markets suggest that the feed prices of previous month (lagged variables) have impact on prices of poultry meat. In the case of variables lagged by more than one month, their significance is declining.*

**Key words:** Price Transmission · Czech Republic · Poland · Granger Causality · Linear Regression

**JEL Classification:** C13 · C22 · Q13

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## Economic Aspects of the Concept of Active Service for the Public Sector

Jaroslav Šetek, Filip Petrách, Ivana Faltová Leitmanová, Jiří Alina

**Abstract:** *The article deals with current issues of economy human resources, which are currently struggling European region, while ensuring their defense, security and addressing the social ills of the current type of society. The main part is focused on the economic analysis of possible solutions, staffing the public sector to reduce current security and social risks.*

**Key words:** The army · Security forces · Security risks · Social ills · The public sector · Service relationships

**JEL Classification:** B41

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/854>

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## Liability of Corporations after Legislative Changes in the Private Law

Martin Slobodnik

**Abstract:** *The author of the propounded contribution is dealing with a controversial issue of liability of legal entities (especially in the field of criminal law) in the light of a comprehensive recodification of substantive private law. Special attention is dedicated to the legal theories about the nature of legal entities, which were significantly changed after adoption of a new civil code, i.e. act no. 89/2012 coll. Original "organic" theory, in accordance with the idea of own will of legal entity, was replaced by the "fiction" theory. Under the replacing theory are legal entities legally incompetent, so they cannot act alone without their representatives. Legal actions of the representatives are imputable to legal entities. The author focuses on the issues of capacity of legal entities to act illegally, especially when they don't have own will.*

**Key words:** Liability of Corporations · The Legal Consequences of the Infringement · Imputability · Legal Entities

**JEL Classification:** K1

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/838>

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## Nonfinancial Risks and Financial Opportunities in Combating Climate Change

Oleksandr Sushchenko, Andrii Buryachenko

**Abstract:** *The problem of global warming in recent decades became especially important and is reflected in a number of international agreements aimed at intensifying the efforts to limit the rate of global warming below 2 degrees Celsius. Ukraine actively involved in the process of combating climate change by reducing the greenhouse gas emissions (under the Kyoto Protocol to the UN Framework Convention on Climate Change and Paris Climate Agreement). As a result, our country has been using the possibility of selling ERUs (Emission Reduction Units) as a part of the Joint Implementation mechanism (Joint Implementation - JI) and certificates AAU (Assigned Amount Units) to attract "green investments". The aim of the paper is to show how nonfinancial risks are influencing the global financial system and what kind of changes do the Ukraine need to undertake to attract resources from the financial market and fulfil our obligations under the Paris Climate Agreement and Association agreement with the EU.*

**Key words:** Climate Change · Non-financial risks · Financial Market · ESG Principles · Corporate Sustainability · Corporate Social Responsibility

**JEL Classification:** G150 · Q58

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/819>

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## National Security at a Crossroad

Marek Šusta, Stanislav Simbartl

**Abstract:** *In this short paper the authors describe their evaluation of a national security strategy published by the government of a small Central European country, in terms of its viability, using computer based policy simulation. The computer model was built in a form of management flight simulation to be used for testing various strategic scenarios across all security system components under various funding schemes. Respective strategy scenario success is measured primarily by the so-called Social Distress dynamics that should remain at acceptable levels to maintain in-country order and citizen's safety, keeping the risk of insurgency low. The secondary purpose of the model is to test the country's international counterinsurgency commitments fulfillment.*

**Key words:** National Security Strategy · Computer Modeling · Systems Thinking · System Dynamics

**JEL Classification:** C60

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/853>

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## Economic and environmental optimization of crop production in selected regions of Slovakia

Tatiana Svetlanská, Natália Turčeková, Rastislav Skalský

**Abstract:** *For the agricultural industry in Slovakia, the dominated sector is crop production. The major part of arable land is devoted to the cultivation of cereals (57%), feed crops (20%) and industry crops (19%). The aim of this paper is to model the distribution of crop management practices in selected regions of Slovakia and identify the net return for four selected crops in these regions. We use integrated modelling framework, which incorporates bio-physical and economic data to identify opportunity costs of agricultural production choices. We delineate homogenous response units (HRU) and aggregate them on regional level as the model is constrained by land endowment in particular region. The results suggest that highest yields and thus high returns are achieved in case of management practise with high nitrogen input and irrigation. The high input management causes environmental pressures on soils, therefore its enforcement in regions is not desirable. The solution might appear in policy premiums for low input management practices.*

**Key words:** Crops · Management Practices · Inputs · Net Returns · Environmental Pressures · Optimization

**JEL Classification:** C61 · Q10 · Q15

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## Short-Run Elasticity of Substitution

Karol Szomolányi, Martin Lukáčik, Adriana Lukáčiková

**Abstract:** *We provide a strategy for estimating a short-run elasticity of factor substitution. The method is based on a co-integration estimation relationship between factor prices and average factor products. From the literature, it is known that this form is useless for estimating a long-run elasticity of substitution coefficient, because it is not consistent with a theory. However, restricting the long-run relationship according to the theory and estimating the short-run coefficients with the co-integration coefficient jointly in one step allows estimating the short-run elasticity of substitution. The co-integration term of the form captures possible underlying long-run processes and so it is useful in obtaining the unbiased estimate.*

*To verify the method we use Jorgenson's sector data of the United States of America. In the results U.S. short-run elasticity of substitution is relatively small and it differs in different sectors. These values are between 0.05 and 0.64. In the conclusions we argue that the small and in different sectors different values of the coefficient is supported by the both empirical and theoretical research.*

**Key words:** Elasticity of factor substitution · Long-run and short-run · Co-integration analysis · Neoclassical growth theory

**JEL Classification:** C13 · E23 · O40

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/833>

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## Influence of Creative Accounting on the Amount of Provable Loss in Public Transport

Martin Telecký

**Abstract:** *The provable loss is an integral part of living of the transportation company in charge of the public transportation under the contract on the traffic services in the real conditions of the Czech Republic. Without the subsidy policies the transportation company would not be able to continue to provide the traffic services within its business. The reason is the annual losses in providing the traffic services. It means that the revenues fail to fully cover the total costs occurring as a result of the public service contract in the public line transport and the passenger track-based transport. The paper points out to the provable loss and to affecting of its amount by creative accounting. The goal is to use the general linear model to ascertain which (transport or accounting) items have an influence on determining the amount of the provable loss and to show the affected areas which are most often manipulated.*

**Key words:** Public line transport · Public track-based transport · Provable loss · Creative accounting

**JEL Classification:** M41

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/804>

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## The Algorithm Used for Numbering German Banknotes: What Counterfeiters Might Not Have Known

Pavel Tlustý, Marek Šulista

**Abstract:** *This paper deals with protection of banknotes and it introduces a less known algorithm used to protect former German banknotes which is a special mathematical model used for their numbering. This model, based on a check digit, may be suitable as a protection against counterfeiting of official documents such as university diplomas, certificates, driving licences etc.*

**Key words:** Check Digit · Counterfeiting of banknotes

**JEL Classification:** G23

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/794>

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## Evaluation of the Quality of Accounting Data in the Regions of the Czech Republic based on Audits by the Tax Offices

Miroslava Vlčková

**Abstract:** *The quality accounting data (QAD) allows manage many processes in a business. The main goal of this paper is evaluate the quality of accounting data in companies and analyze if this quality has interdependence with numbers of audits by the Tax Offices. Data quality is one of the decisive factors in making the right decisions and the overall functioning of the company. It's not the only one, but a very important factor. In practice, there is proved data quality relationship with the successful management of the company – non quality data costs companies around the world each year hundreds of billions dollars. The paper will confront the impact of the numbers of audits by the Tax Offices with the quality of accounting data. These audits are performed under on-the-spot investigations. On-the-spot investigations are conducted by experts from all units of the Tax Offices, most often by experts from tax audit units. This units provide activities such as: carry out the administration of taxes, payments and advances for these revenues, administer subsidies, conduct the offence proceedings, collect and enforce the payments, charges, settlements, considerations, fines and penalties, impose fines, decide on authenticity and amount of claims on taxes, payments and other revenues administered by them in the bankruptcy proceedings and others activities.*

*A survey on the quality of accounting data was conducted on 5,489 enterprises, for each company were calculated individual indicators identified according to used model for determination the quality of accounting data and were calculated QAD by this model. Subsequently, values of quality of accounting data were compared and analyzed with information about financial audit provided by the Tax Offices. It was found that, because the used model is compiled especially for evaluating the quality of accounting data for management, there is no dependency between the various variables.*

**Key words:** Quality of Accounting Data · Regions of the Czech Republic · Tax Offices · Audits

**JEL Classification:** M41

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/851>

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## Financial Model of Interest Rate Calculation of Supplementary Pension Insurance

Klára Vocetková

**Abstract:** *Penzijní připojištění je v České republice bráno za státem regulovaný spořicí produkt dlouhodobého a relativně bezpečného ukládání a zhodnocování peněžních prostředků. Jaká je ale ve skutečnosti finální výše úrokové sazby či jak ovlivní úrokovou sazbu lákavá nabídka daňového zvýhodnění, nás možná překvapí. Výpočty jsou provedeny za pomoci MS Excel.*

**Key words:** finanční produkty · penzijní připojištění · úroková sazba

**JEL Classification:** G32

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## Project Management And Its Impact On Growth Rate Of Small and Medium-sized Enterprises

Jaroslav Vrchota, Petr Řehoř, Monika Maříková, Ladislav Rolínek

**Abstract:** *The aim of the managers in SMEs is to have a competitive enterprise on the market, to develop and achieve some positive results. Project management can play a significant role in facilitating this contribution; however, SMEs require less structured forms of project management than those used by larger, traditional organizations. Project management is the set of managerial activities needed to lead a project to a successful end. The paper deals with finding whether the project management of SMEs influences the growth rate of an enterprise. Data were gathered as questionnaires and interviews from 183 enterprises operating in the Czech Republic. The research was made in the period of 2014-15. Authors in the paper failed to confirm that the organizations with project management have better growth rate.*

**Key words:** Project · Growth rate · SME · Management

**JEL Classification:** L20 · M10

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/828>

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## Procurement and its Rules in the Programming Period 2007–2013 under the Operational Program Education for Competitiveness in the Czech Republic

Petr Vrkoslav, Dagmar Škodová Parmová, Tereza Procházková

**Abstract:** *The paper is focused on procurement within the Operational Programme Education for Competitiveness (OPVK) during the programming period 2007 - 2013. The introductory part contains a brief description of the OP and its integration between regional policy objectives. The study deals with the procurement process in general and, afterwards, in the specific OP environment. It also describes the process of performing control of public contracts (ex-ante and ex-post) and their results, as well as an overview of the most common errors identified during the inspections with a brief analysis of their causes and proposing measures to eliminate them. Another part focuses on the issue of ineligible expenses caused by mistakes in public procurement. The final section provides a closer look at public procurement for the current programs in the period 2014 – 2020.*

**Key words:** Procurement · European Social Fund · Public contracts · Ineligible expenses

**JEL Classification:** H27 · R58

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/830>

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## Differences in the Performance of the Dairy Industries within the Visegrad Group Countries

Ivo Zdráhal, Gabriela Chmelíková, Ivana Blažková, Věra Bečvářová

**Abstract:** *The paper investigates the performance of firms in the dairy industry operating within the Visegrad group countries over the time period of years 2005-2014 based on the microdata obtained from the Amadeus database. Firms' return on assets indicator (ROA) was used to evaluate the economic performance of firms in the dairy industries. On the basis of the results, it may be stated that there are similarities as well as differences in the average economic performance of dairy processing enterprises among the Czech Republic, Poland, Slovakia and Hungary. However, some of the characteristics are typical for the countries under review. The average level of economic performance of the enterprises of the dairy industry is relatively low in the Czech Republic, but its level and dynamic in the recent years are still better in comparison to the average economic performance of the enterprises of the dairy industry in Slovakia, Poland and Hungary. The dairy processing firms in Slovakia and Hungary have very similar level and dynamic of the average economic performance. There is a noticeable positive trend in the values of average economic performance in Czech Republic, Slovakia and Hungary in the second half of the observed period. In the first half of the observed period, enterprises of the dairy industry in the Poland have higher value of the average level of economic performance in comparison to those in the Czech Republic, Slovakia and Hungary, however, the average level of economic performance of enterprises in Poland is declining.*

**Key words:** Dairy sector · Performance of firms · Visegrad group countries

**JEL Classification:** Q15 · Q18 · Q12

**URL:** <http://inproforum.ef.jcu.cz/INP2016/paper/view/852>



## COMPLEMENTARY PAPERS



# Experience for Ukraine from Public Finance Reforms of Visegrad Group Countries

Andrii Buryachenko, Pavlo Logvinov

**Abstract:** *The problems faced by Ukraine in the process of fiscal and budgetary policy reform are not fundamentally new or unique. Considering the proven experience of other countries it is possible to avoid many mistakes and adopt the elements that can be used allowing for the economic structure of the country. The post-socialist countries have the most common features and problems that arise in the process of transformation the state finances into the public finances that radically alter perceptions and attitudes toward the appropriate category.*

*Experience of the Visegrad Group countries, which is considered a model example of a general financial reform among the European Union, is extremely useful for Ukraine. At the present moment the process of power transmission and the corresponding redistribution of local financial security are taking place, which is a normal European practice, but we should not neglect the experience of other countries. The example with members of Visegrad Group reveals successful reform figures and the detailed study of common-reform of the financial system will help to avoid the risk and difficulties that are to accelerate and facilitate the initiated reforms in Ukraine.*

**Key words:** Public finances · Budgeting · Fiscal policy · Financial autonomy · Financial equalization · Delegated authority · Own revenue

**JEL Classification:** H5 · E62

## 1 Introduction

Researching the practice of public finance management reform of Visegrad Group due to objective reasons, including the need to determine the following.

The Visegrad Group, also known as the "Visegrad Four" (hereinafter - V4) reflects the efforts of the republics of Central Europe for coordinated cooperation in specific areas of common interest in European integration. This community brings together the former socialist countries which, at the start of transformational change, had similar organizational structure of the economy, the budget process and heterogeneous political system and the kind of the geopolitical situation - but currently significantly ahead of Ukraine on the effectiveness of public finances, fiscal and other indicators of economic development.

