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SURVEY ON THE LEVEL OF KNOWLEDGE AND SKILLS OF PROJECT MANAGERS IN REGIONAL DEVELOPMENT

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Abstract

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The level of knowledge and skills of project managers in the field of regional development shows a high level of differentiation, which has an impact on management of (non)investment projects in the given region. For effective addressing problems of regional development is crucial that projects will be processed, handled and managed at a professional level. The paper aims to confirm or disprove the given hypothesis and to identify the knowledge areas affected by the ignorance the most. For this purpose the survey on the level of knowledge and skills of project managers in regional development in NUTS III region in the Czech Republic was conducted. The survey results has allowed identifying the level of knowledge and skills of project managers in regional development in project management knowledge areas and thereby has enabled to identify the knowledge areas affected by the ignorance the most. Among these knowledge areas belong mainly Risk management, Scope management and Quality management. The results have also enabled to present the level of differentiation of the level of knowledge and skills of project managers from the mean and to compare findings in the particular NUTS III region of the Czech Republic among each other. The findings show a high level of differentiation of the knowledge and skills of project managers.

Keywords: Project management, regional development, NUTS III regions, knowledge and skills.

INTRODUCTION

Sustainable development is a new management paradigm relevant to projects and programs that requires a careful consideration of economic, ecologic and social issues. Projects of sustainable development span a wide spectrum with regard to length and geographical focus including local, regional and global level (Gareis, Huemann and Martinuzzi, 2013). Project management plays a key role in both global environment and on the local level and represents very important tool to solve problems of regional development. Projects have been defined as various concepts by different organizations such as IPMA, PMI and ISO (IPMA, 2006; PMI, 2013; ISO, 2012). These standards became etalons of project management because they are established on the ethical issues. Ethics is important because any decision when made ethically helps ensure that risks are diminished and trust among stakeholders is established (Emuze and Smallwood, 2012). Either there are large, medium or small projects all of them will face the same problems. How to reach the goal with limited resources and under the given period of time? The success depends mainly on two key facts. How effectively are the processes managed and how and who are the people involved. Both of them are given by the experience earned from project management practice and skills to apply

them. People, who work in the area of regional development as a project managers represent a driving force of social and economic changes in the regions and their sustainable development. These are people who initiate, plan, manage or control various types of projects in different areas with the aim to effectively spent private and public financial sources to improve living conditions in the given region. A research currently conducted has shown that mainly due to the globalization there is a significant increase in the performance of project management methods and tools by organizations (Too and Weaver, 2013). Project management is therefore powerful instrument for accomplishing the planned purposes of an organization's execution and control of activities in systematic order (Mir and Pinnington, 2014). How the project meets its stated goals varies with the project type. Private sector projects are usually required to provide some service or tangible goods in a reasonably profitable way. On the other hand, public sector are more about to provide services like health-care, security or jobs – on a non-profit basis – with the aim to meet social development objectives and to ensure economic growth (Jó and Barry, 2008). Meeting the values of sustainable development requires matching the values of the organizations with those of individuals involved in the project. Ethics, openness, social sensitivity, fairness, integrity, transparency, traceability, respect, efficiency, participation, respect and learning are some of the key values. (Gareis, Huemann and Martinuzzi, 2013). The abilities and skills of project manager significantly influence how the project will be executed and money spent. The ability to turn knowledge into action is called knowledge integration. The integration of knowledge from various competence areas is difficult and advocates integrating expert's individual knowledge to achieve effective knowledge collaboration and application (Grant, 1996). Therefore, "a project organization's competitiveness depends on the diversity and strategic value of specialized knowledge and the ability to integrate it in an effective manner" (Dietrich, Eskerod, Dalcher and Sandhawalia, 2010). That is a reason why there is a crucial importance to have qualified and professional workers on the right working positions. As the level of professionalism is primarily given by the education, practice and personality of project managers should be in the focus of departments of public authorities that are responsible for recruitment process. They should be focused on the level of education in the field of project management, among others. Within the project management practices there are two main standards which define the scope of knowledge and skills of project managers in general. International Project Management Association define three main groups of project manager competences including technical, behavioral and contextual competences (IPMA, 2006) Project Management Institute define ten knowledge areas in five processes groups which should be met by project managers who want to be successful in project management (PMI, 2013). A lot of scientific sources deals with project's critical success factors (e.g. see Cooke-Davies, 2002; Hyväri, 2006; Bannerman, 2008; Khang and Moe, 2008; Nunnenmacher, et al., 2011; or Khan and Spang, 2011). Via the analysis of Word Bank project, among the five most important critical success factors (CSF) where identified also training and institutional environment (Ika, Diallo and Thuillier., 2011).

