Project Management Development – Practice and Perspectives

Second International Scientific Conference on Project Management in the Baltic Countries
April 11-12, 2013, Riga, University of Latvia

CONFERENCE PROCEEDINGS

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PREFACE

Ladies and gentlemen, honoured guests, and friends of project management!

This is the second year in a row that the Economics and Management Faculty of the University of Latvia together with the Professional Association of Project Managers organize an international conference for project management, gathering professionals from a number of countries.

In 2012 seven countries were represented (Latvia, Estonia, Germany, Spain, Russia, Island, Hungary), and this year several others have joined in. We will be hearing project management professionals from Poland, Portugal, and Lithuania.

The conference aims to host a vast exchange of ideas, thoughts, and experience in the benefits of applying project management to resolving practical problems.

Project management has been developing rapidly over the last 30 years and become an important factor in business success. It opens new opportunities for businesses to increase their competitiveness in the market. Project management methods improve project transparency – cash flow tracking, project risk assessment, and risk prevention planning, project stakeholder analysis, project implementation planning and supervision. This is a particularly important aspect for Latvia, since the coming years will bring many large scale projects both in railway reconstruction and big construction objects, such as the new concert hall, as well as various sizeable event organization, for instance Riga-2014.

Success and investment-efficiency of such projects require modern methods of project planning, supervision, and controlling, which in turn raises the question of the professional competency of a project manager. The last ten years in Latvia have seen several incentives to raise their competency, and one of them is the establishment of the project manager as a profession in 2002, and its reinstatement in 2011, in accordance with the most up-to-date PMI and IPMA standards. The renewed professional standard of project managers was approved by a regulation of the Cabinet of Ministers in 2011.

Another no less important event is the development of professional two-year master studies programme for project managers, by the EMF of the University of Latvia. More than 50 professionals have graduated from this programme, which has been available for five years. This year, another 20 will receive their master's degrees. It must be noted that similar programmes have been developed in two more higher education institutions in Latvia – the University of Agriculture of Latvia and the Riga International School of Economics and Business Administration.

The interests of project managers in Latvia are protected by the Professional Association of Project Managers (PVPA), which also fosters further development of the profession. The PVPA has been working for three years already and has participated in the organisation of this conference.

The scope of papers that will be presented in this conference is vast – the subjects range from the theoretical issues of project management to practice. The most essential areas touched upon will be the following:

- Transport, Infrastructure, Engineering, Industrial and IT Project Management aspects

  Development in this field is closely bound to others, such as suppliers, manufacturers, trade partners – we will see how the modern project management can improve their cooperation.
- Problems and Solutions in EU Funds Project Management (Implementation)

  We will take a look at the problems and risks in the project implementation, and how project management methods could improve the situation.
- New Project Management Perspectives

  We will discuss the role of a project manager in a project, and the impact of the human factor, as well as what it takes to increase the competence of project managers. Also we will try to find out new project management perspectives and solutions.

These are questions that practice experts and scientists have proposed to discuss in this conference.

There will be a special event this time – the PVPA award in project management, which will go to the best master's papers of the last year. This tradition was started in the previous conference, and we continue with it this year as well.

We would like to thank our generous sponsors – "Latvijas Mobilais telefons" Ltd. and the Ventspils Free Port Authority – for supporting the organisation and successful carrying out of this conference.

On behalf of the conference organisers, I'd like to greet all participants of the conference, to thank them for honouring us with their presence today, and to wish us all interesting discussions full of new ideas, renewing of old contacts and finding many new ones.

Prof. Dr. oec. Žaneta Ilmete
Chairman of the board of the Professional
Association of Project Managers

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THE ROLE OF LEADERSHIP IN PROJECT-ORIENTED ORGANIZATIONS

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Abstract

The future challenges of telecommunications companies are related to the convergence that will manifest itself as the merger of the Internet, mobile, fixed and television/video communications into one service package.

The key of the project management discipline is the project manager – his/her skills, competencies, experience, and personality. Research shows that leadership is currently the most demanded competence in all levels of management including project management. As projects become more sophisticated and in many cases are related to organizational change the need for leadership is growing. Ability to meet the challenges and hardships, to allay uncertainty in the team becomes crucial to succeed in development projects.

The role of a leader in a project is more than just effectively managing resources – human, financial and time, in order to achieve the goal. The leader has a clear vision, ability to bring out the best in people and inspire them to perform better than they knew they could. Project management based on leadership can ensure that energy is used to create value for the company and people take responsibility for bringing the team closer to the common goal.

The aim of the paper is to justify the leadership change in the organization's management approach as the main competence in project management. Analysis of the role of leadership in mobile telecommunications industry in Latvia confirms that in the changing environment, leadership is an essential competency in business development projects and only a project-oriented telecommunications company with distinct leadership presence can expect to succeed in the changing market environment.

Introduction

Studies show that only 20% of project success depends on the approaches to work management, while the remaining 80% of project success depends on other roles of a project

manager in a project [32], such as leadership, team management, organizing negotiations, problem-solving, among others.

The concept of leadership in academic writings has been known for a long time: the most significant studies date back to the 19th century and leadership as an object of scientific study up to the modern day has become increasingly topical and has developed to have many research aspects [2].The leadership theory presents a vast variety of study objects – the leadership concepts refer to a range of fields of human activities, such as politics, pedagogy, psychology, science, entrepreneurship, etc. One of the scientific study fields is the influence of leadership on development of enterprises, and it has grown over time, along with technological development and with the need for new methods to achieve entrepreneurship goals. Leadership is interpreted as manifestation of power, the managerial status and social position, as well as the implicit impact on processes.

Under circumstances of increased globalization, technological development, and intensified competition, the creation and implementation of new ideas are crucial in development of a company, fostered by successful process management. As the external conditions change, the company must adapt and the past activities must be adjusted and rearranged, which, for its part, calls for making unaccustomed decisions. Lack of leadership in a company's management ensures keeping the internal peace in the company and ignoring the external factors. In a long term, this type of management of a company can lead to its inability to adapt to the external environment.