All four members of the Visegrad Group countries considered high income and a high index of human development.

Today's problems of Ukrainian public finance sector in general and in particular fiscal policy is not unique. Most of them were relevant to all post-socialist countries. These problems can be solved by applying the effective economic mechanisms. Quite interesting and useful for Ukraine could be the experience of the Czech Republic and Slovak Republic, which started the development of the economy in difficult conditions as the Ukraine.

Three countries participating community V4 are contiguous border with Ukraine. Some of the administrative territorial units, located on opposite sides of the borders, the small distance between them, using a similar initial conditions (demographic, climatic, economic and geographic) are notable differences in socio-economic

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development. These differences are caused in the first place, historical, philosophical and mental factors of citizens, and secondly - the functioning different models of government.

V4 countries formerly belonging to the group of post-socialist transition economies. Should be considered transitional economy, which is in the process of large-scale changes that lead to another stable economy (in this case, the market economy and democratic society).

Can be considered the most useful experience of reforms Visegrad countries (Hungary, Czech Republic, Poland, Slovakia) and - Estonia, Latvia, Lithuania and Slovenia. Studying the experience of V4, can be extremely beneficial for researchers and practitioners - financiers. Even the experience of the United States and other developed countries is difficult adapted to the realities of the post-socialist countries.

It should be noted about the current variation of the introduction and implementation of budgeting in countries V4. For example maybe Czech Republic - where the introduction of advanced technologies budgeting is quite important indirect and carried rather low. Another example is Slovakia, as a republic which is considered a model example of the overall financial reform among the countries of the European Community and OECD.

## **2 The latest research and publication analysis**

The study of foreign experience of the effective organization and transparent mechanism for allocation of budgetary resources in Ukraine has been investigated by a number of scientists who have characterized the theoretical elements and practical conclusions. Special mention should go to the researches made by Fedosov V. (2008), Moldovan O. (2011), Shcherbyna I. (2006), Chuhunov I. (2004), Buriachenko A. (2013), Badyda M. (2010), etc.

However, it should be taken into account that fiscal policy of the advanced nations is rapidly developing. The proven experience continues to be borrowed, mistakes or technical obstacles that occur – to be eliminated. The process of adoption of various legal documents, related to the public finance, has been investigated attention is focused upon the practical component of the reforming algorithm and package of measures undertaken by the government. In modern scientific literature the issues concerning individual components of the fiscal reform of Ukraine (such as special-purpose programme of budgeting, tax mechanisms and budget accounting) are being examined. However, the interaction algorithm of all aspects of the budget process and corresponding effect provided by the factors of fundamental importance on the stage of planning, organization, execution and especially performance-based budgeting is still unexamined.

## **3 The objective and tasks of the research**

The main objective of the research is to investigate the proven experience of some countries fiscal reform implementation as the exemplary process among the EU countries. To highlight the decision-making and decision-upholding algorithm at various branches and levels of government in Chzech Republic and Slovak Republic as compared to the corresponding attempts in Ukraine. To cover the essential differences, obstacles and disadvantages arising in the process of fiscal mechanism reforming in our country as compared to the similar processes in this republics. The task is set to lay the possible ways of direct experience usage to alleviate the implementation of the mechanism of Ukrainian public finance effective performance.

Current stage of the public finance sector functioning in Ukraine is going under the process of reforming and formation. It stands to mention that a number of decisions regarding fiscal reform component, which are rather declarative, function as pilot projects (actually put on a back burner), instituted from the socio-economic development program of the President of Ukraine for 2010-2014, ending with a number of legal documents of the Ministry of Finance of Ukraine. Although a number of controversial issues were regulated with the help of current Tax and Budgetary Codes of Ukraine, they are said to be inefficient and are to be improved, considering poor effectiveness of the mechanisms of filling and application of funds, complicated tax management and accounting. Primarily, it is to be done with grounded, qualitative and reasonable use of the experience of the developed nations.

#### 4 Empirical results of the research

As is known, in the budget process of Ukraine, at the level of the experiment, the special-purpose programme is being adopted and it is considered to be the effective mechanism for planning and execution of expenditure budget. Local budgets are formed under the scheme “proof from above” and the corresponding formula calculations; these mechanisms have also been adopted. However, in our case there is the considerable accumulation of funds from the local budgets to the budget of higher level with further significant transfers inversely.

In its turn, the profitable component of the fiscal system is being reformed via the adoption of Budget Code and Tax Code of Ukraine. The current stage of the development and reforming of the financial system should be regarded as the most progressive in the years since Ukraine’s independence. However, a lot of practical issues and regulatory collisions appear on the way of departure from the previous system.

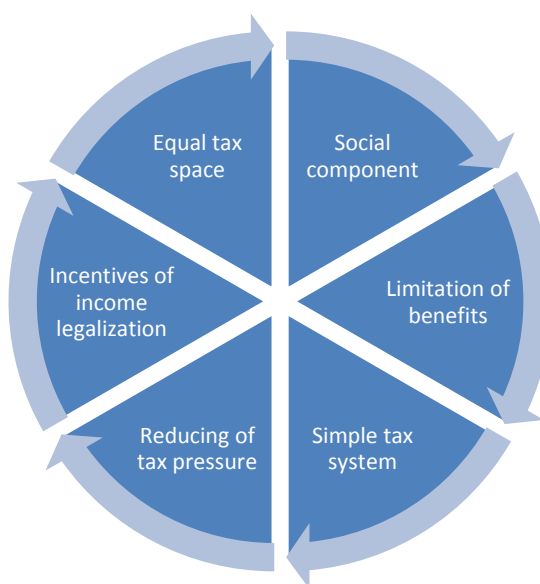
We are to consider several of them and refer to the proven experience of the post- socialist country, which after some effective, sometimes unpopular reforms has formed the most competitive fiscal space in the Central Eastern Europe. In fact, current Ukrainian problems of public finance sector in general and fiscal policy in particular is non-unique. But experience has proven that these problems can be solved by applying effective economic mechanisms (Moldovan O., 2011)

We are to mention the category of financial capacity of areas in the system of economic relations of state and local authorities, investigated by Buriachenko A.Y. (2013), with an indication of practical applied experience of the developed nations and specific functioning mechanisms, which have no practical implementation in Ukraine.

In fact, the current method of balancing the region budget acts upon the system of interbudgetary payments, which only allows retaining a number of various passive (or depressive) areas, however absolutely stimulates to determine the qualitative component of the revenue of these territories.

In the process of analyzing the sweeping public finance reform of Slovakia (public finance management reform), it is important to distinguish six priorities (Figure1), with the help of which the foundation of the tax system, as the strategic element of the revenue, has been formed.

**Figure1** Priority areas of public finance management reform



Source: authors

Having outlined the condition of state finance reforms in Ukraine, we are to refer to the funds accumulation mechanism of the fiscal system of the Slovak Republic to reveal the differences between the fiscal systems of two countries. Thus, initiating the reform in the sphere of finance, the government of Slovakia has declared that the end result of the reform is the turning of the Slovakian tax system into the most competitive one throughout the EU and the OECD. Under these circumstances the reasonable reference has been made to the fact that competitive performance of the tax system means not only low taxation, but initially the high level of efficiency, transparency and equality. (M. Svetkovska, 2010)

*Reduction of the tax burden in a business environment.* Over a period of tax reform, Slovakia has decreased the rates of key taxes and social due fees. Thus, during the years of 1995 – 2010 a number of sequential steps to reduce the tax burden on the economy have been undertaken; the following process had been represented by the clear dynamics of GDP growth before the financial and economical crisis began.

*Introduction of the economic incentives of income legalization.* In this respect the business tax operations are the pattern of the Slovak tax system efficiency.

Ukrainian experts are well aware of the fact that Ukrainian legal system contains a large number of norms regulating the method for determining the tax base, that requires expanding of the controlling bodies' staff, who have to ensure the accuracy, completeness and reliability of calculations and so on. In addition the tax fiscal efficiency remains low due to the common practice of tax minimization.

Slovak legislators have made it much easier. They have analyzed the reasons that motivate employers to minimize the income tax and eliminated them. Thus in the legislation today several basic points are dedicated to the definition of tax base and tax reporting is simple and understandable.

The system of corporate relations in Slovakia is constructed in the following way: the functions of controlling bodies in matters of accuracy, completeness and reliability of profit declaration are accomplished by the shareholders, who are interested in its legislation as only the profit produces their income. The profit from the capital investments is now liable to tax only once – at the level of the corporate profit. Thus since the dividend income are exempt after tax, there is no point for the shareholders to avoid a tax.

It may seem extraordinary for Ukraine, but the managers of Slovak companies under the pressure provided by shareholders, demonstrate the miracles of ingenuity to increase profit and the tax base of income tax correspondingly.

*Creation of a simple and accessible tax system.* Before the implementation of the general financial reform the tax system in Slovakia was too complicated, fragmentary and intricate, and these are the characteristics of the current tax system in Ukraine. The Income Tax Law, which regulates the corporate tax and individual income tax, can be provided as an example. Formerly five tax rates (from 10% to 38%) and 21 kinds of income tax operated there, as well as various taxation procedures depending upon the branch of economy and in-place enterprise location.

Due to the reform in 2004 Slovakia began to use flat tax rate schedule. Currently, individual income tax, value-added tax and company income tax have the rate of 19%.

Restriction of the benefit list and transparent system of tax assistance for certain fields and regions. The meaningful constraints of the existing tax concessions have been made. Practically, tax concessions as the tool of contributing to the investment stimulation, were cancelled, except for the benefits as a form of government assistance, which may be available only for the enterprises on the depressive areas, specific fields and is limited in amount (e.g. as a percentage of the investment).

Tax concessions can occur only among the industries which use the large number of human resources (for work creation), or include innovation capacity.

*The social component of the tax system.* Taxation of income for people is organized in the way that minimizes the tax burden on the unsecured citizens' income. Population with the total revenue of 3440 Euros per year is exempt from income tax.



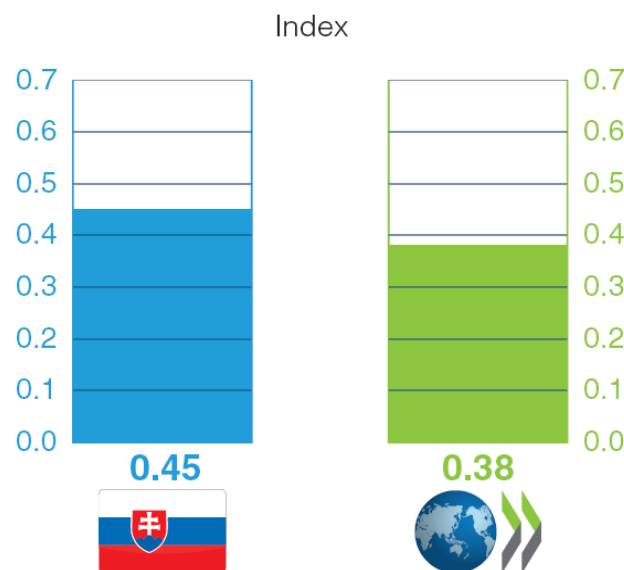
For the well-off there is an innovative property tax rate. The poor do not pay the property tax, unlike the owners of garages and country houses, who receive additional taxes.

*Aligning of the tax space.* Before the tax reform, Slovakia had the large number of tax abatements, benefits, preferences and special treatments. In addition, their amounts and addressees, as in Ukraine today, were highly correlated to the political power, being in office.

During the tax reform 80% of tax incentives, including all the reliefs for the VAT payment were abrogated. Special tax treatments are to be applied only on the depressed areas and are clear, transparent and temporary. The simplified taxation system is aimed at supporting the small business and reduced to the simplification of accounting.

The introduction of budgeting in Slovakia presented as a component of a complex national development strategy that provides effective control of costs and transparent system of accountability of public finance management. The concept of budgeting system was implemented in Slovakia in 2002 in the "public finance management reform» (PFMR), as a system of measures to regulate both directions of the budget process - expenditures and revenues, as a complex of interrelated processes. These reforms contain a new set of legal rules of expenditure and legislative innovations governing revenue component that involves complex changes in the management of public finance in general.

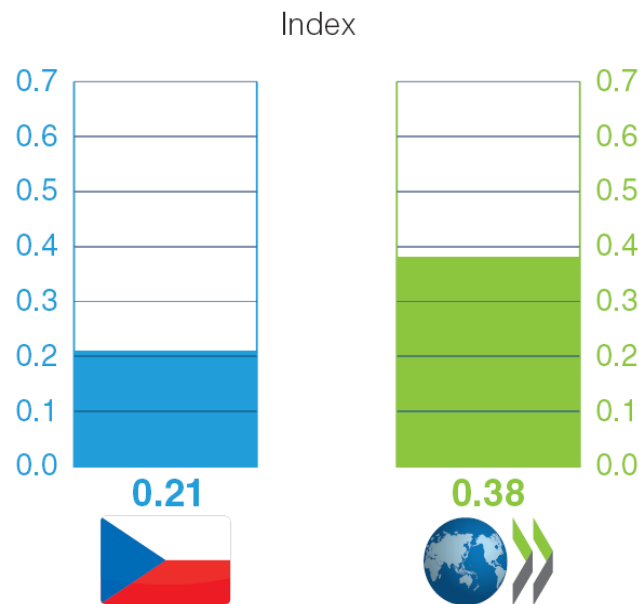
**Figure 2** Use of performance budgeting practices in Slovakia at the central level of government compared to OECD countries



Source: [http://www.oecd.org/gov/GAAG2013\\_CFS\\_SVK.pdf](http://www.oecd.org/gov/GAAG2013_CFS_SVK.pdf)

In a detailed analysis of the practice of using advanced technologies budgeting concluded that the program budgeting in the Czech Republic are not considered to be successful, revealing because at present day levels of implementation and coverage is not universal character. According to the OECD index of analytical calculations using program budgeting in the Czech Republic is 0.21 point that is lower than the average of 0.38 points (presented in Figure 3). At the same time research indicator budgeting practices in Slovakia is 0.45 points, which is higher than average (presented in Figure 2). In Ukraine, these calculations can not be done today. Certain Czech researchers this method, given the small historical and social differences, given the conclusions on the need to use the experience of Slovakia as an exemplary implementation of program budgeting. (L.Nečasová, 2011) (M. Hornakova 2009)

**Figure 3** Use of performance budgeting practices in Czech Republic at the central level of government compared to OECD countries



Source: [http://www.oecd.org/gov/GAAG2013\\_CFS\\_CZE.pdf](http://www.oecd.org/gov/GAAG2013_CFS_CZE.pdf)

Program budgeting starting in December 2006 after implemented in the Czech Republic for using «ISPROFIN» (as an abbreviation «Systém PROgramového FINancování»). The program «ISPROFIN» aims at implementing tools to use software-based method not only at the level of the state budget, but also at the level of local government. An important component of the program is focusing on the experience of "abroad" as an important aspect that should facilitate the successful implementation of program-productive method in the Czech Republic. The program «ISPROFIN» is a complex of measures for management, control of the state budget and the current (operational) monitoring of program goals. Additionally, the organization provides for coverage of technical capabilities, via the Internet, more information to the public through the sharing of resources accumulated in the budget.