There exists several researches on how the projects can contribute to the process of value/output creation (e.g. see Cooke-Davies, 2002; Thomas and Mullay, 2007; Winter and Szczepanek, 2008; Lechler and Cohen, 2009) but there is much less researches on the level of abilities and skills of project managers. The difference between the competencies defined by project management standards and the competencies required for considering sustainability was observed by Silvius, Shipper, Planko, Van den Brink and Köhler, 2012. Furthermore, there exists a study which aims to specify the competence gap of project managers with regards to sustainability and to provide guidance on how to close this gap (Silvius and Schipper, 2014) or research dealing with specific improvements in most of the behavioral competencies of project managers or graduates of project management (Alam, Gale, Brown and Khan, 2010).

To be able to effectively address the particular level of knowledge education one need to know what are the abilities and skills of project managers who are participating in the management of projects in the field of regional development required. Therefore there has been survey conducted on the level of knowledge and skills of project managers working in the field of regional development. As different regions are dealing differently with their own problematic issues of development (e.g. see Rodríguez-Pose and Fratesi, 2004; Iyer, Kitson and Toh, 2005; Blažek and Csank, 2007; Kilijoniene, Simanaviciene and Simanavicius, 2010 or Storper, 2011) there has been traced that the level of knowledge and skills of project managers in the field of regional development are of a high differentiation, which has an impact on the level of processing and project management. This paper aims to confirm or disprove the given hypothesis and to identify the knowledge areas affected by the ignorance the most.

Survey results which were conducted for that reason have allowed identifying the level of knowledge and skills of project managers in regional development at NUTS III level in the Czech Republic and thereby to determine the level of differentiation and particular knowledge areas with the highest ignorance. The findings enable to target training of project managers in key areas of project management as well as provide the input information for the future researches tasks in the field or regional development.

MATERIALS AND METHODS

The paper is divided into three thematic sections. First section provides a background and literature review of the importance of knowledge integration of project management in the field of regional development. The second section explains the survey methodology by focusing on the study area and survey approach. And after all, the third section discusses the survey findings with brief conclusion.

Study area

The survey was conducted under the grant of Internal Grant Agency of Faculty of Regional Development and International Studies of Mendel University in Brno No. SP3151351. The survey aimed to determine the level of knowledge and skills of project managers who are involved in solving of regional development problems at NUTS III level in the Czech Republic. There are 14 NUTS III regions in the Czech Republic involving regions, how they are called in their original language: Praha, Stredocesky kraj, Jihocesky kraj, Plzensky kraj, Karlovarsky kraj, Ustecky kraj, Liberecky kraj, Kralovehradecky kraj, Pardubicky kraj, Olomoucky kraj, Moravskoslezsky kraj, Jihomoravsky kraj, Zlinsky kraj and kraj Vysocina. These regions administrate their geographical areas through the public bodies – Regional Offices, where the project managers dealing with the developing (non)investment projects within the given region are employed. There were addressed 42 project managers, 22 men and 17 women while 24 people were in the age of 18–35, 16 people in the age of 36–50 and two of them in the age of 51–60.

Survey approach

Survey was conducted through structured questionnaires. Questionnaires has aimed at finding out the level of knowledge and skills concerning fundamental principles, tools and techniques of project management according to international standards of project management (IPMA, PMI). The survey was conducted through interviews and filling out a questionnaires with the relevant project managers employed at NUTS III Regional Offices who are personally managing (non)investment project in given region. The questionnaire contains 22 questions divided into the fundamental knowledge areas of project management defined by the International Project Management Association (IPMA) and Project Management Institute (PMI) standards such as: Project Integration Management, Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Risk Management, Project Change Management, Project Procurement Management and Project Communication Management, (IPMA, 2006; PMI, 2013). There have been collected 42 questionnaires in total. Project managers at Regional Offices of NUTS III regions were interviewed on expression of their knowledge and skills in 9 knowledge areas of project management. The given answers were proposed and scaled according to following criteria:

The colors of answers in the table correspond to the colors of answers in the particular figures. They are same for all figures in the paper. The survey was conducted from March to September 2015.

For the statistical analysis the indicator of statistical dispersion is used. Statistical dispersion measures how far a set of number are spread out. For our purposes we have used the measure via the average deviation. The average deviation is equal to the following formula.

$$average\ deviation = \frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})$$

This formula expresses an average of the differences between each element of the set of data and the mean where n is number of elements, x is the value of element and $\bar{x}$ is the mean (Bartsch, 1987). The results will enable to define the level of knowledge and skills differentiation.