Project management as a set of planning, performance, and control techniques is a way of organizing the necessary changes at a company. The project-oriented organization form has existed in Europe since then 1960-ties. Such companies organize the internal processes, activities and everyday work in line with project planning methods, because it significantly reduces resource consumption. Ensuring that all of the company employees have the necessary knowledge and understanding of process planning, management, and control in project form is very important in increasing the value of a project-oriented enterprise. In such companies, managerial competence in project management is of major importance, along with the project managers' knowledge, competencies, personal skills and qualities. Well-trained project managers and capable leaders are those, who guide a company towards achieving excellent results.

Theoretical Background

In the 21st century, the importance of leadership is increasing over the world, and that is determined by the expanding manifestations of globalization – investment flows, labour force movement, increasing consumption of goods and services, changes in national economy structures. Business globalization also affects the requirements with regard to leaders' skills. For example, in managing young, highly qualified employees, one has to take into consideration new methods with more intensive engagement of employees in decision-making processes [35]. Maccoby believes that today's organizations have to cope with particularly difficult circumstances, under which diversity is increasing, forcing to give up stereotypes and truly understand personality differences and ways of thinking and learning [24]. Therefore, new paradigms and skills are required for organizations to be able to meet the challenges of rapidly changing environment.

Development of Leadership Theories, Leadership Definition

Historically, leadership study schools have evolved from analysing an individual and his/her impact on processes to analysing behavioural theory aspects (behavioural theories).Thus, for instance, the academics Müller and Turner distinguish the main stages of leadership theory development as the trait school thought, which developed during the 1930-ties (leaders' personality, knowledge, charisma), followed by the behaviour school during the 1940-ties (managerial style in achieving goals),the contingency school of the 1960-ties (the leader's goal to be achieved and the problem situation), the visionary and charismatic school of the 1980-ties, and the competence school of the early 21st century [29].

Criticism of the theoretical stances of the leader trait thought encouraged further development of theoretical cognitions about leadership. Therefore, effort was made to keep away from leaders' traits and address behavioural analysis fostering achievement of results. Theoreticians of manager behaviour also distinguish between change-oriented behaviours(based on promoting creativity, assuming risk) and passive leadership (based on the followers' and subordinates' self-initiative and potential to self-manage) [8].

Furthermore, Northouse also mentions that in the preceding studies of leadership theories and practice, it is concluded that "there are almost as many different definitions of leadership as there are people who have tried to define it" [31]. Upon considering a number of leadership definitions, it can be inferred that leadership is a process, whereby an individual influences a group of individuals to achieve common goals [31] and it is described by collaboration between leaders and members of a group, including a sharing of leadership responsibility [9]. Kotter defines leadership as "development of vision and strategies, the alignment of relevant people behind those strategies, the empowerment of individuals to make the vision happen, despite obstacles" [20]. Features and historical development of theoretical schools of leadership are analysed in the next section.

Leadership-Defining Approaches and Leadership Management Styles in Projects

The leader and his/her followers play an important role in the leadership process. The leader shapes a vision, gets engaged in achieving the common goals, and it is important for the leader to influence changes and achieve results [20]. In order for the leader to manage a project successfully, they must have not merely skills and abilities, but also followers. Maccoby points out that, in trying to understand what leadership is, it is often forgotten that in the leadership equation, the leader's followers are of the greatest importance. Maccoby considers a tendency of followers projecting the leader as an important person from the past (the mother, father, brother, or sister) [24]. The following approaches characterizing the leader have been described in writings:

- trait approach–identification of such traits of a leader that distinguish him/her from the manager or followers (intelligence, self-confidence, sociability).The works by Tead, Stogdill, Lickert and Fiedler among others must be highlighted in the study of trait approach [40];
- skills approach–identification of the most significant skills of the leader. Katz points out three most important skills – technical, human, and conceptual [3], as well as problem-solving skills, knowledge, decision-making [26];

- style approach– in writings, autocratic, liberal, and democratic managerial styles are distinguished. Such academics as Lewin and McGregor must be highlighted in the style approach research. The aforementioned styles differ by the level of engaging the employees in decision-making, by information flows and type of communication.
- situational approach –the models of personal traits of managers and the behavioural models could not explain the logical link between a manager's behaviour and effectiveness. Even though the manager's traits are an important success factor, the studies proved that management effectiveness is influenced by other factors as well. Namely, the work environment, information exchange, nature of group tasks, etc. Both trust and clearly defined tasks are important in the process of completing tasks [5].
- psychodynamic approach [31] – leaders using this theory are those who understand:
  - the followers' attitudes, potential, behaviours, and expected responses to leadership;
  - the level of maturity of followers and its impact on their responses to leadership actions;
  - the desires and motivational keys of followers;
  - the meaning and interpretation by followers of language, behaviour, symbols, and situations;
  - the proper balance of dependence and independence appropriate for a given group of followers;
  - the proper psychological relationship between the leader and followers; of the psychodynamic interplay between the leader and followers and between and among leaders as well [33].

Leadership is regarded as the key to success not merely for a single project, but for entire business structures as well, moreover, it is also linked to failures in achieving business goals. Bass describes measuring of leaders' effectiveness at a company using quantitative methods – taking into account net turnover dynamics, profit indicators, costs, and return on investment, and other similar indicators. Other indicators affecting achievement of a company's goals and attributable to leader's effectiveness are not less important, such as employees' performance, quality of goods or services (number of customer complaints, changes in the customer loyalty indicators) [2], effective project management, performance of the project leader and work group. Likewise, the leader's impact on a company's development features also indirect effect – in shaping the employees' attitude towards, opinion about, and understanding of processes occurring in the company, including – the project management process.