The budget process in the implementation of program budgeting, and other progressive methods of maintenance budget of Czech Republic, is primarily regulated by two main legal documents:

- Budgetary rules with changes» (Act # 218/2000 Coll.);
- Budgetary rules of territorial entities» (Act # 250/2000 Coll.).

Among the important innovations in the Czech Republic presented a system of long-term budget planning, as progressive technology budgeting and designed for use mandatory, the budget calendar for all levels and actors prepare the state budget. These elements are complementary.

Parliamentary phase the budget process of the Czech Republic is regulated by appropriate legal documents that result in debates (listening), which held three readings.

The budget process in the Czech Republic can be described as traditional itemized budget on an accrual basis, which focuses on just in costs, but not performance or utility. Government declared reform of the state budget in the format of budgeting based on results, but the use of this method is as individual initiatives of ministries as a way to learn more about the performance of certain expenditure items.

Described progressive system elements of the budget process to date give reason to believe that the Czech Republic can not be described as a successful example of program-target method at the state level. Budgeting is used at the local government level, and is the exclusive competence of regulating them. According to the

processed material there is no reason to conclude in full force using this method of budgeting in the public finances of the Czech Republic.

The key event in the field of public finance of the Czech Republic is the introduction of so-called "expenditure audits" among ministries spending units. This type inspection - analyze the use of public funds for the implementation assessment of efficiency and effectiveness for setting priorities and funding savings reserves.

All ministries received questionnaires listed in detail all the costs in terms of programs, explaining their feasibility and proposing possible ways to reduce costs. The Ministry has not found any unnecessary expenditure items. This tool can be viewed as a hybrid combination of productive basics of budgeting and analytical type checks.

The central government of Czech Republic sets the minimum standardization for local authorities and councils, so the question of the application of advanced technologies budgeting belong to their own competence of local government, in terms of the financial procedures, accountability and financial control. These requirements include compliance with the accounting, auditing and financial reporting. The standards for the implementation of the budget process around such as municipalities and the regions.

Central regulation leaves significant room to municipalities to determine ways of preparation and adoption of the budget. Prerequisite is available to the public and the possibility of taking into account the comments in approval. (Fedosov V. 2008)

## 5 Conclusions

Researched practice of Visegrad Group countries, which like Ukraine started its economic reconstruction in difficult conditions, is extremely important. More than ten years ago the country had a complicated tax system: local stakeholders (business, regions) tore the budget via lobbying of numerous tax concessions; companies took their profits out to the offshore companies and avoided taxation, what considerably put the brakes on the economy and investment environment. The material contained in the research, clearly reflects the specific points to be useful in case of reasonable borrowing and further implementation in Ukraine. On the basis of the research, eight priority measures to be implemented in Ukraine are formulated. They are as follows:

1. The process of budget balancing is to be elaborated not only by injecting the funds in the form of transfer income, but via stimulating the financial capacity of territories and transparent mechanism for funds allocation, run on the particular area, leaving the broader disbursement powers to local authorities.
2. Utilization of the qualitative filling of the budget revenues by introducing effective taxes and fees, which are out of use or administered thoroughly in Ukraine.
3. Simplification of the tax legislation as a key factor for business and investment activation. Solving the issue of tax and accounting merger.
4. Equalization of the fiscal environment for all the participants by eliminating the tax concessions and preferences that distorts the competition and puts similar enterprises into unequal conditions.
5. Recruitment of investors via tax reduction of capital. According to the Slovakia's experience, when a country is endeavor to obtain outward investments, not just favorable conditions should be offered, but ones that are better than in neighboring countries.
6. Introduction of a transparent system of state support for strategic economy sectors of specific regions, as the industry support on the mountain areas will have an effect similar to the tourism support on the industrial areas.
7. Introduction of the transparent mechanism of public finances for the general public to monitor the amount of benefits, funds direction and the results obtained.
8. The process of providing broader disbursement powers to local authorities and corresponding decentralization of public finances. Namely the local authorities are absolutely responsible for the socio-economic situation of a particular territorial unit; they accomplish the economic policy, search and entice the investors.

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# Financial Management Practices of Students

Liběna Kantnerová

**Abstract:** *The main aim of this paper was to analyse budgets of students, their incomes and expenses, as the most threatened group of the population not only in the Czech Republic as generally stated in media. The situation among universities was compared. Five universities were included in the sample – two universities in Prague and one in Pilsen, Cheb and Czech Budejovice. The next aim was to compare the level of life style of students in these cities. All incomes were evaluated, expenses only in case of the city, where the paper was written. The budget deficit and balanced or surplus were analysed for the possibility to evaluate the knowledge and skills of student who do not deal with the problems, and debts. There were 774 respondents. For the evaluation, short questionnaires were used together with statistical methods. The level of incomes is the highest in Prague. The lowest income was reported in Czech Budejovice, where the students most often apply for social money.*

**Key words:** · Questionnaires · Incomes · Outcomes · Budget

**JEL Classification:** · I22 · I23 · I31

## 1 Introduction

This paper analyses the need to deal with the issue of financial literacy and financial knowledge not only by adults, but also youth. This paper shows how our students manage their finance.

Individuals are increasingly in charge of securing their own financial well-being. Today's students very often have to decide their budgets with their own incomes in the comparison of the past, when mostly have incomes only from their parents. Financial markets have become more complex and individuals are faced with a proliferation of new products and the solution how to manage a balance between incomes and outcomes. As the financial crisis has made it clear, it is very hard to navigate it and the consequences of mistakes can be devastating. But how well equipped are individuals to make their financial decisions? Statistical method was used for analysis of the situation

Financial systems connected with housing become, more and more, an important part of the whole economy. Housing loans will increase, because urban expansion is intensifying.

### 1.1 The situation

Universities generally are centre of education and science now. They are regulated by Act No. 111/1998 Coll., where is stated their functions. One part of it regulates student's scholarships too, what is one of very important part of student incomes. The second one is Act No.117/1995 Coll. on social help of the Czech citizens. The incomes from their parents is not enough very often and they work in some full or part-time job as waiters, cleaners, help in warehouses or bakeries etc. Their job and incomes has big influence in the economy of cities, where is the university based, because from one point of view it is a help of companies, which are not able to find right person for some job, which is not too much attractive for citizens because of small salary, work is very hard or time-consuming. Students are time-flexible and mostly in good physical condition, what is good prerequisite for such work.

On other side students have lot of demands for their accommodation, food, free time activities, transport and some of them for their healthy needs too. It means they spend a lot of money in the total so that they can help to the city economy too.

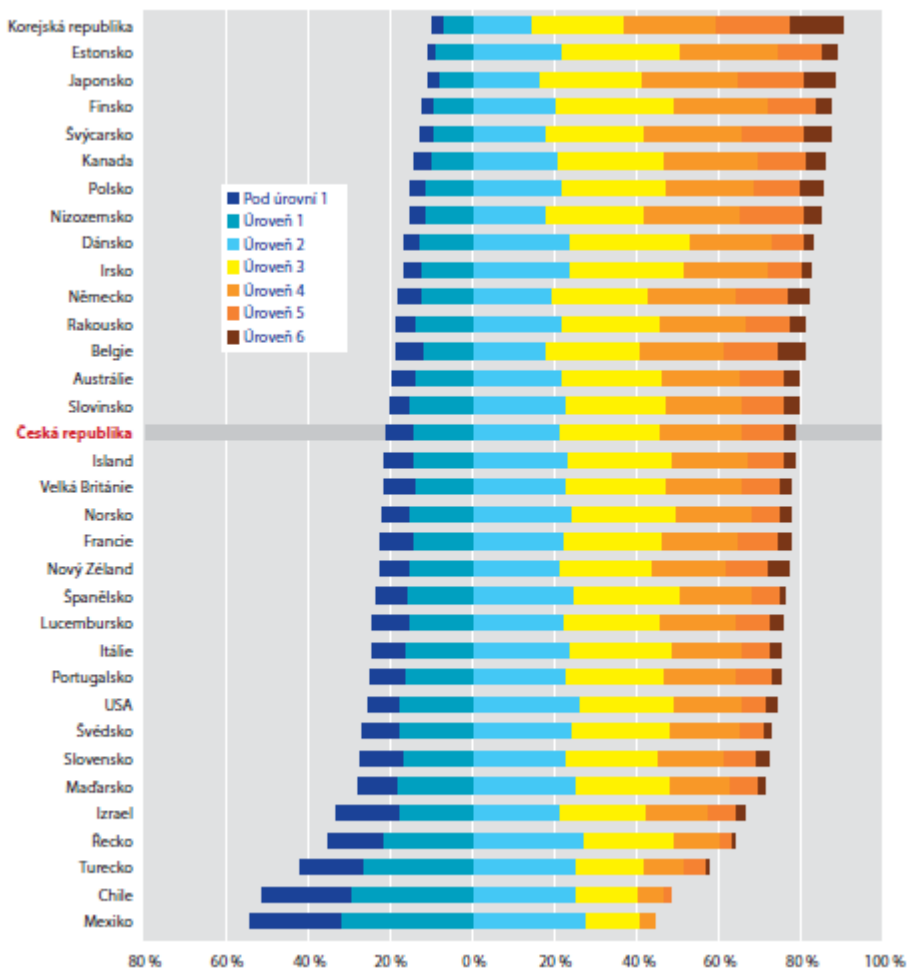
The effect of students on the financial markets, economy and staffing levels is clear. The last on is the general impact of universities to both of it, because they are one of – and often important in smaller cities – employers in the country.

Brown and Heaney (1997) in their book „A Note on Measuring the Economic Impact of Institutions of Higher Education “ stated in the analysis of impact of students on economics of the region a hypothesis „What will be done if the university will not be here?“ They described three impacts in the total:

- Migration. They stated that higher education has big impact on the willingness of citizens to move for a new job.
- The impact on labour market in the region, because universities offer lot of – and often very specialised - job-positions.
- Opportunities for citizens in city – because of the offer on labour market of city and easier access to the education for them, what in the end means the better situation in the labour markets anywhere for them..

Steinacker (2005) discussed the impact of universities to the community of mostly smaller cities and towns in the USA. She said that the impact in big cities is insignificant. She found that more than a half of universities in the USA have less than 2 000 students and only 20 % of universities have 2 – 5 thousands of students. By her, only 5000 of students and more has impact on cities. She sees it mostly on retail and services as petrol stations, car services, cosmetics and hair dresser’s. Her research found that 25 % of students live in the place of their study.

**Figure 1** Differences among Schools in the Mathematical Literacy



Source: [http://www.csicr.cz/html/Sekundarni\\_analyzyPISA\\_matika/flipviewerexpress.html](http://www.csicr.cz/html/Sekundarni_analyzyPISA_matika/flipviewerexpress.html)

By Beck et al (1995), it is not easy to analyse economic impact of universities on the region, because incomes and outcomes can not be separated between a group of citizens and students, complicated by the situation, that a part of the student are the citizens of city. But they see such researches very important..

Except of the impacts stated in Steinacker's work they see a possible technological advantage due to schools because of the co-operation with residential business and advantages for residents in the price of their education.

Activities on the Field of Financial Literacy in the Czech Republic.

By the Regulation OECD (OECD, 2005) with the recommendation for schools, how to improve the system of financial education was made the National Strategy of improvement of financial literacy. So the Czech Republic accepted all and prepare the Strategy of Financial Education in. 2007 (MF, 2007). Except of financial literacy is the mathematical literacy screened, too, because it is one of the most important parts of it. Lot of people does not able to calculate basic calculation for example by shopping, it is not good situation for their other financial decision. .

In. 2012 PISA (Programme for International Student Assesment) was made a search in mathematical literacy research (see at: [http://www.pisa2012.cz/articles/files/Hlavni\\_zjisteni\\_PISA2012.pdf](http://www.pisa2012.cz/articles/files/Hlavni_zjisteni_PISA2012.pdf)) and the next one in 2015. It looks that the situation in the Czech Republic is now worse than before.

The figure 1 shows the results from 2015. It looks that the Czech Republic is again in the mid.

The next results are from the search of Allen (2012) and shows the situation of 5,500 people in Europe.