RESULTS

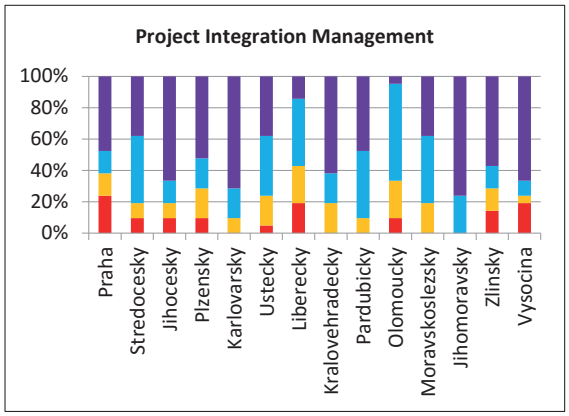
On the base of survey there has been found out the data regarding single knowledge areas in given regions. Data detected in the given regions according to the project management knowledge areas defined by the international standards are introduced below and they are interconnected with

I: *Questionnaire answers and criteria of their scaling*

Certainly not	**I do not know the issues, I need complete training and education in the given field**
Rather not	**I have heard about the issues, but I have never applied it, I need thorough training and education in the given field (refreshment problems, definition of the issue, application examples etc.).**
Rather yes	I have studied and applied issues in the past but I do not remember them, I need to refresh knowledge in the given field
Certainly yes	I know issues and I apply them regularly, training is not needed, I am able to work independently in the given field.

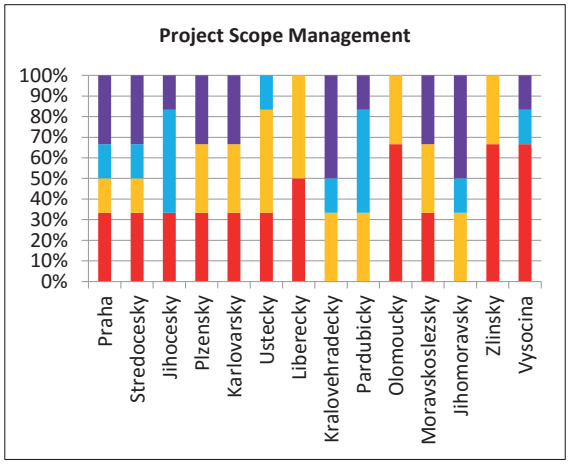
Sources: authors

the basic principle of project management – triple constraint. Triple constraint represents the model of the main project's attributes such as time, cost and scope (IPMA, 2006, PMI, 2013).



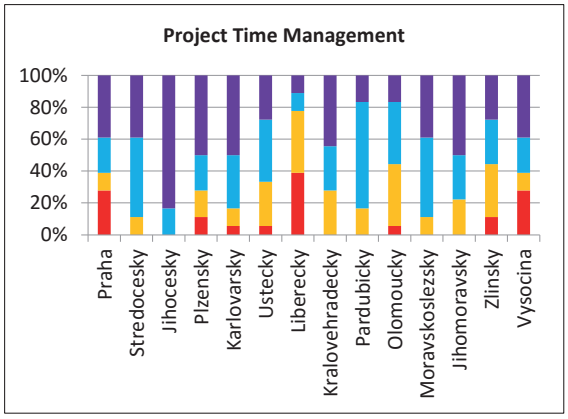
1: *The level of knowledge at NUTS III regions in the knowledge area of Project Integration Management*
Sources: authors

The Figure 1 shows data of level of knowledge in the Project Integration Management. This knowledge area contains processes such as developing project plan, definition of project objectives and benefits, preparation of project organizational structure and developing of responsibility matrix. Concerning the project's triple constraint (time, cost, scope) within this knowledge area the given attributes of triple constraint are planned and interconnected among each other. According to the data detected there can be observed that there is generally no problem with management of project integration in the regions. Project managers dispose of knowledge and skills regarding management of the project on the whole and the integration and management of time, cost and scope run without problems. The lowest level of knowledge is around 40 % in one of the regions.



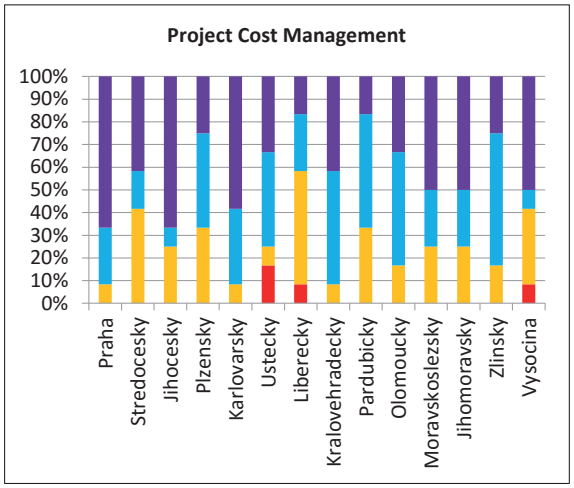
2: *The level of knowledge at NUTS III regions in the knowledge area of Project Scope Management*
Sources: authors