To ensure a targeted and continuous working process, people interact. Leadership management styles have been widely discussed in writings. For instance, in line with the situational leadership model "*path-goal*", several types of management for achieving the necessary aim are distinguished. Thus, for instance, House and Mitchell have identified various management styles, such as supportive leader behaviour, with which the goals are achieved through subordinate satisfaction, reducing the stress level, participate leader behaviour, with which goals are achieved by getting deeply involved in the team work and taking into account the opinions and suggestions of subordinates, achievement oriented behaviour, with which achievement of goals is possible by setting high requirements for goals and expecting maximum

investment in accomplishing them [16].The writings describe 7 more management styles that leaders use in achieving the set goals:

- *Human Relations Leader* is based on team-work, human relations, high level of involvement in decision-making. This leader type manages the team assuming that all of the subordinates are honest and motivated and that supporting and engaging working environment ensures the employee satisfaction and productivity alike;
- *Democratic Leader* is based on a well-organized work with clear goals and responsibility. The team is managed assuming that most of the subordinates are honestly performing job duties, working with high dedication to achieve the set goals;
- *Laissez Faire Leader* assumes that people are unpredictable and not particularly controllable, therefore the manager's task is to avoid interfering with the team work as much as possible;
- *Autocratic Leader* is based on exercising power and authority, hard work conditions in achieving goals. The leader's behaviour is built upon the belief that all people are lazy and irresponsible, therefore planning and decision-making is the leader's competence with minimum involvement of the subordinates [38];
- *Charismatic Leader* is based on the belief that the leader's behaviour serves as an example for achieving common goals and tasks. This type of leader supports the team directly, creates working conditions, which encourage generation of ideas and participation in decision-making;
- *Transactional Leadership* is based on achieving goals by applying relevant stimuli or punishment, as well as ensuring well-grounded criticism or response;
- *Servant Leadership*, in which the leader in a way serves his/her followers and helps them grow and achieve the set goals. It is achieved by stimulating idea generation and taking the ideas into account in the decision-making process [15].
- *Project-oriented leadership*, in which important leadership behaviour elements contain planning (of resources, time, goal achieving strategy, etc.), communication, risk, and decision-making processes [30].

To sum up the aforementioned, it can be concluded that no single management approach exists in leadership; moreover management styles have evolved over time. It was affected by the global development tendencies and by the need to respond to the demand of goods and services and to apply new approaches in organizing business processes and achieving common goals. The next section deals with the project-oriented approach to a company's management and the role of leadership in it.

Project-Oriented Organization and Leadership Competency in Projects

Thyssen describes the project-oriented management as a widespread manner of company organization. Along with its dissemination, the understanding of the management style has changed – project-oriented management has evolved from a mechanism solving individual tasks to a strategic concept of companies [36].

Compared with traditional management approach the major concepts common to "new" management approaches such as organisation as competitive advantage, empowerment of employees, process-orientation, team work in flat organisations, continuous organisational

change, customer-orientation and networking with clients and suppliers can be perceived as a "*New Management Paradigm*" (Figure1) [13].

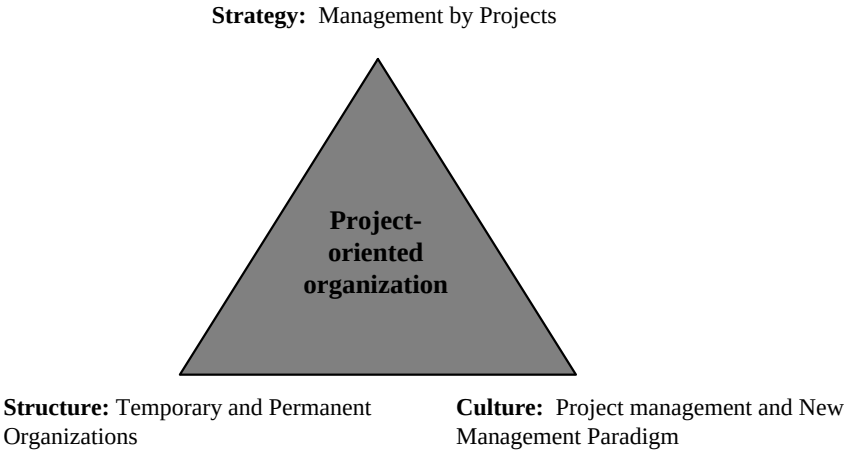

Figure 1. Strategy, structure and culture of the Project-oriented Organization

Source: Gareis, Huemann

Changes influence also the organizational structure and decision-making processes. Thus, for instance, along with focusing on projects, human resource management and the management process are also undergoing change (possibilities and limits of managing) – the importance of training, use of incentives (non-monetary rewarding) is increasing [17]. Project-oriented company managers need organisational, decision-making, and technical knowledge, as well as cost planning skills [4]. Project-oriented organization in writings is defined as a company or parts of a company (divisions, business units, profit centres), which employ project management and program management approaches to carry out complex and rather unique business processes. Companies of this type have special strategies, structures, and culture of professional project and program management, as well as of project portfolio governance [12]. The creation of unique products and processes in a form of a project is a difficult task. Maylor mentions that there is scant knowledge of managing such a complex endeavour [25]. The leadership of the project, and its management, are considered the specific skills of managers [11]. Project-oriented leadership is a systematic application of management understanding and skills during each stage of the project life cycle [19]. Toth defines project leadership as a term that describes good practice management related to the project environment [37]. Below are the most important leadership tasks in projects in each stage of the project life cycle:

- providing information;
- agreeing on goals and delegating tasks;
- controlling quality and references;
- solving conflicts;
- creating circumstances to motivate the participants for project organization;
- encouraging learning and further development of each individual and the team as a whole [12].

Project-oriented companies are characterised by work in groups relevant for the project duration [34].According to project-oriented leadership theories, important leadership behaviour elements include planning (of resources, time, strategy for achieving goals etc.), communication, risk, and decision-making processes [30]. Ahlemann argues that the management of projects should no longer focus solely on scheduling and resource management [1]. IPMA "Project management national competence baselines v3.0." describe leadership as a competency of project managers that is particularly important for achieving the project goals. Leadership is highlighted also as a significant competency in situations, when problems arise in the project, changes are required, or uncertainty about further action emerges. Leadership is necessary for applying all of the project manager's competences in a way that is clear and acceptable for the team to achieve the project goals [23]. Project management is just as important as specific knowledge and a good leader knows how to address and organize a team, solve conflict situations, and promote achievement of goals.