**Table 1** The list of countries in EU and Turkey in Financial Literacy

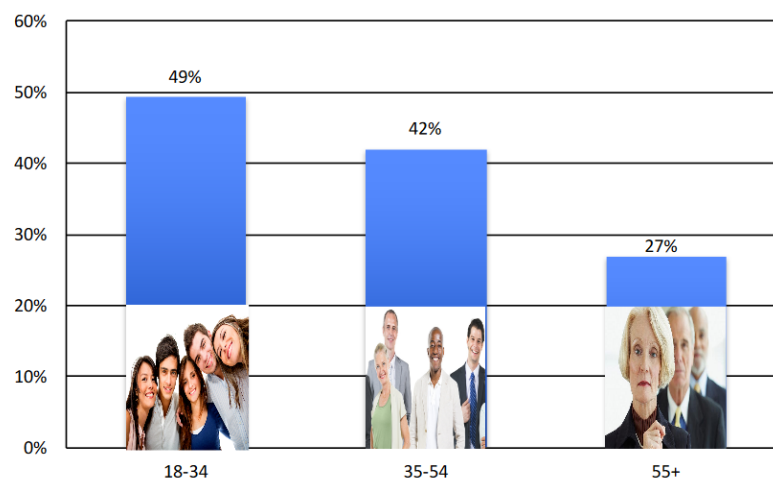
Country	Excellent	Good	Basic	Poor
Greece	3%	21%	62%	14%
UK	3%	19%	58%	19%
Netherlands	3%	19%	63%	15%
Hungary	2%	13%	69%	16%
Czech Republic	2%	12%	67%	19%
Romania	1%	11%	67%	21%
Bulgaria	1%	11%	66%	22%
Poland	2%	9%	66%	23%
Slovakia	1%	8%	71%	20%
Spain	1%	8%	65%	26%
Turkey	1%	6%	66%	27%

Source: Allen (2012)

The financial fragility by young people shows the next chart from the meeting of OECD in Amsterdam in .2016 made by Lusardi (2016). The most threatened population are young people between 18 and 34 years (49%). They do not have enough experiences, more incline to take risks, starts families and greater demands on financial resources while - usually – they have lower incomes.

**Figure 2** Financial Fragility by Age

*% of respondents certainly or probably unable to come up with \$2,000 in case of unexpected emergency*



Source: <http://gflec.org/wp-content/uploads/2016/04/Amsterdam-OECD-Lusardi-.pdf>

Financial literacy is one part of people's knowledge which can be measured or at least compared with another category. Therefore, in the year 2015, the Ministry of Finance of the Czech Republic again performed measurements on the one hand knowledge of the finances of our citizens and also the efficiency of invested funds. It is possible that the decrease people's interest in their finances balanced by positive economic growth in the country.

## 2 Methods

This paper discussed the practice of financial management of students. The research was done in the following cities: Prague - different faculties of Charles University and University of Economics in Prague (303 respondents), in Pilsen - West Bohemian university (167 Pilsen and 53 in Cheb) and in Czech Budejovice – South Bohemian University (251) with the main aim – to analyse the management of money in the young population of university students and accept (or not) generally speaking statement of media, that this population is very threatened by an adverse situation and they do not have enough knowledge and experience.

To find data on students finance, the questionnaire was made at first including 6 questions. Expenses were searched only in the place of study, incomes anywhere. The questionnaire was distributed to universities after an exam period. In the total it contained 774 questionnaires.

Results were processed by STATISTICA 12 with the help of following methods:

- frequency analysis
- test of independence in the pivot table (including the determination of the degree of independence)
- Kruskal-Wallis test (compliance testing of probability distribution, multiple comparison test)

### *The sample*

In the total there were 774 students, 215 men and 559 women.

## 3 Research results

Table 2 shows the percentage of different types of budgets in each city. Given that a balanced budget had very few respondents there were only created two categories: the budget deficit and the budget balanced, respectively surplus. The data in this table it is clear that at least the money based on students studying in the Czech Budejovice. A total of 32.27% of respondents have a budget deficit. On the other hand, students studying in Prague come with money the best (only 20.13% of those surveyed have a budget deficit). These findings can be attributed to the fact that the average income of the students questioned in Czech Budejovice is CZK 6,792, while in Prague 12 473CZK, i.e. approximately a half.

**Table 2** Percentage distribution of different types of budgets in individual cities

<b>Město</b>	<b>Budget deficit</b>	<b>Budget balanced, respectively. surplus</b>
<b>Cheb</b>	28.3%	71.7%
<b>Pilsen</b>	27.54%	72.46%
<b>Czech Budejovice</b>	32.27%	67.73%
<b>Prague</b>	20.13%	79.87%

Source: own processing

The above data may lead to the hypothesis that the budget depends on the type of city in which students study. To test this hypothesis, the independence test was used in a PivotTable, whose results are shown by Table 3 and Table 4. Since the p-value = 0.012716 < 0.05, we showed the type of dependence on the city budget, in which students study. Cramer coefficient (see Table 4) is equal to 0.1182565, indicating that the dependence is very weak.



**Table 3** PivotTable (expected frequency) - Output from STATISTICA 12

Summary Table .: The expected frequency The frequency of labeled cells > 10 Pearsons chí-sq : 10,8241, sv=3, p=,012716					
budget	Cheb	Prague	Pilsen	C. Budejovice	Total
Deficit	13,90052	79,4690	43,7997	65,8307	203,0000
Surplus	39,09948	223,5310	123,2003	185,1693	571,0000
all	53,00000	303,0000	167,0000	251,0000	774,0000

Source: own processing

**Table 4** Cramer coefficient - Output from STATISTICA 12

Statist.	Statist. : budget(2) x city(4)		
	Chí-kvadr.		
Fi	,1182565		
Contingency coefficient	,1174382		
Cramer's V	,1182565		

Source: own processing

### 3.1 Budgets of men compared to budgets of women

Another question that is interested was whether the money are managed better by men or women? Table 5 shows the percentages of different types of budgets for women and men in the towns. After watching can see that in Cheb and Prague come with money better men than women, while in Pilsen and Czech Budejovice is the opposite. We therefore hypothesize that the type of budget is not affected by gender. To verify, was used again test for independence in a PivotTable, the results of which are shown in the table. Since the p-value = 0.911227 > 0.05, we have shown that the type of budget is really not affected by gender.

**Table 5** Percentage of different types of budgets for women and men in the towns

City	females		men	
	Deficit budget	Balanced or surplus budget	Deficit budget	Balanced or surplus budget
<b>Cheb</b>	38,46%	61,54%	25%	75%
<b>Pilsen</b>	19,23%	80,77%	31,30%	68,70%
<b>C. Budejovice</b>	23,91%	76,09%	37,84%	65,85%
<b>Prague</b>	29,81%	70,19%	15,08%	84,92%

Source: own processing

**Table 6** Pivot Table - the output of STATISTICA 12

Summary Table .: The expected frequency The frequency of labeled cells > 10 Pearson's chí-sq. : 0,012430, sv=1, p=,911227			
Gender	Deficit budeget	Balanced or surplus budget	Totals
Women	56,3889	158,6111	215,000
Men	146,6111	412,3889	559,000
All	203,0000	571,0000	774,0000

Source: own processing

#### 4 Conclusions

The above research shows that student incomes in Prague greatly exceed revenues in other cities. In individual cities, then the greatest disparity in income has Cheb, the smallest in Czech Budejovice. Sources of income is - with the exception of Cheb - the most income from parents, the second place was occupied by the brigade, which in turn are more frequent in Cheb (53.93%).

In addition to other usual income such as scholarships and social benefits students reported under "other" most nutritious orphan's pension allowance from grandparents, savings, occasional gifts of family and business income.

Some students in all cities said they have no income from their parents, 21% in Prague, Pilsen 18.56%, 52.83% in Cheb and 22.58% in the Czech Budejovice, which means it feeds off its own resources

Expenditure on food for students in this sample of respondents ranged from 20% to 40% of total spending. Special diet for celiac cook offers only canteen in Czech Budejovice and in Prague is the fact by students fairly criticised because they significantly increase the cost of food (by [www server. bezlepkovadieta.cz](http://www.server.bezlepkovadieta.cz) in our country registered around 50,000 affected by the disease which represents about 2.5% of the population).

In Prague 35% of students have no expenses for accommodation (living in Prague or commutes), or 65% of students said sample is valid for accommodation in Prague and affects the real estate market. Of the total expenditure by 36.4 % of respondents falls on entertainment only 10 - 20% on clothing and even up to 10% (with 34.4% of students).

The positive is that 44% of surveyed students will not spend anything on alcohol and cigarettes. On the other hand, 51% of student expenditure on cigarettes and alcohol constitutes 20% of the total expenditure.

In Pilsen students relatively high percentage - 71.25% - states that do not have a job in the place of residence. 65.3% of students but also says there is no job in Pilsen. Ie., the 34.7% it has a job in Pilsen and affecting the labour market. On the other hand, with 10.79% of students questioned produce revenue from a brigade in Pilsen 80% to 100% of total income. It can therefore see significant impact on student labour market.

47.3% of students are spending on food in the range of 10% to 30% of total spending. Although 46.1% of the students have no expenses for accommodation (staying in Pilsen or commute). The 53.9% pay for accommodation in Pilsen and affects the real estate market. In 35.2% of students with accommodation costs ranged between 20% to 50% of the total spending. For 71% of the transport expenses ranged from 0% to 40% of total spending. For fun, 75.44% of students spent 0-40%. 14.97% of students do to not spend anything for fun. For 56.88% of respondents spent 0% to 50% of the total spending. 58.1% of students spending any money on cigarettes and alcohol. On the other hand, in 3.6% of student expenditure for cigarettes and alcohol ranges from 40% to 50% of the total expenditure

In Cheb make up for 18.87% of students receiving from parents of 80 to 100% of their income. 60, 37% of students have part-time job at home. 58.5% of respondents have a brigade in Cheb, while 18.86% for an income of brigades in Cheb 80-100% of total income.

Spending for meals range from 30% to 50% of total in 41.5% of students. This is probably due to the fact that subsidized meals in the canteen this city does not offer. It's probably due to the small number of students in this town. Perhaps it would be useful if the school management agreed on board with some secondary schools, which could help the economy some of the high school cafeterias. 43.4% of students have no expenses for accommodation (live in Cheb or commute). On the other hand, 21% of students questioned accommodation costs constitute 30% to 40% of total spending. 28.3% of students do not pay anything for the service. In 21% of students transport expenses is 20% to 40% of the total expenditure of the total expenditure at 32% of students falls on a fun 10-20%. 19% of students questioned the fun will not spend any money. On clothing in 26.4% of students questioned falls 10% to 20% of total expenditure. It is positive that 75.4% of students questioned not spend anything on alcohol and cigarettes, which is in this survey, the highest percentage of students, on the other hand, offer leisure activities in Cheb are relatively small with regard to the complains of students seems to move around the city in the evening annoying if not even dangerous.

40.7% of students from Czech Budejovice have an income from their parents 60-100% of their total income. 62.9% of them have part-time job at home. 76.3% of students have no income from temporary jobs, while 9.2% of students reported receiving between 60 and 100% of their total income.

42.4% of students have spending on food ranged from 20% to 40% of total spending. As demonstrated in this investigation is the canteen in the Czech Budejovice probably one of the monitored device, where they cook the food for celiacs. 32.8% of students had no accommodation costs (live in Czech Budejovice or commute). But this in turn means that 77.2% of students pay for accommodation, and significantly affects the real estate market on the other hand, with 31.6% of students questioned accommodation costs make up 40% -60% of total spending. Expenditure on transport for 50% of the students are 10% to 30% of total spending. Of the total expenditure at 41.2% of students falls on entertainment 10% to 30%. 19% of students questioned the fun will not spend any money. 41.6% of students questioned not spend anything on alcohol and cigarettes. On the contrary, 40.8% of students questioned the expenditure on alcohol and cigarettes up to 10% of total spending.

Given that a balanced budget had very few respondents were only created two categories: the budget deficit and the budget balanced, respectively surplus. The worst money based on students studying in the Czech Budejovice. A total of 32.27% of respondents have a budget deficit. But which corresponds to the social benefits (for students in Czech Budejovice also the highest - 27%). On the other hand, it also means that students in the Czech Budejovice have good knowledge of budgets and further efforts are needed in this area for hours. Unfortunately, there is one aspect that no teacher will affect, and that is an example of a family education and ability to resist temptations around if there are insufficient funds. Students studying in Prague come with money the best (only 20.13% of those surveyed have a budget deficit). Even this finding corresponds to benefits paid (2.7%) and the highest average incomes. Furthermore, these findings can be attributed to the fact that the average income of students questioned in the Czech Budejovice 6 792 CZK while in Prague 12 473 CZK, ie. about half of it.

Collected data led to the hypothesis that the budget depends on the type of city in which students study. To test this hypothesis test for independence was used in the PivotTable. The value p-value = 0.012716 < 0.05, was thus demonstrated that fact.

When compared with a loss of money between men and women showed that in Cheb and Prague come with money better men than women, while in Pilsen and Czech Budejovice is the opposite. Also, any statistical verification of the hypothesis that type of budget is not affected by gender in the pivot table was p-value = 0.911227 > 0.05, therefore we have shown that the type of budget is really not affected by gender.

In the agreement with data can be stated that university students in this survey are not threatened by their finance deficit or not good decision.

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# The impact of Golf Club Český Krumlov on its surroundings

Jiří Sláma, Václav Bystřický

**Abstract:** Model study was conducted in the cadastral area of Chabičovice, where is the golf course located with the name of Golf Club Český Krumlov. A study based on a questionnaire survey of spring 2016 in the cadastral Chabičovice and its historical context has to assess the impact of the construction of the golf course.

*The effect of the existence of the golf course on its surroundings is critically evaluated by the literature review. Selection of literature, mostly articles, was conducted thoroughly in scientific databases. The questionnaire survey was carefully driven by hypothesis. The evaluation of questionnaire survey was performed using simple descriptive statistics. The interpreted results were assessed critically and summarized in the comments. The area of study (cadastral area) was displayed in a geographical information system (GIS). Based on the evaluation of data from the selected cadastral area and observing this area, it is possible to assess the direct impact of the golf course.*

**Keywords:** cadastral area, golf course, historical background, influence, questionnaire survey, socioeconomic, tourism

**JEL Classification:** A13 · Q51 · R14 · R23 · Z13

## 1 Introduction

The first essential fact is that the golf course is directly connected to tourism (Stynes, Sun, Talhlem, 2000). This tourism is so specific that it is also called golf tourism (Hudson, Hudson, 2003). Golf tourists spend a lot of money not only on the golf course, but also in the surrounding area. In the US amounts this spend to circa millions of dollars. Golf tourism creates own industrial sector (Shipway, 2015), it can be talk even about the industry and sets the trend. Even though not in such money-scale, golf course has an impact on the residents in the surrounding area. A very important task for the management of the golf course is that this impact must have

a positive effect (Warnken, Thompson, Zakus, 2007). The necessity of a comprehensive strategy, these authors show in the following figure (Fig. 1). Here is shown the consistency and there are various interactions between the components of economic, governmental, tourist, but also environmental.