The Figure 2 introduces data regarding the level of knowledge in the field of Project Scope Management. This area contains processes such as creating Work Breakdown Structure (WBS) or defining and validating project scope. This area shows significant level of ignorance in all regions included. Some of the regions show more than 60 % lack of knowledge where project managers admit that they do not work with WBS and its outputs. WBS has the most important consequences on planning project scope and subsequently planning time and cost. Without proper knowledge of this method the project planning and execution is highly endangered.



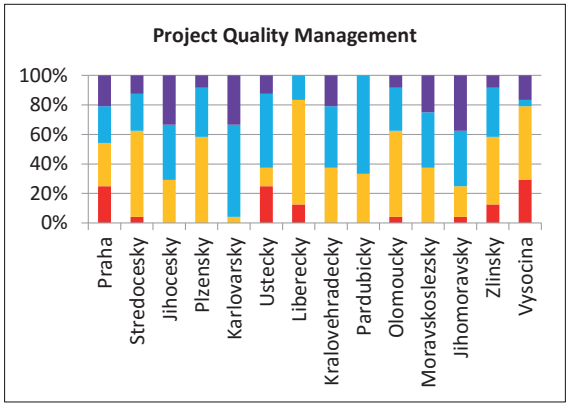
3: *The level of knowledge at NUTS III regions in the knowledge area of Project Time Management*
Sources: authors

The Figure 3 introduces data regarding the level of knowledge in the knowledge area of Project Time Management. This area contains processes such as developing and controlling the schedule on the base of the methods such as Earned Value Management (EVM), Milestones Trend Analysis or percentage completed method. This knowledge area is connected mainly with time within the triple constraint framework and interlinks the planning, executing and monitoring and controlling phases. According to the data detected there is no problem with this knowledge area in general. Nevertheless there can be seen the problematic situation in several regions. As the regions have not much problems with schedule development, there is significantly low level of knowledge of methods to control schedule. The main problems were detected with EVM and method of percentage completed which may cause problems with monitoring and controlling of time.



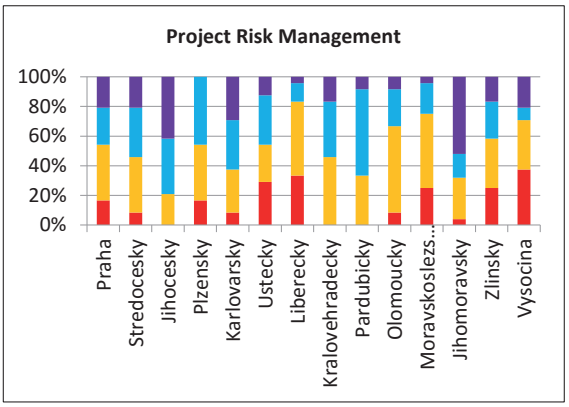
4: *The level of knowledge at NUTS III regions in the field of Project Cost Management*
Sources: authors

The Figure 4 shows data regarding the level of knowledge in the field of Project Cost Management. This area contains processes such as budget determination, preparation of cash flow and calculation of rentability data, payback period or net present value. This knowledge area is connected with cost within the triple constraint model and interlinks planning, executing and monitoring and controlling phases. On the base of data detected there is no problem with the knowledge of this area in general. Problems were detected with the methods of returns of investments and rentability data calculation in couple of regions which may cause a problem in planning phase of the projects.



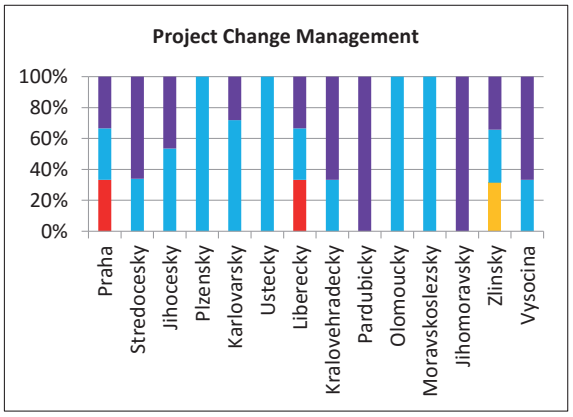
5: *The level of knowledge at NUTS III regions in the knowledge area of Project Quality Management*
Sources: authors

The Figure 5 introduces data regarding the level of knowledge in the field of Project Quality Management. This knowledge area contains processes such as quality assurance and quality control on the base of the tools such as systematic data collection, histograms, trend analysis, Pareto analysis, Cause and effect analysis etc. This knowledge area is mainly connected with planning, executing and controlling of scope but have also important consequences for planning and executing of time and cost. According to data detected this knowledge area shows problematic issue for most project managers in regional development. In half of the regions there was detected more than 40 % of project quality management ignorance.