Over time, the focus of a company's activities on projects has increased across the globe in various fields, including the information technologies (IT) and telecommunications (T) sector. The following section looks at the challenges of the mobile telecommunications market to assess the aspects, which will directly affect the importance of leadership in successful growth of companies working in this sector.

Leadership and New Challenges of Mobile Telecommunications in Latvia

Development of the information and communications technologies (ICT) is one of the most significant triggers for the competitiveness of Latvian economy on a global scale. The ICT sector is an important part of the Latvian economy, constituting 3.6% of the value added share in the gross domestic product [41].

Mobile telecommunications is one of the most dynamically changing areas and its development can be divided into three major phases. During the first phase, the tasks of mobile telecommunications companies were linked to establishing a strong telecommunications network and ensuring infrastructure, as well as rendering the base services (voice, text messages) to consumers. During the second phase, the development of telecommunications companies was based on improving the infrastructure and rendering broadband internet services, as well as selling such end user devices, which would provide the client with the fastest and soundest internet connection with maximum possible coverage. During this phase, smart phones spread rapidly. The third development phase is linked to focusing more on the users' needs and better understanding of those needs. Activity of telecommunications operations will not be based on offering ever more powerful and technologically improved devices, but rather on introducing such new services, which will ensure resources for future development and ever better end user experience.

Latvian National Development plan 2007-2013 includes development tasks of the ICT sector, information society, and e-government critically important for the state development, which will enable improving the national competitiveness to a considerable extent in a long-term and will affect the development of mobile telecommunications service providers in Latvia. For instance, promoting the possibilities of a broader use of such e-services as electronic document circulation and e-communication, e-signature and e-authentication (introduction of e-identification cards, ensuring electronic elections, etc.) [22].

The overall development tendencies clearly show that the modern telecommunications environment is described by flexibility and the need to adapt to the market conditions, where, in order to improve productivity and cut costs, the managers must promote collaboration between business units, as well as foster the use of new technologies and approaches [18].Today, telecommunication companies are no longer talking about technological superiority, but rather thinking of the potential of providing higher added value services and solutions to the clients in a new, competitive way. Along with further development of electronics, miniaturization of devices will be increasingly fostered by the capacity of end user devices and interfaces are also becoming ever more user-friendly. Within five to seven years, it is expected that a fourth generation LTE (*Long Term Evolution*) telecommunication system will be created, which will allow employing mobile telecommunication networks and infrastructure for various industrial uses. Future challenges of telecommunication companies are related to convergence, which will manifest itself as blending of internet, mobile, land, and television communications, social networks and cloud-computing into a single set of services.

The added value generated by the telecommunication sector in Latvia in 2011 amounted to 213 million LVL (2% of the total added value created in the economy) [7], 5.5 thousand employees were working in the sector [42]. A similar share is seen also in the Baltic neighbour countries – Lithuania and Estonia, and on average in the 27 European Union countries [10]. In 2011 in the European Union, the value added created by the telecommunications sector was 181 billion EUR, more over three countries – Italy, France, and Spain – account for 35% of the total amount [43]. Development of the telecommunications sector is affected not merely by the factors of demand, but also by the policy of the electronic communications sector, which in Latvia is implemented within the framework of the common European Union policy and it is dynamically developing. In the report of the sector prepared by the Ministry of Transport of the Republic of Latvia, it is said that the consumers ever more frequently are asking for integrated electronic communications services, which fully answer their needs and guarantee business safety [27].

Upon performing a more elaborate analysis, it can be seen that in 2011 the mobile telecommunications market in Latvia reached a saturation of 102.94% [28]. Also the ARPU (*Average Revenue per User)* has been reducing gradually, as the service volume has been increasing. Currently, the attraction of new users to mobile telecommunication companies is possible only at the expense of competition or by investing in development. As the range of services becomes more diverse, the number of competitors is also growing, hence promoting the overall development of companies in the sector and the acquisition of new spheres. The key indicators characterising the mobile telecommunications market of Latvia for the period from 2003 until 2012 are shown in Figure 2.

Having studied the development of the Latvian mobile telecommunications market participants, the authors conclude that currently, all of the biggest Latvian mobile communications operators are rearranging their business philosophy from offering specialised and narrow profile products to the changing clients' needs and creation of relevant products and services. The dynamic component of the sector is that it determines the need of new competencies in development of companies. Leadership is necessary to initiate change, introduce novelties, and develop new services. In writings, it has been pointed out that successful service provider companies ensure a better client service level [6] and demonstrate the skill of better adapting solutions for the clients' needs.

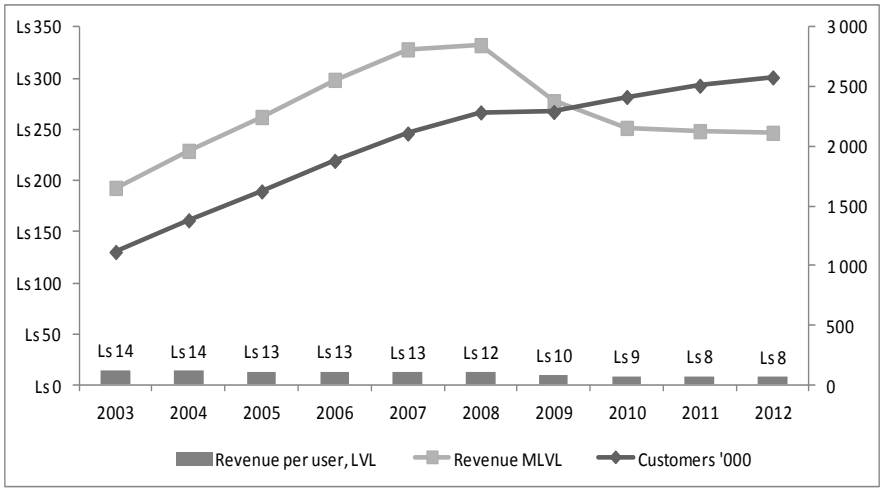

Figure 2. Characterisation of the Latvian mobile telecommunications market (2003-2012)
Source: Annual reports of the Latvian mobile telecommunications operators