Especially environmental sciences are an integral component and they are inherently linked with every major economic study of the urban project. Environmental aspects are closely connected with social values (Eriksson, Eriksson, Ignatieva, 2015). Comprehensive evaluation of each structure with impact on the environment incl. golf course is implemented in the European law and therefore the Czech legislation (law nr. 100/2001 Coll. and its subsequent amendment).

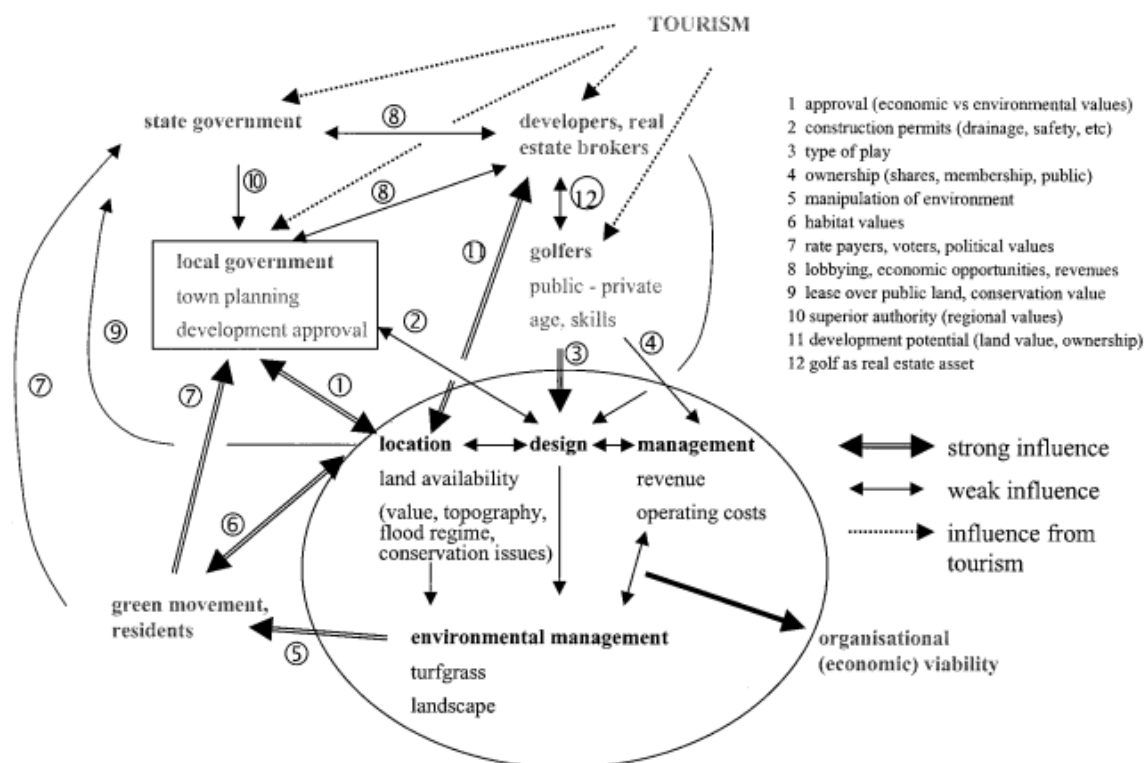
Particularly the environmental trend in tourism is now very highlighted (López-Bonilla, López-Bonilla, 2012). It is necessary to monitor whether the tourists seem interested in environmental backgrounds of their destinations (e.g. golf course). As well as awareness of environmental sciences should be increase in mindset of people living in the nearby area of tourist destinations (e.g. golf course). Fundamentals of environmental sciences are already taught in schools. Likewise, a growing number of golf courses in the world (as in the Czech Republic) needs environmentally conscious management (Vargas Sánchez, Riquel Ligeró, 2009). Mainly management approach can affect the quality of tourist destinations (e.g. golf course), but also the quality of life in the surrounding area of the destination. It is necessary to create a strategic document on the municipal level (Řehoř, Hajnová, Březinová, 2013). It is about local development (municipality, village, settlement) with consequences for the entire region.

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**Figure 1** A comprehensive strategy for the construction of the golf course taking into account various aspects and their interactions



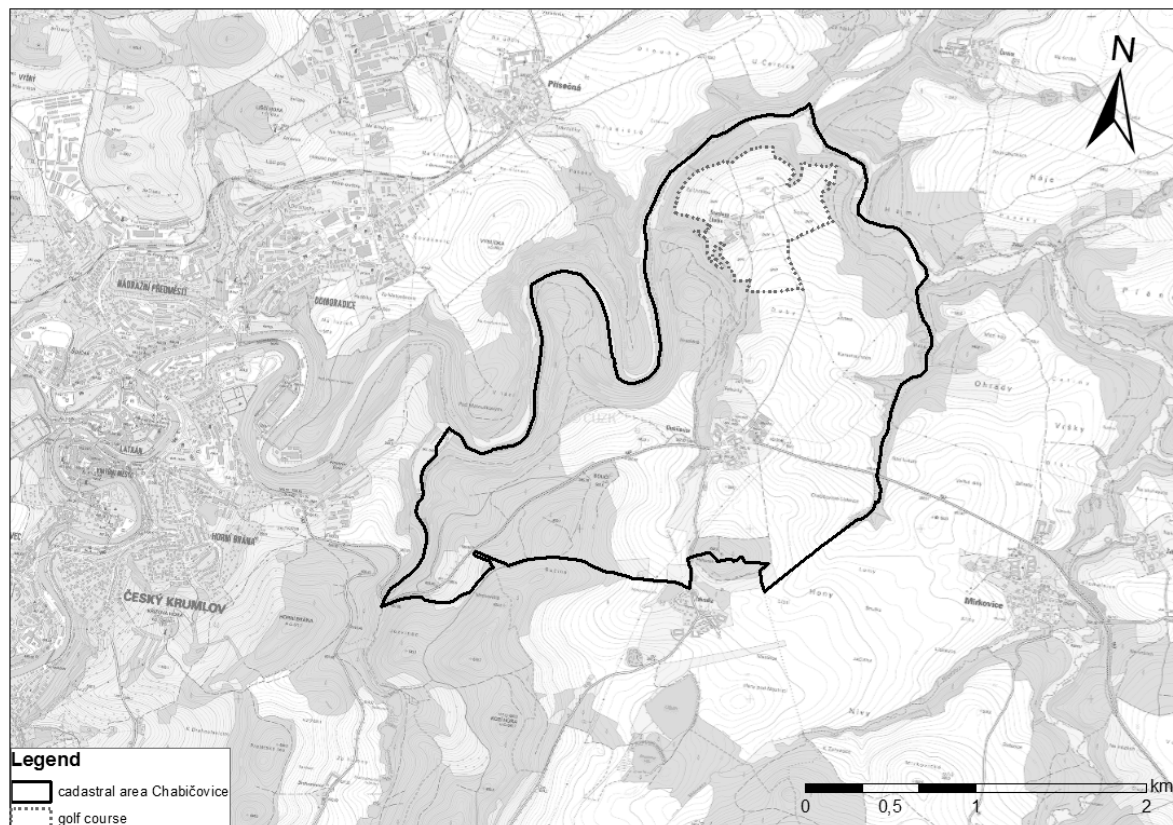
Source: Warnken, Thompson, Zakus (2007)

The study based on an analysis of the historic town, which was affected by tourism (evaluated were both positive and negative parameters), was conducted in Northern Cyprus (Vehbi, Doratli, 2010). Although the surveyed sites are in other climatic regions, their changes were affected by tourism and these changes are very similar. The conclusion of this study gives emphasis on planning, which should take into account the historical context of the area. It is necessary to respect the historical context of the region and it will bring the development of area and satisfaction of local residents. In this paper was studied impact of golf course on the cadastral area (Chabičovice) by a questionnaire survey.

Since the construction of the golf course is the cadastral area confronted with the golf tourism, it is therefore a specifically communicated tourism. Specificity of marketing communication in golf deals study (Macháček, 2011), which calls this type of marketing communication the phenomenon. Currently one of the most widely used communication marketing channels are social networks. Different marketing channels use: public golf course, championship golf courses or golf courses built in specific location (e.g. castle). This paper deals with public golf course in pure nature and close to old settlement.

## 2 Materials and Methods

Investigated location is on the cadastral area Chabičovice, where is the golf course located. The cadastral area including highlighted of golf course is shown in the following Map 1. Maps were made in the geographical information system ArcGIS 10.0 (ARCDATA [software], ©2016). The cadastral area is the smallest territorial unit under the Territorial Identification Register of the Czech Republic (Územně identifikační registr ČR [online], 2012). The cadastral area Chabičovice includes settlement called Svachova Lhotka and seat-type small village called Chabičovice. According to the census of 2001 (Český statistický úřad [online], 2011), there live 82 inhabitants. On the cadastral area has an aging population and the influence of factors (discussed in the next paragraph), the population during over the past 15 years decreased. In Mirkovice are registered 57 people as permanent residents on 1<sup>st</sup> January 2016 (figure from delegated authority - mayor of Mirkovice).

**Map 1** The cadastral area Chabičovice with highlighted golf course

Source: own processing

*The exact localization of investigated area<sup>4</sup>:*

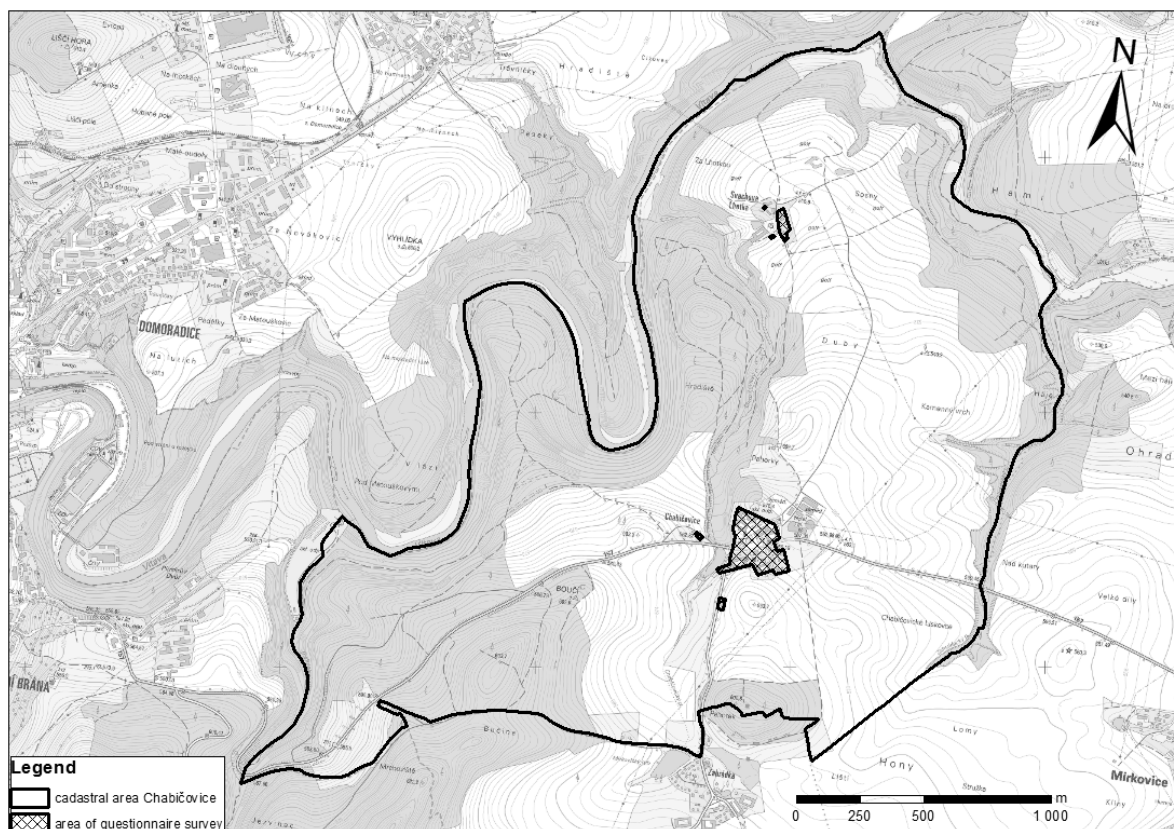
The cadastral area Chabičovice (consist of settlement Svachova Lhotka and small village Chabičovice), Mirkovice (LAU 2) 382 32 (zip code), District Český Krumlov (NUTS 4 new LAU 1), South Bohemian Region (NUTS 3), The Czech Republic (NUTS 1)

On the cadastral area was carried out a questionnaire survey. Map 2 shows the urbanized and inhabited objects (buildings), where was conducted this questionnaire survey. Distribution of questionnaires was carried in the spring of 2016, namely the half of April. Questionnaires collection was then concentrated at the end of April. It has already been mentioned that the population of the cadastral area Chabičovice is 57. Some residents, who are registered in this cadastral area, do not live here permanently. Due to the position of the region are either employed in abroad (e.g. Austria), or real estate belongs to foreign residents and they are only registered here. The undisputed role in the living standards has an economic crisis, even in tourism (Dušek, Skořepa, 2014). Conversely, the role played by regional development through its smaller units (municipalities) and their own residents (Dušek, Skořepa, 2007). An example may therefore be the development of Svachova Lhotka (settlement) and its inhabitants due to the construction of golf course and other tourist facilities. The size of the population (the local population) as an indicator of the response on external pressure states (Těšitel, Kušová, Bartoš, 2001). These authors made their case study on the right shore of the Lipno Lake.

Therefore has managed to distribute 44 questionnaires. The following table (Tab. 1) indicates the return of distributed questionnaires. Response rate is calculated from distributed questionnaires and 73 %. This value is above the minimum acceptable rate of return for a sample of 31-50 people, which amounts to 66 % (Mareš [lecture], 2010).

<sup>4</sup> Abbreviations in parentheses are governed by the applicable nomenclature (Eurostat, 1988).