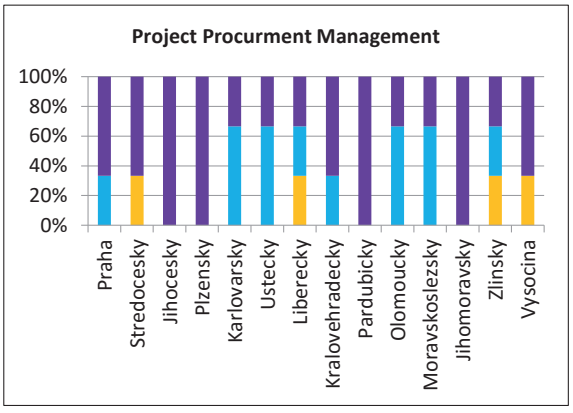
6: *The level of knowledge at NUTS III regions in the knowledge area of Project Risk Management*
Sources: authors

The Figure 6 introduces data regarding the level of knowledge in the field of Project Risk Management. This knowledge area contains processes such as risk identification, risk quantification and use of methods such as Risk Project Analysis (RIPRAN), Facilitated Risk Analysis Process (FRAP), sensitivity analysis, risk tree assessment etc. Risk Management is integrated into the whole model of triple constraint and without proper risk analysis the triple constraint cannot be effectively planned, executed and controlled. According to data detected risk management represents problematic issue for project managers in regional development. Majority of regions shows more than 40 % ignorance of this issue and two of them show more than 30 % of total ignorance of Risk management knowledge area.



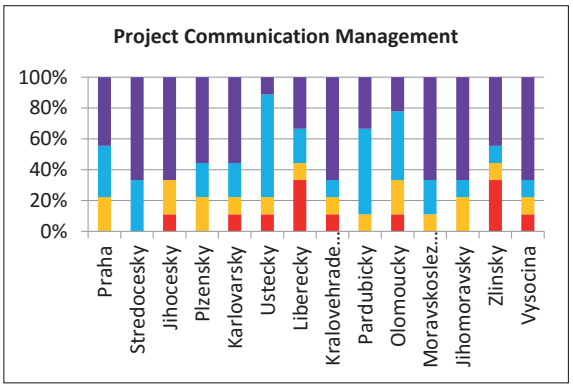
7: *The level of knowledge at NUTS III regions in the knowledge area of Project Change Management*
Sources: authors

The Figure 7 introduces data regarding the level of knowledge in the field of Project Change Management. This knowledge area contains all processes connected with the management of changes in project triple constraint. Within this knowledge area there is important to follow not only the changes of single attributes of triple constraint but also to predict what will happen with the attribute (e.g. time) when one of the others has changed (e.g. cost or scope or both). The mutual correlation of the triple constraint attributes and the ability to predict the future development is one of the key skills of project manager generating project success. According to data detected Change management does not represent problematic issue for the project managers even though there are some of them who never manage changes in the projects according to their statement.



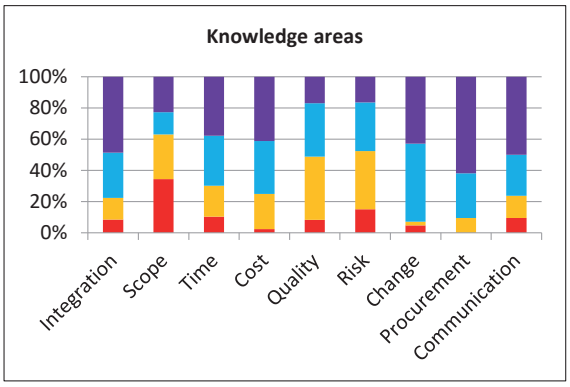
8: *The level of knowledge at NUTS III regions in the knowledge areas of Project Procurement Management*
Sources: authors

The Figure 8 represents data regarding the level of knowledge in the knowledge area of Project Procurement Management. This knowledge area contains all processes connected with the management of procurements and contractual relationships. From the triple constraint point of view this knowledge area represents a supportive power. With a proper knowledge of agreement statement, law conditions and all other contractual issues many of problems that occur within a project can be quickly and effectively solved. According to data detected procurement management represents less problematic issue and for the project managers in regional development working in public bodies represents their daily routine. The question rises here, how the project managers are able to react when there is an unexceptional contractual case or problem which is not of their daily routine.