The ability of a telecommunications company to focus on the most important clients and vendors, keeping track of their development, and forming long-term relations with them, resulting in ensured growth and survival of the company, form the bedrock for gaining a significant competitive edge. It means that building relations is considered an important success factor of a company. Nowadays, a mobile telecommunications client can be described as demonstrating a high level of awareness and education, as well as having higher demands towards the expected service. Moreover, it must be taken into account that nowadays, the society can be active around the clock (*24-hour society*). The technological progress has facilitated an increased power of the client – with the aid of digital devices, the client can find out other clients' opinion about a service in specialized online forums, as well as can compare costs and the price/quality ratio [6].

The authors believe that the development of a new business on the market and improvement of user experience, by providing high added value services, is not an easy task and it influences a change in the management approaches of an organization. Among the most important factors affecting company operations are effective project management and development of the necessary competencies – new development conditions on the market imply transformation with regard to the employee skills, as well. It means that the human resource management requires a systemic approach, otherwise, there is a risk that the staff will refocus on low added value tasks (*low-value tasks*) [18]. Development of telecommunications companies is fostered also by its opening and innovation promotion, and hence – also by formation of skills needed for development. The role of project leaders in this process is to promote generation of new ideas, to care for the growth of each individual and the overall team development. Some of the staff development directions having an important impact on the overall business development of a company are given below:

- Human resources as the business strategy – labour force planning is carried out so as to achieve that the company has staff that can ensure successful development of today and tomorrow alike;

- New generation talent organization [18] and supportive culture [39] – *talent management*, based on company's needs;
- Developing the necessary skills – identification of the special skills or groups of skills that are important from the viewpoint of company development. Upon identifying the necessary skills, they can be acquired in a training process;
- Driving Diversity – diversity of labour force allows choosing additional human resources, who enrich and promote the company's development with their individual work [18];
- Leadership–focusing on rapid growth, with relevant investments, seeking new challenges and increasing operational flexibility, assuming risks, and expanding goals. Tolerance and indulgence towards differing approaches, promotion of improvement and development of each individual and of the group as a whole, engaging employees in creating innovations;
- Organization culture – to integrate diverse talent, telecom companies must evolve toward more open, collaborative cultures that intrinsically value creative freedom, dissimilar perspectives, and far-reaching innovation as much as they have traditionally valued predictability and conformance to specifications [39].

The task of project management is to use resources as effectively as possible in implementing the company's strategy, with a strong focus on the goal, and hence – focusing on the main tasks. Likewise, project management ensures transparency and facilitates control, as well as reduces the stress caused by the negative effect of uncertainty and change. The project-oriented approach makes it easier to overcome changes, because employee teams are united in achieving project goals. Only strong project leaders can engage employees in a way that they feel a part of achieving the project goals, by creating circumstances for free communication, effective conflict resolution, idea generation, and personal development.

Therefore, in companies with business development challenges, it is important to promote project-oriented leadership culture, by training, supporting, and engaging employees of various structural units in acquiring and implementing a uniform approach.

Conclusions

The initial analysis confirms that in the changing environment of Latvia, leadership is a critical competency in business development projects. The study of the role of leadership in a project-oriented organization is topical, because achievements and competitiveness of telecommunications companies take shape due to the effect of leadership.

Vast amount of research indicates that business entities today are faced with circumstances that are challenging more than ever, as diversity and uncertainty is growing; hence, promoting the need to alter thinking paradigms and beliefs to allow growth and full realisation of business potential.

The new development conditions on the market imply transformation with regard the human resource management; thus, among the most important factors affecting a company are effective leadership-based project management and development of the necessary competencies to facilitate growth, expertise and engagement of the employees.

In conclusion, by summarising the information about the challenges of the mobile telecommunications market, the authors conclude that only a project-oriented telecommunications company with marked leader competencies can hope for a successful breakthrough in the changing external environment and under harsh market competition circumstances.

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IMPROVING PROJECT MANAGEMENT USING BIM

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Keywords: Building Information Modelling, Project Management, Construction

Abstract

The aim of the article is to clarify the benefits of Building Information Modeling (BIM) for the purposes of Project Management (PM).

BIM is a systemic approach that takes its concept from the digital design of the products in the aerospace, shipbuilding and industrial mass production industries developed in the 70s and 80s of the 20th century.

Essential prerequisite of BIM is cooperation between different stakeholders at different stages of the life cycle. The objective is not to create sole model of the building, but to pass complete, reliable, affordable and exchangeable information about building for anyone who needs it within the life cycle.

In terms of quality and resource management it improves the competitiveness of firms that have adopted BIM, because the system leads to significant time and cost savings.

Introduction

Planning of a construction is critical and very challenging activity in the field of project management. During the design stage we consider different options and we can influence the course or even the overall result of the project. Planning involves the selection of technology, definition of tasks, estimating of resources required and duration of each task as well as any interaction between them. A good plan is essential for well established budget and schedule.

In today's projects we met with a reduction of quality of construction work and that is major problem even because it appears to be more frequent than ever before. One reason is the global financial crisis, which caused a lack of opportunities in the market that negatively influenced the construction industry. Increased risk in the calculation of return on investment (ROI) results in limited funds and higher interest rates.

Investors are cutting down budgets and Contractors have to bargain prices in order to be successful in the competition. Cost savings could be significant in a positive way but Investors have to ensure savings are not done at the expense of quality by substituting types of material used.

Possible solution to ensure quality while on the other hand allows for budget reduction of a project is to use the systematic approach of a Building Information Modeling (BIM).