**Map 2** Marked urbanized objects (buildings) for questionnaire survey in the cadastral area Chabičovice



Source: own processing

**Table 1** The return of questionnaires in the cadastral area Chabičovice

Filled (nr.)	In terrain (nr.): locality		Non-distributed
	Svachova Lhotka	Chabičovice	
32	3	9	13
Sum: 12			
<b>Response rate ≈ 73 % (counting from distributed)</b>			

Source: own processing

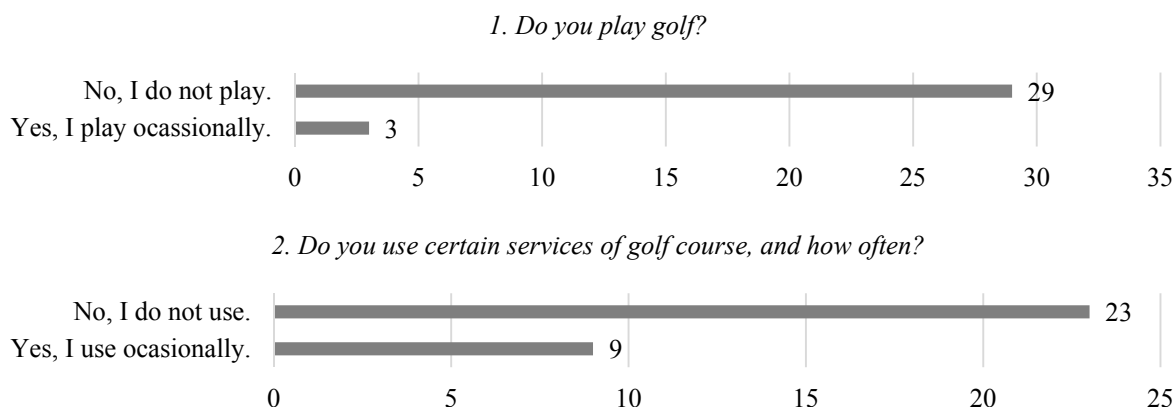
The questionnaire survey is corroborated by hypotheses that will be supported by analysis of individual questions (Kozlová, 2009). Descriptive statistics was possible to evaluate individual questions. The questionnaire and hypotheses have been compiled according to the methodology and consultations (Majerová [přednáška], 2015). The questionnaire was also critically evaluated under other relevant lectures (Kozlová [přednáška], 2015).

### 3 Results

The questionnaire consisted of 11 fact-finding questions that included even sub-questions (concretely questions: 6, 7 and 10). Evaluation of individual questions is already carried out under hypotheses (a total of 8 hypotheses). Hypotheses are either confirmed or disproved. A summary table (Tab. 2) of evaluated hypotheses is placed in the final chapter Conclusion. Identification questions were designed to form a complete picture of a population group living in the cadastral area Chabičovice and they are evaluated separately.

*1<sup>st</sup> hypothesis (consists of questions 1 and 2):* Residents of the cadastral area are interested in the golf course.



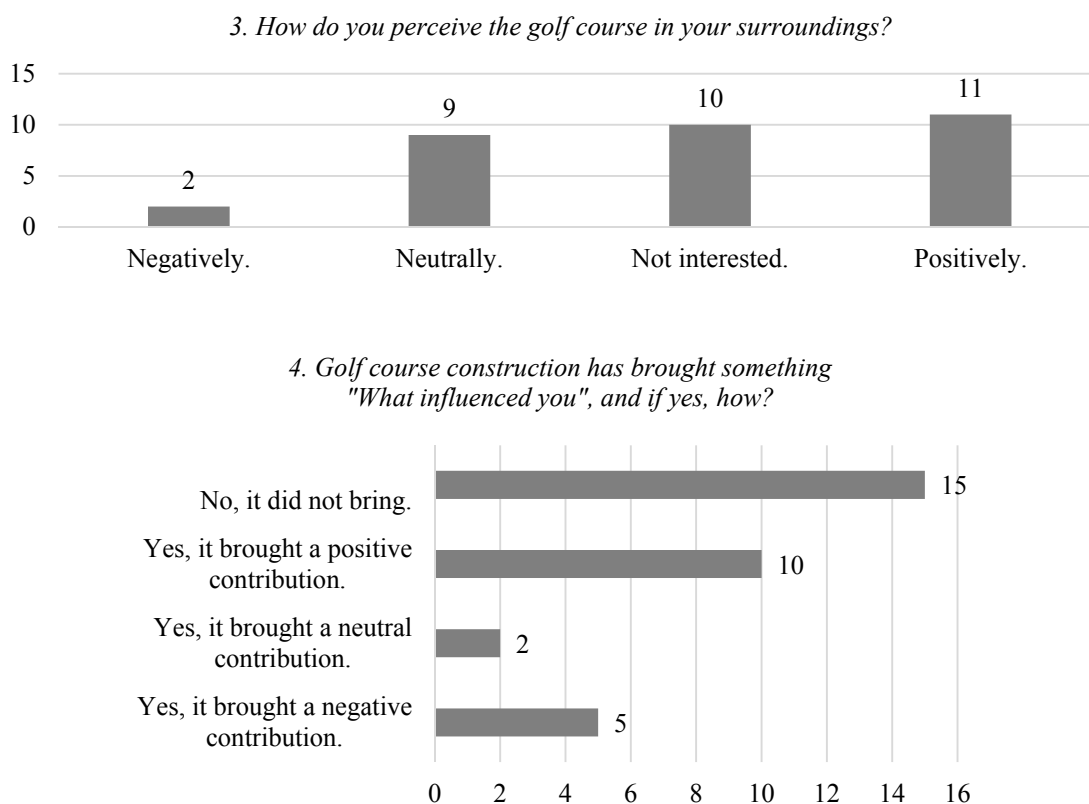
**Figure 2 & 3** Graphic display respondents' answers to questions 1 and 2

Source: own processing; Note: The numbers of respondents' answers.

The result of this hypothesis is that residents are not golfers and do not use golf services, the hypothesis can be significantly rejected. Upon closer dismantling of these two questions is no difference in the settlement of Svachova Lhotka and in the small village of Chabičovice.

How to show other hypotheses, the golf course affects a much larger range of factors. In fact, the golf course have occurred changes in the landscape, infrastructure, housing, employment and many others.

*2<sup>nd</sup> hypothesis (consists of questions 3 and 4):* The golf course has a positive effect on the population in the cadastral area.

**Figure 4 & 5** Graphic display respondents' answers to questions 3 and 4

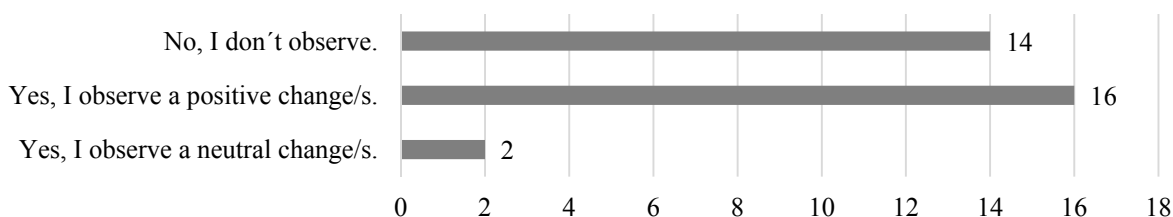
Source: own processing; Note: The numbers of respondents' answers

This hypothesis cannot be confirmed, especially in the positive sense. Approximately 30% of respondents believe that the construction of the golf course brought a positive contribution. The greater part of the respondents expressed a neutral attitude to construction of the golf course, or they are not interested about it. Only a very small proportion of respondents believe that the impact of golf course construction was negative and an even smaller proportion of respondents perceive the current golf course negatively.

*3<sup>rd</sup> hypothesis (consist of question 5):* Residents of the cadastral are observed after the construction of golf course positive change in the landscape.

**Figure 6** Graphic display respondents' answers to question 5

*5. Do you observe change/s in landscape in your surroundings after the construction of golf course? In case of yes, how are affected?*



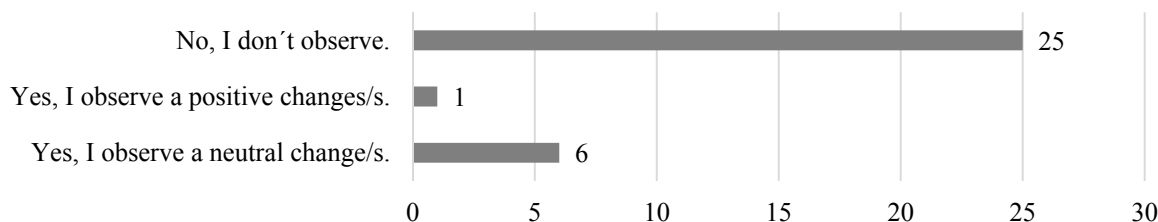
Source: own processing; Note: The numbers of respondents' answers

Positive changes in landscape character were recorded in 50% of the respondents. The hypothesis is not confirmed, to confirm the hypothesis is necessary to have more than 50% of respondents. It necessary to say, that there were recorded no negative changes in landscape character in the respondents' answers.

*4<sup>th</sup> hypothesis (consists of questions 6 and 7):* After the construction of the golf course residents of the cadastral area noticed improvements in infrastructure (e.g. transport, communications, energy and utilities).

**Figure 7 & 8** Graphic display respondents' answers to questions 6 and 7

*6. Do you observe change/s availability of transport in your community after the construction of golf course? In case of yes, please specify.*



*The observed change:* 2x repair of roads; 2x increased road traffic (year-round); 2x increased road traffic (seasonally); 1x treatment of green areas.

*7. Did the construction of golf course touch of energy or utilities in your community? In case of yes, please specify.*



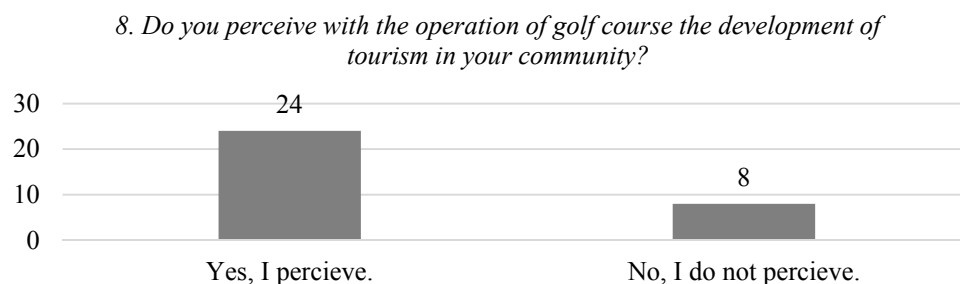
Source: own processing; Note: The numbers of respondents' answers.

*Affected energy or utilities:* It was introduced by the public water supply. (1x)

Again, this hypothesis cannot be fully confirmed. Some residents of the cadastral area recorded changes, but the majority of residents expressed neutrally or impartially. Testimony of those who noticed and described the changes are listed under the appropriate graphs.

*5<sup>th</sup> hypothesis (consist of question 8):* Residents of the cadastral area noticed the development of tourism after the construction of golf course.

**Figure 9** Graphic display respondents' answers to questions 8

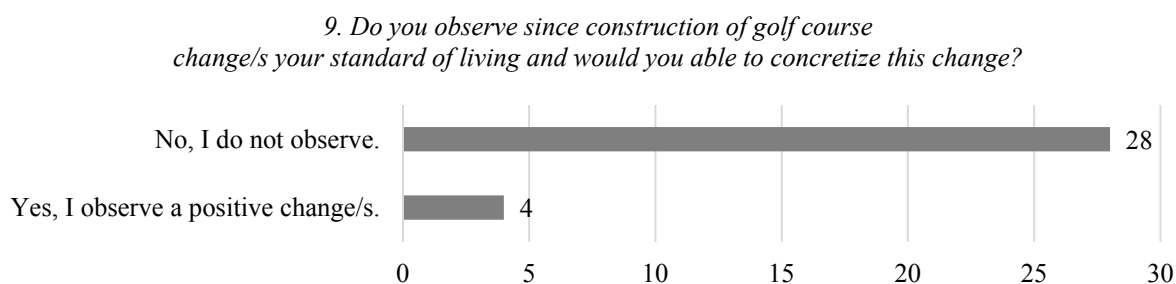


Source: own processing; Note: The numbers of respondents' answers.

This hypothesis is clearly confirmed. Now it is necessary to determine living standards of population of the cadastral area and to identify the visible tourist objects, which also have an impact on the local population.

*6<sup>th</sup> hypothesis (consist of question 9):* Residents of the cadastral area observed improvement in their living standards after the construction of golf course.

**Figure 10** Graphic display respondents' answers to questions 9

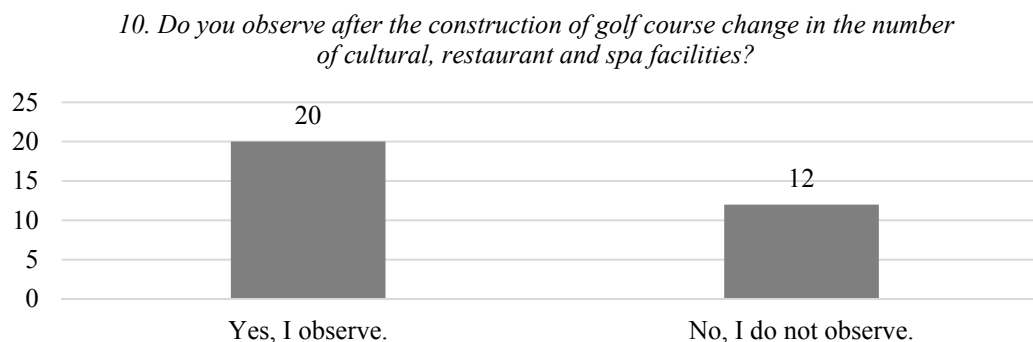


Source: own processing; Note: The numbers of respondents' answers.

The hypothesis of improved living standards for residents of the cadastral area has not been proven. However, it has not been observed negative change in living standards by resident of the cadastral area. In addition, 4 of the respondents observe even positive change/s.

*7<sup>th</sup> hypothesis (consist of question 10):* Residents of the cadastral area observed an increase in cultural, restaurant and spa facilities after the construction of golf course.