9: *The level of knowledge at NUTS III regions in the knowledge area of Project Communication Management*
Sources: authors

The Figure 9 introduces data regarding the level of knowledge in the field of Project Communication Management. This knowledge area contains processes such as development of communication plan, preparation and finalization of project documentation and use of project IT software. This knowledge area represents also a supportive power for the management of triple constraint attributes. This is not much about management of triple constraint factors but more about tools how to ensure their proper planning and executing. The effective communication with stakeholders represents one of the critical success factors of projects in general and IT support one of the precondition (not necessary) how to manage projects effectively. It also simplifies the final documentation of the projects. According to the data detected there can be stated that the use of IT technology and preparation of communication plan with stakeholders represent no problem for project managers in regional development. Nevertheless there still exist regions in the Czech Republic where IT software is not a common tool for the project management



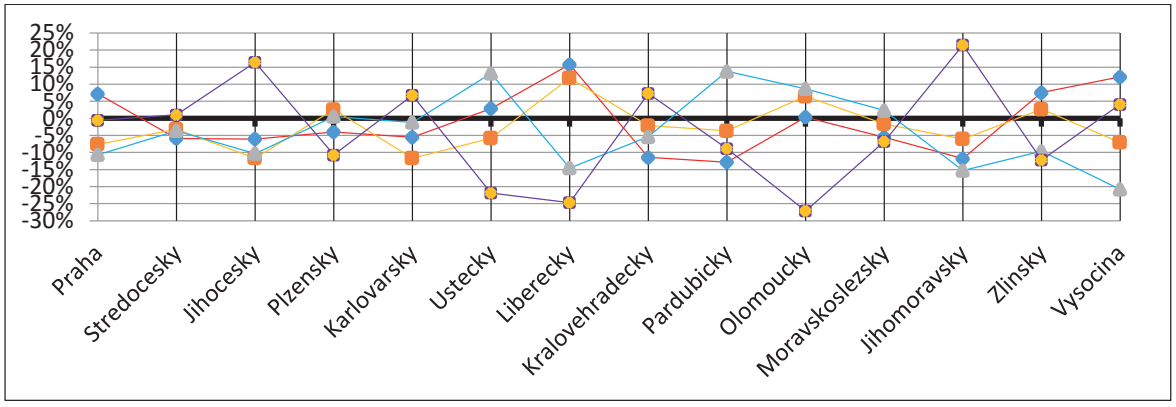
10: *The level of knowledge of project managers in the given field of project management at NUTS III level regions in the Czech Republic*
Sources: authors

To conclude an analysis of level of knowledge in single knowledge areas of project management there is the Figure 10 presented where all knowledge areas are introduced in one chart. There was detected Project Scope Management, Project Quality Management and Project Risk Management as most problematic knowledge areas with lowest level of knowledge among project managers working in regional development in all regions. The ignorance of Scope knowledge area reached over 60 %, Quality and Risk knowledge areas have around 50 % lack of knowledge. These knowledge areas significantly influence the project triple constraint and without proper knowledge of their principles and way of implementation the project are highly endangered to reach a success.