According to many authors, BIM seems to be the largest breakthrough in the Architecture, Engineering and Construction (AEC) industry in the recent years and surely can lead into significant cost savings.

For the purpose of this paper the advantages of BIM for project manager regarding the Cost Management, Schedule Management and Quality Control will be discussed.

Building Information Modeling – BIM

Adoption of a work with computers during the past years helped to improve whole AEC industry. It all started with simple CAD (Computer Aided Design) software designed to automate repetitive tasks allowing drawing lines, arcs and symbols in 2D, followed with 3D software by adding 3th dimension – height, to create space visualization mostly for architectural purposes it brought us to current software that allows creating data rich and complex models able to carry an information through whole life cycle. These sophisticated systems are called BIM or eventually Virtual Modeling.

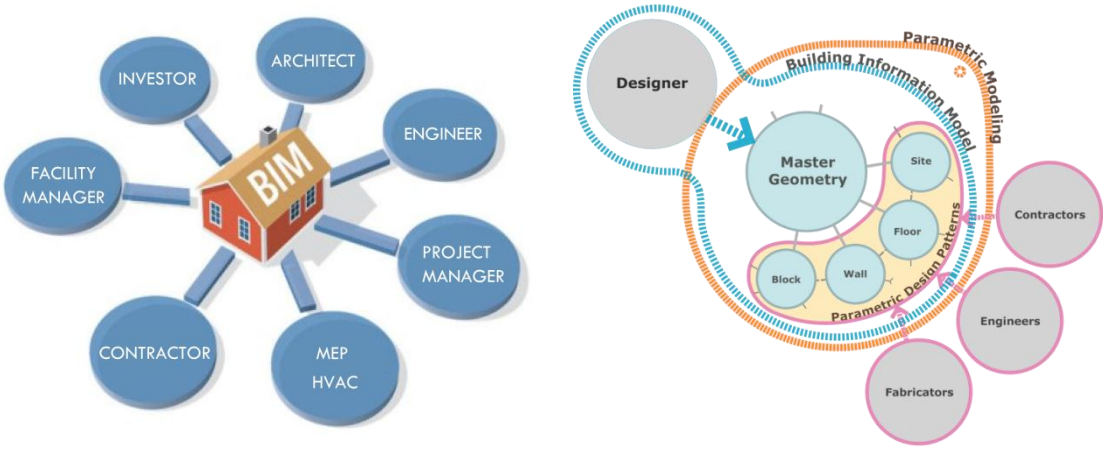

Figure 1. BIM scheme

National Building Information Model Standard Project Committee of the building SMART alliance defines BIM as following:

"Building Information Modeling (BIM) is a digital representation of physical and functional characteristics of a facility. A BIM is a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle; defined as existing from earliest conception to demolition." [8]

Essential prerequisite of such an application is cooperation between different stakeholders at different stages of the life cycle. It is necessary to enable them to insert, remove, modify or update of information in the model corresponding with their roles.

Since BIM is a platform that consists of multiple components and implies an exchange of information between different professions, hence the different programming environments, there was an IFC (International Foundation Classes) file type created. IFC is standardized and

fully documented file / model format that was created and defined by the organization building SMART alliance.

3D, 4D, 5D BIM

Information model resp. virtual model, which is filled with the correct information, is a prerequisite for further use within the building. One of the primary advantages is creating quantity takeoff. It is no longer necessary to calculate quantity and volumes of individual elements and items of the project and search for information in 2D drawings and technical reports. Complete report containing all items with precise quantity can be obtained by as simply as using function of exporting. This benefit greatly reduces the possibility of errors due to non-inclusion of an item, object, or an error of incorrect calculation. Everything that a designer incorporated in the model retains for further use.

A powerful tool for PM is the 4D BIM where individual 3D objects can be linked to the project schedule creating construction simulation. Through BIM we gain a comprehensive understanding of the construction operations and constraints which allows PM to consider several alternatives and deal with space conflicts ahead of time.

Figure 2. 4D BIM simulation

As a part of project schedule, details regarding labor and material resources are added to ensure PM has complex information about project and improve his ability to control and manage workflow in case of delay.

By extending 4D model with cost related information we obtain 5D BIM. This tool helps to track the exact need of funds in each project phase of a project life cycle. This allows PM to better plan the financial aspects of the project.

Improved Project Management

Project manager is obliged to make various decisions during life cycle of a building in order to successfully finish the project. "*Decisions should be based on competent economic evaluation with due consideration for adequate financing, the prevalent social and regulatory environment, and technological considerations."* [3]

Using BIM tools project manager obtains more realistic information about actual stage of project which allows him for better decision taking. According to Hendrickson "*In the project life cycle, the most influential factors affecting the outcome of the project often reside at the early stages*." [3] It is very important to communicate with stakeholders and analyze more specific details of project in early stages of a design. This is one of the most important roles of project manager.

"Collaboration among all disciplines during planning, design, analysis, bid proposals, permitting, construction, as-built records, maintenance, operations and sales could be coordinated, thus increasing efficiency and cost savings for all stakeholders." [7]

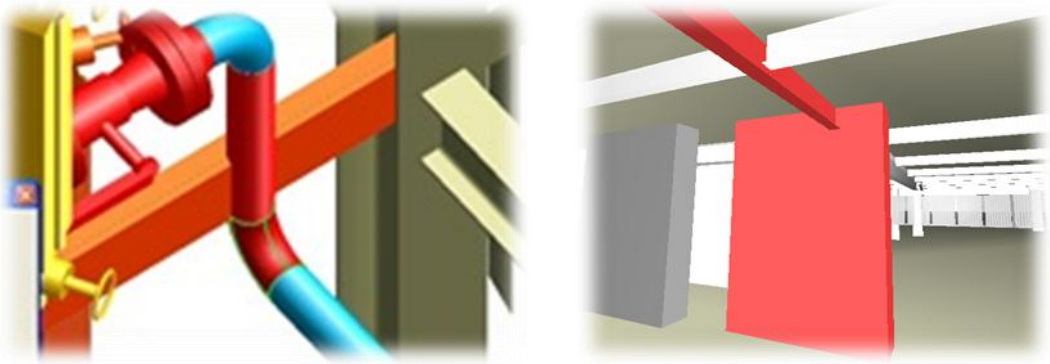

Figure 3. Clash detection

With no doubt this progressive system offers improvements for control over the project. It is very important to encourage more firms from AEC industry to adopt BIM. After passing initial training stage following benefits of BIM for PM has been observed by users during the past few years:

a) Quick access to information and easy sharing
   All information within model is collected in "one place". All the details, technical data sheets, quantity takeoffs, lists of elements and other can be simply gained from the model. This information is very important for PM, who must have all the information. BIM base information is uniform and can be shared with all participants.
b) BIM allows the use of sophisticated networking tools that connect different software
   Don't imagine sole all-in-one software in BIM that is fine for everything. Interoperability is a fundamental requirement of BIM systems which refers to the ability of two separate systems or software programs to communicate and exchange data with each other. *"Exchanging models and other data between different software platforms remains one of the industry's biggest challenges on the way to fully integrated and collaborative project teams."*
c) Supports good estimate for pricing and procurement,
   BIM can link information to quantify materials, size and area estimates, productivity, material costs and related cost information. It is an ideal tool for keeping the control over the budget or when building robust schedule.

d) Clash detection
Software is able to identify physical conflicts between elements reducing significant construction delay, and extraordinary additional expense. Identification of conflicts that may arise during construction is done automatically when delivering data to model. Where modifications are suggested, the impacts of the proposed changes are immediately apparent, subject to evaluation and reconsideration.

e) Improved accuracy of fabrication
Confidence in shop drawing and fabrication accuracy is improved by BIM because the model can provide construction details and fabrication information. More materials can be fabricated more economically off site under optimal conditions due to the confidence in the accuracy of the fabrication.

f) Better visualization
BIM 3D environment assists in sequencing and constructability reviews. It improves coordination over construction process providing effective presentation of work progress for investor or marketing purposes. It also gives PM a possibility of analysis of various simulated situations and opportunity to integrate environmental considerations.

g) Fewer errors and hence fixes
BIM single data entry into one model avoids the opportunity for inconsistency and error of repeated input of identical data in multiple media. Data once entered or altered is available in the single current model available to all.

h) Saving funds and resources
BIM design efficiency reduces the cost of design and preparing contract documents. Among other it allows for optimization of resources in labor, materials and components and therefore saving funds and resources.

Project Information Management – PIM

Technology PIM is a complementary solution to BIM. It manages the flow of information and communication within the model. It supports cooperation, responsibility and trust, not only within the company but also to external collaborators. PIM manages basic needs regarding organizing, finding, tracking, sharing, monitoring and re-use of technical information and communications in a manner that is fully consistent with people.

In other words PIM delivers sorting and efficient information handling tool in order to reduce time spent by searching for information allowing project managers focus on more important roles. "*By standardizing your BIM-related work processes across teams and projects in your organization, your firm can maximize the cumulative benefits of BIM and PIM to enhance efficiency in project delivery, reduce risk and maximize client satisfaction*." [5]

Conclusion

Based on the analysis of the current condition of the problem it is possible to evaluate the potential benefits of BIM. In order to integration and smooth information transmission in the life cycle of a building BIM adoption is essential also by contractors. Without functional

interoperability and information exchange from participants in the process of construction in the early project stages, we can use all their efforts just as expensive visualization. Each stakeholder has to have suitable software capabilities and trained staff.

Adoption of innovative systems help to manage more complex projects because without it they cannot compete with BIM adopters in terms of quality and resource management as they lead to significant savings (either time or cost). However, it is interesting to observe that despite the undeniable benefits that BIM systems offer so far they are not widely used.

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DESERTEC AS A SOLUTION FOR COAL-DEPENDING STATES WITH LOW SOLAR POTENTIAL – CASE POLAND

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Keywords: Green certificates, solar energy, wind energy, Desertec, Levelized Cost of Electricity LCOE, Poland

Abstract

A few years ago renewable energy in Poland was still relatively unnoticed - just a few smaller projects were realized. According to the target setting from the European Union (EU directive 2009/28/EC) to reduce CO_2 emissions, Poland is obliged to produce 15% of clean energy in the whole domestic energy production by 2020, whereas it fulfills currently only half of the target (8%) [1]. The polish electricity market is mainly based on conventional energy sources. Hard coal and lignite fired power plants account for around 90% of total electricity production of 2011.

The solution for Poland must be extreme because to get rid of coal you need a capacity of almost 140 TWh/y. In the result of this work the author will prove that the best alternative to manage this challenge is to connect Poland with the abundant sun resources in North Africa. This statement is based on two arguments: the resource must be sun because from all renewables, it is the only which has enough volume to fulfill such a high energy demand and it must be Africa because the solar radiation is plenty enough [2].

This concept for Poland bases on the current initiative of Desertec. It will be shown how the needs and possible offers of both participants – Desertec and Poland – fit together. An action plan how to manage this symbiosis will be proposed.

1. Introduction

Poland is a country rich in minerals and among the world biggest producers of hard and brown coal. Poland's reserves of coal are estimated 45.5 billion tons. With the annual production of 77 million tons of hard coal and 57 million tons of lignite (in 2010), coal will be sufficient for much longer as coal is being replaced in Polish economy with environment-friendly natural gas and renewable sources. On the other hand the EU policy requires that Poland must enhance its energy efficiency and produce clean energy in whole domestic energy production by 2020. Herewith Poland expects to reduce the production of hard coal to some 82 million tons a year and by 2050 to about 40 million tons [3].

As need to increase the share of renewable energy, the Polish Ministry of Economy launched in this year new energy regulations, schemes and attractive subsidies for supporting the generation of electricity from renewable energy sources (RES), especially for the solar

industry. But before start to invest in solar projects in Poland there must be analyzed if it is a long-term solution or only a kind of boom and bust cycle as was seen in markets like Spain and the Czech Republic.