**Figure 11** Graphic display respondents' answers to questions 10

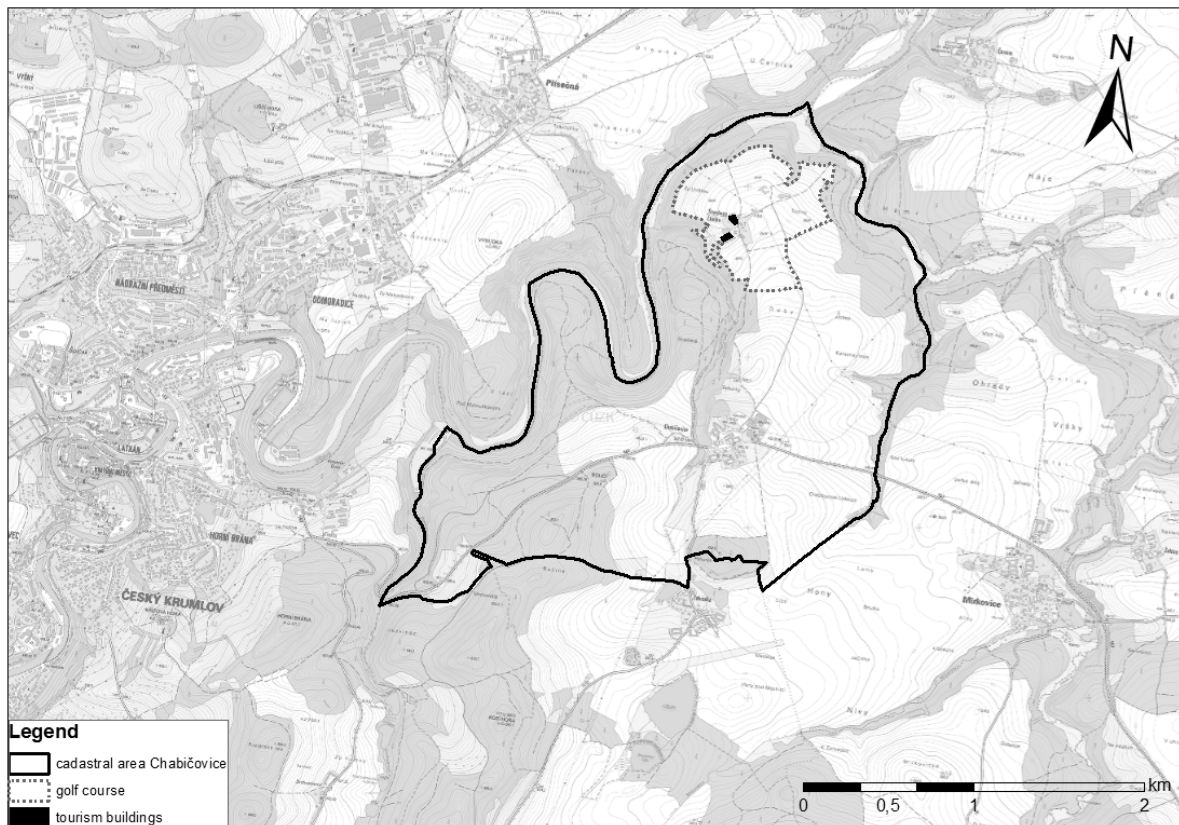


Source: own processing; Note: The numbers of respondents' answers.

*Specific types of facilities observed by respondents:* 14x restaurant; 12x spa/wellness (focus on beer cure); 8x hotel/accommodation; 5x brewery; 3x distillery.

This hypothesis was confirmed. It is obvious, that the cultural component is the most touching to respondents. This visible component is also closely related to (golf) tourism. It should be said that these facilities also brings job opportunity thus increasing employment in the cadastral area (hence the region). Studying cultural facilities offer space for a completely separate study. The following Map 3 serves for graphical localization of the tourist objects.

**Map 3** Highlighted tourist objects (buildings) by golf course in the cadastral area Chabičovice



Source: own processing

*8<sup>th</sup> hypothesis (consist of question 11):* Residents of the cadastral area are educated on environmental issues after the construction of golf course.

**Figure 12** Graphic display respondents' answers to questions 11

*11. Do you feel the pressures of your surroundings (foreign and local groups) after the construction of golf course to education in the environmental field?  
Are you educate in this field?*



Source: own processing; Note: The numbers of respondents' answers.

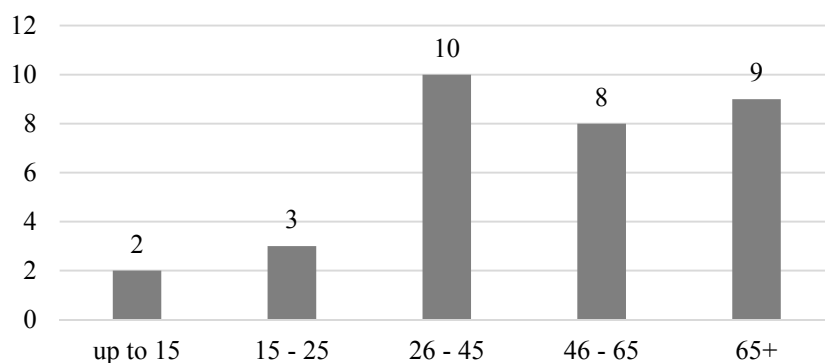
Unfortunately, the construction of golf course did not bring any sense of urgency in education in the environment. This hypothesis has to be rejected based on respondents' answers.

### Evaluation of identification data

It is necessary to state a couple of facts about the analyzed sample of questionnaire survey. From identification data was chosen a representative selection related to the above mentioned data.

In terms of age structure there are the most numerous economically active people between 26 and 45 years (31%) and people under 65 years of age (25%). People of retirement age are 28%. Young people (under 25) are combined together with children (total 16%).

**Figure 13** Age of respondents by analyze sample (in years)

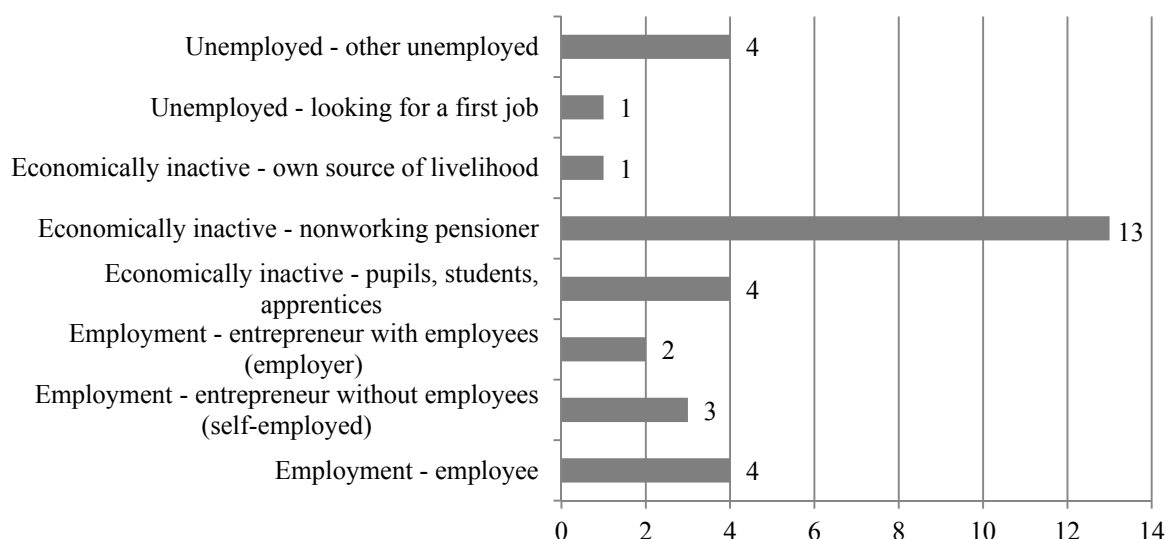


Source: own processing; Note: The numbers of respondents' answers.

Among the respondents were 17 women and 15 men, almost gender-balanced sample. Respondents live in the cadastral area Chabičovice on average 24.5 years (even the oldest resident of 91 years and vice versa the least 2 years).

The following characteristics of economic activity of respondents (sample from population) of the cadastral area Chabičovice were 13 pensioners, as well as 13 workers. The economically inactive population in the form of 4 students, just as 1 person live from own sources and person looking for a first job are not considered as a negative phenomenon. A certain percentage of unemployment is a common phenomenon in every society.

**Figure 14** Economic activity of respondents

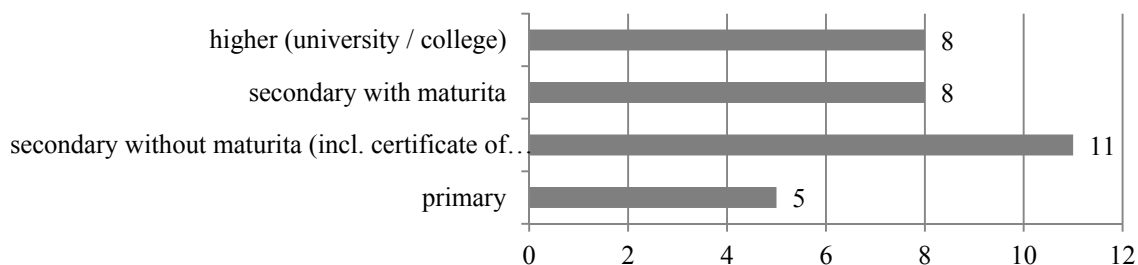


Source: own processing; Note: The numbers of respondents' answers.

*Field of work by employment:* healthcare, services (hospitality), business activity, garden work, artisanship (different kind of craft - e.g. bricklayer, tradesman, etc.).

The structure of education is fairly balancing with place where respondents live and what they do. Apprenticeship certificate has over 30% of respondents. Graduated from high school and university education is equal to half of the respondents, we can therefore speak of a well-educated population sample.

**Figure 15** Highest achieved education of respondents



Source: own processing; Note: The numbers of respondents' answers.

#### 4 Conclusion

A summary table (Table 2) is created from the above evaluated hypothesis. A generally positive perception of the golf course by respondents was not found, but there was neither detected nor its negative perception. Respondents (residents of the cadastral area Chabičovice) perceive golf course neutrally. The sensitivity of the respondents was found to the golf tourism, which brought golf course, it confirms 5th hypothesis. With a golf tourism are also closely associated objects (cultural, restaurant and spa facilities) that respondents observed and thus confirmed 7th hypothesis.

**Table 2** Summary evaluation of hypotheses

Nr. of hypothesis	Proved	Rejected
1		X
2		X
3		X
4		X
5	X	
6		X
7	X	
8		X

Source: own processing

From the foregoing, it would be useful to continue to focus on objects associated with golf tourism and analyze them. Especial mention is made from Svachův Court (spa, wellness and restaurant), the Glok's brewery and the Svach's distillery Svach. These buildings have been renovated and turned to their purpose. It was preserved their architecture appropriate architecture in South Bohemia in the 19th century. Along with preserving the landscape after the construction of the golf course fits composition Svachova Lhotka into the local landscape. It can be talk about the development Svachova Lhotka (hence the cadastral area Chabičovice) by influence of golf course Golf Club Český Krumlov.

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# The Fourth Industrial Revolution and Its Expected Consequences

Drahoš Vaněček

**Abstract:** *The aim of this article is to focus on the development of technologies and the incoming industrial revolution, referred to as Industry 4.0. The Ministry of Industry and Commerce of the Czech Republic has already accepted measures concerning this topic and in 2016 the Government of the Czech Republic also accepted its conclusions. Industry 4.0. reacts to ongoing digitalization, robotization, artificial intelligence and the whole future technological development with both positive and negative impacts on mankind manifesting in both material wealth growth and in a big growth of unemployment. Some expected consequences of the development are mentioned in this article.*

**Key words:** Fourth Industrial Revolution · Industry 4.0 · Supply Chains · Fermentum

**JEL Classification:** O33

## 1 Introduction

Human society is currently reaching a significant break in its development resulting from the huge development of new technologies. We will face this change in the quality of lifestyle, with both positive and negative impacts, in the following 10 – 20 years. This change is referred to as the fourth industrial revolution. It is connected with so-called Moore's law, according to which the value of transistors in an integrated circuit will double every two years. It also means that every two years the capacity and effectivity of related computers and whole systems will double as well. The law was formulated in 1965. Technical development has an exponential character which in a graphic form has a slow growth at first, but from a certain point the curve starts soaring. Industrially advanced states can be found at this point of growth at present. As our economy is mostly connected with Germany, which is one of these advanced states, the Czech Republic will also face the above mentioned conclusions. This will bring both positive and negative impacts which have been given a little publicity so far, mostly appearing in the form of short pieces of news and articles in newspapers and magazines and thus being considered science-fiction by readers in comparison with the problems caused by the migrant wave and terrorism or global warming. Therefore, university students in particular should be informed about these future events objectively and should be able to react in an appropriate way.

The term INDUSTRY 4.0. come from Germany and it denotes a contemporary trend of digitalization and related automation of production and changes in the labour market that are coming.

The first industrial revolution at the 19th century was a transition from manual production to machine mass production using water and steam power.

The second, at the beginning of the 20th century, was characterized by the extending of labour division and mass production using electricity. The third started in the sixties of the 20th century with the electrification and robotization of production and the introduction of computer software operating programmes into production.

The fourth, referred to as Industry 4.0., was diagnosed shortly after 2000 and in the coming years it will completely change the organization of production. It will have top automation, digital connection of all levels of production as well as creating added value, from product development to logistics. There will be digitally connected people, machines, and products at all levels of the production chain. The virtual and real worlds will flow one into another (Fair Trade Brno, 2015).

In September 2015, the Ministry of Industry and Commerce of the Czech Republic elaborated a SWOT analysis of National Initiative Industry 4.0, originally a project of the German government. Also in Germany, the



number of technical workers is decreasing and the population is getting older. The same problems are in the Czech Republic. New technologies should enable us to connect the whole chain of machines, production lines, warehouses, deliveries and commercial firms. Ready-made goods and microchips will themselves determine how to process the chain further. Machines will address maintenance men themselves. Warehouses will inform suppliers when to replenish stock. A “smart” factory will operate by itself using cybernetic systems, cameras, sensors and transmitters. Individual customer wishes will reach the production line directly and will be able to be fulfilled at the same costs as for mass serial production. The link between the IT world and the production process will be created by robots.