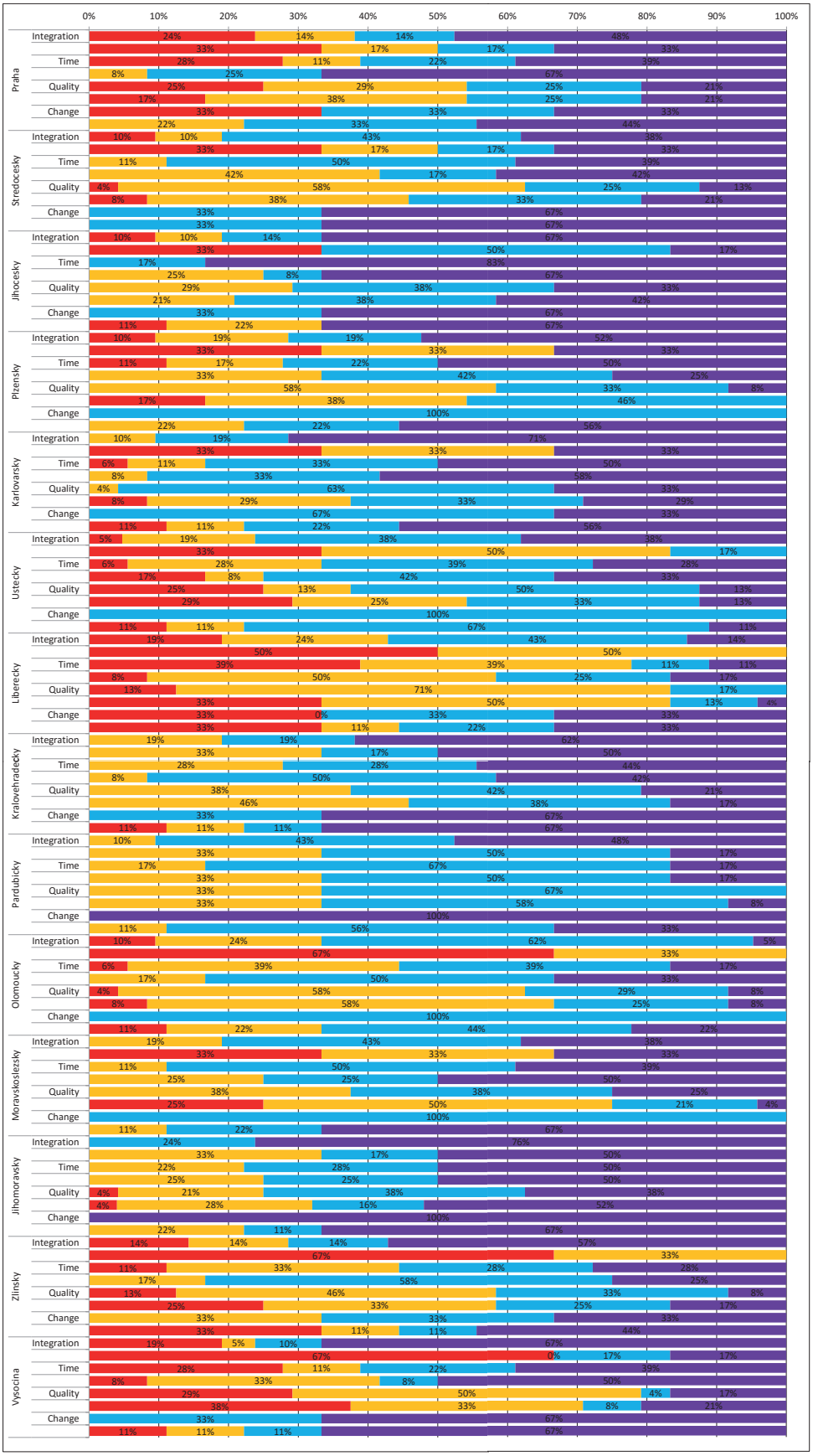
After the analysis of the most problematic knowledge areas we can look on the level of differentiation of knowledge and skills in given regions.

In general we can state that the level of knowledge of project management principles in NUTS III region in the Czech Republic vary from each other, moreover there can be seen several differences in the single knowledge areas, namely Scope Management, Quality Management and Risk Management. For compact view we can look on the situation in the data set of statistical dispersion. We will look how all project management knowledge areas in given regions vary from the total average of level of knowledge in the Czech Republic. The Figure 11 introduces the dispersion of level of knowledge in the NUTS III regions from total average of level of knowledge in the Czech Republic in all knowledge areas of project management. The positive or negative difference from national average oscillates from 20 % to –22 % on upper limit and from 1 % to –1 % on lower limit. We can see that within this range the collected data are differentiated around the mean and what extent exactly.

For all-inclusive view, the Figure 12 presents all data gathered from all regions where the differentiation can be observed. According to data detected we can see that there is a group of ten NUTS III regions that have more than 50 % ignorance of at least one of knowledge areas. The most affected knowledge areas are Scope, Quality and Risk that was already observed in the analysis above. One of the regions also proves more than 50 % ignorance in Time and Cost knowledge areas. On the other hand higher level of knowledge can be observed in the group of four NUTS III regions. There can be found NUTS III region with none ignorance in all knowledge areas within this group.



11: *Dispersion of level of knowledge in the NUTS III regions in the field of project management (all knowledge areas)*
Sources: authors



12: *The level of knowledge of all knowledge areas in NUTS III regions in the Czech Republic*
Sources: authors

DISCUSSION

The European Union aims to strengthen social and economic cohesion of member states and spent huge amount of money to invest in order to boost a social and economic development in the regions. The approved budget for the Czech Republic in the programming period 2014–2020 is € 32,082,340,686 in total, from which € 24,203,705,168 is from EU budget and € 7 878,635,518 from the national budget (European Commission, 2015). This money is administrated by public authorities on both national and regional level. The regional level is arranged by the project managers who are personally dealing with single projects of various types and sizes. From this perspective the project managers, their personalities, abilities, skills and knowledge play a key role in successful or unsuccessful solving of regional problems. The level of management of (non)investment projects in the regions influence the level of effectively spent financial resources on these projects and thus level of development in given region. Project managers as a coordinators of activities, leaders or managers of project team or economic experts are (or should be) therefore in the core of interest of public decision makers. There is common agreement that project managers should have a particular stint of knowledge of project management, (Dolezal, Máchal, Lacko et al., 2012). This is also worldwide consensus which is proved by existence of international project management standards (IPMA, 2006; PMI 2013). If project manager does not dispose by given stint of knowledge for particular level of project management it can significantly and negatively influence the aims of society to boost economic and social development in the regions.