## **2 Expected Contributions of the Fourth Industrial Revolution**

### *a) Substantial growth of production*

Products will be cheap, produced using mass production methods, with the possibility of individual changes according to the customer’s wishes.

### *b) Restructuring of supply chains*

Protection from goods from Asia will be ensured to a considerable extent, because the cheap labour force there will no longer enable effective competition with European products. New technologies, especially digitalization and 3D printing machines, will mean European countries no longer need to import components for more complicated products from Asia, but to produce them cheaply also in Europe. This will shorten supply chains considerably, as well as transport distances and will contribute to a better environment (less CO<sub>2</sub> in the atmosphere).

Shortening supply chains will result in the slowing of globalization and an increased inclination to use local resources: from globalization to localization. Industrial robots will inquire about necessary products, resources and electricity and priority will be given to cheaper quotations, esp. those from local sources. Thus many regions falling behind could expect substantial growth.

### *c) Smart houses, towns, factories*

The system creates programmes itself on the basis of monitoring particular patterns of behaviour of inhabitants (of a house, a town, a firm) in combination with other external factors (environment, meteorological conditions, ecology, etc.). The system learns to set a particular device for certain functions (handling light, setting thermoregulators, heating water, etc.) and predict future states of an operating complex (a house, a town). (Zavoral, 2016).

A smart house is equipped by many electronic instruments for remote handling using e.g. a smart phone or a computer, providing the comfort of perfectly running a household (dinner being cooked, heating turned on, etc.). But all these decisions are mostly initiated by the inhabitants. It is more an automatized house than a smart one. We will have to re-define the behaviour of the technological elements.

Konečný (2015) asks a question: What can a smart house do? It can handle a washing machine, a dishwasher, feed a dog from a distance, dim lights, put blinds down, etc. and all this to be integrated into a single application, which can be downloaded into a smart phone. We can control at a distance whether gas or water is switched off, etc.

A smart city uses digital information and communication technologies to enhance the quality and performance of its urban services for the purpose of improving the life of its citizens. It is expected:

To have more effective waste management – in particular, by reducing the amount of waste and by enhancing the recycling process into new energy sources.

- To deploy new meters in water management, ensuring a reduction in individual consumption, effective monitoring of water quality and prompt identification of any water leaks combined with their effective prevention.
- Most importantly, in the area of energy, to regulate immediate energy consumption and electricity supply through the use of smart grids. It is expected that the development and construction of eco-building will be possible by using renewable sources of energy.

Písek is the first smart city in the Czech Republic that decided to use progressive technologies such as wireless technology for flexible junction control. Such technology enables the city to enhance transport convenience, the smart control of public lighting and the navigation of parked cars.

*d) Social services*

As the population gets older and richer, there is a need for those who will care for the elderly.

Hníková (2015) mentions an example from the future:

You come home after a long shift, sit on a sofa and drink coffee. While sitting, you talk to your wife Erika about a harsh argument with your boss. “Don’t bother with it anymore, tomorrow will be a better day” replies Erika with a calm voice and roguish wink. However, her gesticulation is a bit strange. No wonder, Erika is in fact a robot. She/It was built by a Japanese scientist named Hiroši Išiguro. There are a lot of human-like robots, as Erika and their number is increasing. They are capable of talking, answering questions and many of them can express emotions. Robots will soon become important companions of human beings. They will take care of the elderly and possibly work as receptionists in hotel lobbies or in grocery stores.

In order for a robot to become a companion, it should look like a human being to mitigate people’s psychological fears from an interaction with a higher machine. Robots should be smaller than people. Perhaps when future sons and daughters have no time to take care of their parents, they will buy a robot. Robots can help with ordinary daily activities such as supervision to see if the elderly take medication, or reading them a book. There have been failed attempts so far to integrate all the needed functions into one robot and therefore, we expect in the future specialized robots for different functions.

The era that will be dominated by robots is expected to take place in roughly 30-40 years from now. The question is how much will this affect the cross-generation relationships in such times? Psychology should play a major role in the issue.

*e) Health care*

One of NASA’s goals is to create a technology that would allow the doctors based in medical facilities on Earth to perform surgeries on astronauts in space. Such technology would of course be possible to use for cross-continent surgeries as well.

The military tend to replace traditional field hospitals with new mobile operating rooms placed in army vehicles. The new technology would allow the top surgeons based at military hospitals miles away from the battlefield to perform surgery on a wounded soldier in the heart of the battle. The military medical service would then be very like controlling the battle drones from special facilities via satellite connection.

“The remotely controlled surgeons” could perform a top quality medical service even in the most hostile environments. The label “medical robot” is not yet exactly accurate. There is still a human touch involved, however, the doctor controls everything remotely.

Thanks to nanotechnology there will be robots so small that they can operate inside organisms. Such robots could be placed within the intestinal tract or arteries to remove cholesterol from clogged blood vessels or to find and destroy cancer cells.

The data collected about patients (such as with x-rays) during their whole lives could be saved into computers. It would be necessary to combine the data into a single system that would be able to make a diagnosis of the patient right at the beginning with the participation of an attending doctor.

There are some ethical issues such as these:

- A diagnostic system could be programed to prefer medications produced only by a certain drug company.
- Who would be responsible for failed diagnoses?

Most importantly there is a lack of laws regulating such systems which is not an issue on the national level but on the world-wide level. (Novák, 2015).

### 3 The expected threats

#### a) Job losses

In the first place, the use of robots makes sense for simple routine operations. Robotization does not only concern jobs in factories but also in banks, insurance companies or newspaper agencies where robots can work faster and more efficiently than human beings. Not only blue-collar jobs but most white-collar jobs will be handled by robots including some of the jobs that may be wanted by our current students. At the beginning, it would be possible to find another job for the people that were replaced by the robots but eventually a situation might happen in which many people would not be able to find permanent jobs. The only vacancies for them would be seasonal jobs.

Vyhnanovský (2016) states that in developed economies which contain 65% of the world's labour force, 7.1 million jobs would perish by 2020 and only 2 million would be created. For the male population, one vacancy would be created for every three jobs where a human is replaced by a robot. For the female population, it is expected to be as high as one per five. Two thirds of jobs where the human touch would become unnecessary would be in office and administrative work. The rest would be in production and construction work. The future changes will also impact the field of finance, energy and health care. However, the demand for people working in data analysis or specialised sales and trading will rise. The biggest change would be noticeable in the methods of human work. Technology would allow us to work from anywhere in the world which would inevitably lead to outsourcing people for specific contracts.

#### b) Life-long unemployment

The economic forum in Davos discussed the issues regarding robotization. (Bureš, 2016). The computer revolution threatens more than 40% of jobs. Most threatened are the routine operations such as tax returns, telemarketing and similar jobs that can be simply digitalised. Even the non-routine jobs where a large amount of data or non-biased judgement is needed will be impacted by robotization. People are known for having biased judgements and that is why robots will be preferred in revealing fraud, in medical diagnoses or trials.

#### *Do computers replace people in working environments?*

One group of experts consider that the lost jobs will be replaced by new professionals. But people are slowly changing their qualifications. It isn't easy to switch from a storekeeper to a golf coach. Such a situation may result in long-term technological unemployment. And what if today's computer revolution will not bring the new jobs? A new problem seems likely to arise: providing livelihood for the new unemployed. But unemployment causes very negative opinions among people. If there are a lot of similar people, what kind of society will it be? Only a human being is capable of hearing out the problem of others, understanding and making a certain situation easier, not a robot.

Responsible governments are currently trying to find out how to deal with this situation. One of the ways is to assure permanent incomes for all people regardless of whether they work or not. The USA and Finland, for example, did some experiments in this field. In Finland two thousand people are given a monthly salary of 560 Euros which is sufficient for a frugal living. What they earn extra through their work, is a bonus. This solution, however, raises some doubts. There are still many maladjusted people in our society who are not interested in working and live off the state or charity organisation's aid. Would the introduction of this measure result in an extension of this group of people?

The difficulty does not lie in providing people with a living and meals but in the purposeful use of their leisure time, leading to a good quality life. Otherwise there is a threat of higher criminality, alcoholism, drug abuse and subsequently various terrorist actions.

Mr Aliapulios, a British economist, thinks that everybody may be entitled to money without work (Bureš 2016). For example, a basic income could reach 300 – 400 Euros per person, with gradual increases. No countries have introduced it, but pilot testing exists. India gave monthly payments of 300 rupees, to 6 thousand people for two years. The amount represents a half of minimal living costs for village residents. This basic income had a beneficial effect on the people's well-being, health, diet and education. They worked harder and more productively.

Social systems in Europe are said to be bloated, complicated and bursting with exceptions. The number of officials who patrol the social benefits is approaching the number of beneficiaries.

Together with that the costs of the system are increasing. Fraud and abuse are a daily reality. A flat rate of benefits would eliminate this. The new world would not necessarily be a world of slackers. It works in the Gulf States and in Alaska where the governments try to keep people in places which are difficult for living (Hrstková, 2016).

Swiss residents refused a similar system in a referendum on 5 June 2016. Schuster comments on it as follows (Schuster, 2016): the guaranteed income would be 2500 Swiss francs per person, i.e. 61 thousand Czech crowns, and 625 francs (15 300 crowns) for minors. These amounts could ensure a modest, but safe life without financial difficulties. Of course, implementation of such a system would take time, e.g. 10 years, and the existing social system would have to be changed. The system would get the same money but a new mechanism for better money distribution would be used.

The question is, how to motivate people to work despite a guaranteed income. It is high time to attend to people who have no opportunity to assert themselves on the labour market or must perform poorly paid work and then become blackmailed easily.

*c) Widening the gap between the rich and poor.*

The existence of the digital world together with the spread of the Internet and social networks has accelerated the development of a small group of people who own an increasing share of global wealth. Brynjolfsson and McAfee (2015) refer to the application of the principle “Winner takes all“. An Olympic winner may get millions of dollars while the one at the second position may be forgotten although their results differ in tenths of a second. Even top executives draw salaries like pop stars. The ratio between a CEO and an average worker has increased from 7-to-1 in 1990 to 300-to-1 in 2005. Most of the increase is connected to the use of information technologies. CEOs use digital technologies to monitor activities in companies all over the world, give instructions to change the processes, ensure accurate execution of the instructions and in this way the value of these people increases. In the past CEOs could only affect a small range of activities through a long chain of their subordinates.

Whenever a market is digitised, the economy based on the “Winner takes all“ system, becomes more significant. The traditional market works in the following way: a man works at 90%, makes 90% of the value and gets 90% of money. In contrast, a software programmer who creates a better navigation application (with more data or nicer icons) may totally dominate the market. Demand for a fifth or tenth map application is unlikely to appear although it can operate comparably with the first version.

The economy of personal services (keepers, gardeners,...) differs totally as each provider meets only a small fraction of overall needs on the market. However, when an activity changes from the second group to the first one, such as preparation of tax returns, the economy leans to the “Winner takes all“ system. Only the best version applies to the market and makes millionaires of the authors.

*d) Intelligent robots and guarantees on their activities*

Robots have still operated on the basis of programming. However, they will gradually begin to decide themselves in some situations. Experts are currently holding talks on the responsibility for accidents caused by the driverless cars. Such self-driving cars have been tested in designated areas, e.g. in Singapore, and an accident caused by a driverless car has already happened. The car was dazzled by the sun and misinterpreted the situation. The producer announced he will cover the accident costs.

An electric car, Model S, produced by Tesla Motors is able to observe the distance from other cars, change lanes and park. Difficulties may appear when the self-driving car tries to decide whether and how to save its passenger if it endangers a child on the pavement. All rules must be programmed in the cars carefully and implemented into the law system.

Intelligent robots are used in military areas, e.g. unmanned drones which can be navigated to a target such as a wanted terrorist and fire a missile which can kill him. However, even though a man still decides about

navigating and firing the missile, civilians may die together with the terrorist. Armies develop small tanks which can easily get in the enemy's rear, find the humans and liquidate them. These tanks, however, will have to make decisions for themselves, because remote commands can reduce their merits. Then the robot will decide who is to die. This is not science fiction but close reality. Jurisprudence should deal with these problems (Petr, 2015).

#### 4 Conclusion

Incoming generations of workers may not be prepared for the changes connected to Industry 4.0. Their hopes and plans will not be fulfilled and young people can easily be manipulated by political parties and contribute to disturbances in the society.

The following news can illustrate the situation. Some students were asked questions concerning the future of technology development and unemployment growth. All of them agreed with the fact that technology development can lead to 50% unemployment but nobody counted themselves among the unemployed. All of them suppose they will not belong to the unemployed. That is not a good preparation for the future. Students should focus on their own creativity, ability to adapt in various surroundings and concentrate on multi-purpose studies.

Centuries ago Voltaire asked people to judge students by their questions, not answers. (Brynjolfsson and McAfee, 2015). Asking our own questions means that we want to understand the topic better, and get insight into it instead of rote learning. In general, the school system is recommended to:

1. Change rote learning to system thinking. See problems from all points of view.
2. Adopt an interdisciplinary attitude. We currently educate highly specialised experts. They are highly qualified in their field but do not know anything about others.
3. Undertake re-training. Sixty percent of people are expected to change their professions in the following 15-20 years. Numbers of workers in production will decrease while the numbers of those who will supervise production will rise. Workers will become operators of security systems.
4. Offer courses for students of information technologies and health and social care who will be in great demand. Lawyers and psychologists will play an important role in the development of Industry 4.0.

Nowadays computers seem uncreative and un-innovative. They are not brave, cannot smile. Computers and people may complement each other in the future.

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Title: Complementary Papers and Book of Abstracts  
of the 10th International Scientific Conference INPROFORUM 2016

Editor: University of South Bohemia in České Budějovice, Faculty of Economics

Publisher: University of South Bohemia in České Budějovice, Faculty of Economics

Copies 50

Pages 76

First edition