The results that were detected during the conducted survey show the level of knowledge of project managers who are working with single projects in NUTS III regions in the Czech Republic. From the survey we know that Scope, Risk and Quality are the most affected knowledge areas by ignorance. While Quality and methods of its control and assurance can be taken as marginal for projects in regional development from the project managers point of view because the quality of product is under the responsibility of product (service) producers (providers) who are usually different from the employees of Regional Offices, the other results – significant ignorance of Scope and Risk knowledge areas – raise the alarm. The Project Scope Management is about to create Work Breakdown Structure which represent hierarchical structure of several level of details of project activities or output. Without the proper knowledge of WBS creation there is very difficult and ineffective way how to prepare project schedule and project budget. WBS creation represents fundamental knowledge of all project managers and inability to create WBS jeopardize all project phases.

While Scope ignorance jeopardize all project phases, the ignorance of Risk management endanger mainly the phase of project execution. Underestimation of project risks (both internal and external), inability of risk identification or risk quantification represent project risk itself. Without proper risk analysis of given project, project will be all the time affected by casual circumstances which can lead to total project failure in ultimate consequences. And this can be very costly for public budgets.

The role of project managers in the field of regional development requires adequate abilities, skills and knowledge. This can influence project positively or negatively in its entirety and therefore the orientation on the level of knowledge of project managers should be in core interest of any decision maker. This conforms also to the findings of Grant, 1996; Dietrich, Eskerod, Dalcher and Sandhawalia, 2010; Ika, Diallo and Thuillier, 2011 or Silvius and Schipper, 2014. The survey on abilities and skills of project managers in regional development in the Czech Republic confirms the hypothesis, that the level of abilities and skills is highly differentiated in the NUTS III region in the Czech Republic. The knowledge of basic project management techniques and principles in NUTS III regions in the Czech Republic are spread out from the mean in the range of from – 20 % to + 20 %. This can be the reason why some of the regions are more successful in financing projects from EU funds than others. The impact of level of knowledge of project managers working in regional development on the regional development itself will be matter of future research. By avoidance of failures in human resource management in project management within the framework of regional development and by targeted education and increasing professionalization of particular project managers the management by projects can be much more effective and more oriented on successful results.

CONCLUSION

The purpose of this paper was to confirm or disprove the given hypothesis and to identify the knowledge areas affected by the ignorance the most through the survey on the abilities and skills of project managers working in the field of regional development, specifically in NUTS III region in the Czech Republic.

Project management is a problem-solving fundamental instrument of regional development. This is not only an effective tool for management and control, but represents also the philosophy of thinking that can solve most problems imaginable. Its understanding and rooted principles are applicable to tackle problems on both global and regional level. The development of regional policy in the Czech Republic and in the EU in the last decade and solutions of problems of regional development through EU subsidy policy have caused differences and erroneous perception of the concept of project management, projects and effective tools and techniques of project management among others. From these differentiated perceptions much differentiated level of knowledge and skills of project managers at regional level run. The survey on the abilities and skills of project managers in NUTS III regions in the Czech Republic proves that the level of knowledge and skills of project managers in the field of regional development is highly differentiated. The balancing and increasing the level knowledge and skills of the project managers should be taken as a target of decision-making bodies that are responsible for the programming period 2014–2020. The endeavor to increase the level of knowledge and skills of project managers should be intensified mainly in the regions Liberecky, Olomoucky, Zlinsky and Vysocina where the level of ignorance of the project management knowledge and skills in general are more than 40 % which is supposed to be significant since the lowest level of ignorance is seen in Jihomoravsky and Jihocesky regions at a level of 20 %.

The results of the survey have shown that the knowledge areas affected by the ignorance at the highest level are Scope Management, Risk Management and Quality Management. Training particularly in these areas in all regions should be better targeted according to international standards, which are based on long-term monitoring and analysis of best practices of a large number of projects, both on regional and global level. This should be target of all regions because these three knowledge areas represent a basic precondition of successful project planning and executing. The findings of this paper should serve as input information for the future researches tasks in the field or regional development as well.

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