Although the Polish government provides stimulation to encourage the renewable resources, it will not be sufficient to fulfill the demand in Poland. This estimation is based on two connected facts: because the sun radiation and the wind intensity in Poland are too low and due to this reason the Levelized Cost of Electricity (LCOE) of these technologies will always be above coal or imported renewable energy [4].

2. Potential of Solar Power in Poland

Currently, solar energy is used in Poland mainly as a source of heat through solar collectors (flat collectors, parabolic collectors or heliostats). Solar collectors are commonly used in houses or public buildings [5].

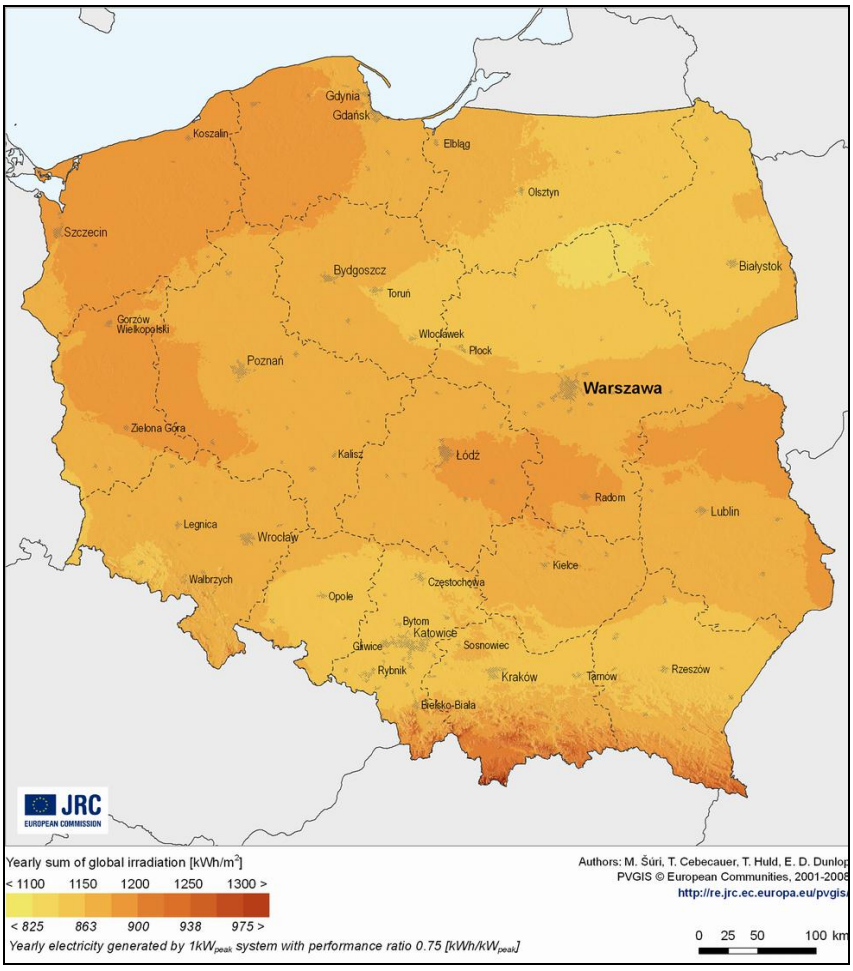

Figure 1. Global Horizontal Irradiation (GHI) in Poland [13]

Those systems heat the water for domestic purposes and the photovoltaic (PV) installations produce electricity used for supplying telecommunications devices, lighting road signs, and a few installations are used by individual users or by local societies. Solar installations are mainly small and located at the top of the buildings.

The following map illustrates the Global Horizontal Irradiation (GHI) values for Poland.

The solar radiation density on a horizontal plane in Poland is ranging from 950 to 1,250 kWh/m^2 annually and it is distributed unevenly throughout the year. Approximately 80% of the total annual insulation is received during six months in spring and summer – from April to September.

In Poland, the most favorable areas in terms of solar radiation are the southern part of the Lublin province and the central part of the country; annual irradiation is ranging there from 1,022 to 1,048 kWh/m^2. The area receiving low sunlight is the north coastal strip [5].

In the Energy Policy of Poland, the Polish government states that in 2020 the Poland's installed PV capacity will reach just 2 MW and by 2030 the number will increase to 32 MW covering 0.0622% of total electricity production in Poland [1]. The country has little solar resource to fulfill the energy demand. One option to meet the target is to look for better locations where the solar sources are abundant like in North Africa and import the energy.

3. Analysis of Solar Power Production in North Africa

With the intention to introduce renewable and CO_2-free energy sources in Europe, since years there has grown the idea to import solar energy from desert regions of North Africa. The theoretically potential of this source is enormous. Hence 1% of the worldwide area of deserts would be sufficient to cover the total primary energy demand, considering an efficiency of 15% [6].

The solar energy available in deserts is more than 700 times the present global primary energy consumption. This is far more than needed to replace fossil fuels. The deserts receive in more than 6 hours and energy from the sun than humanity consumes in a year [6].

According to site selection studies by German Aerospace Center (DLR) using satellite data the deserts in the Middle East and North Africa (MENA) region would allow the production of electricity of 630,000 TWh/y, about 40 times the present world electricity demand [7].

Due to costs and efficiency the power generation with Concentrated Solar Power (CSP) is currently preferred. Furthermore with this kind power generation there exist the possibility to use storage systems to guarantee a constant power generation and delivery. In recent years the price of photovoltaic modules decline considerable, these Modules become more and more competitive and a change in strategic orientation cannot be excluded. The essential factor for the power generation with concentrated solar power is the Direct-Normal-Irradiance (DNI). Figure 2 illustrates a map with the DNI of North Africa.

Figure 2 shows, that the annual DNI in desert regions is three times higher than in south Europe. Hence the annual DNI for the southwest of Egypt reaches approx. 3,000 kWh/m²y. In contrast the north of Spain achieves approx. 1,000 kWh/m²y.

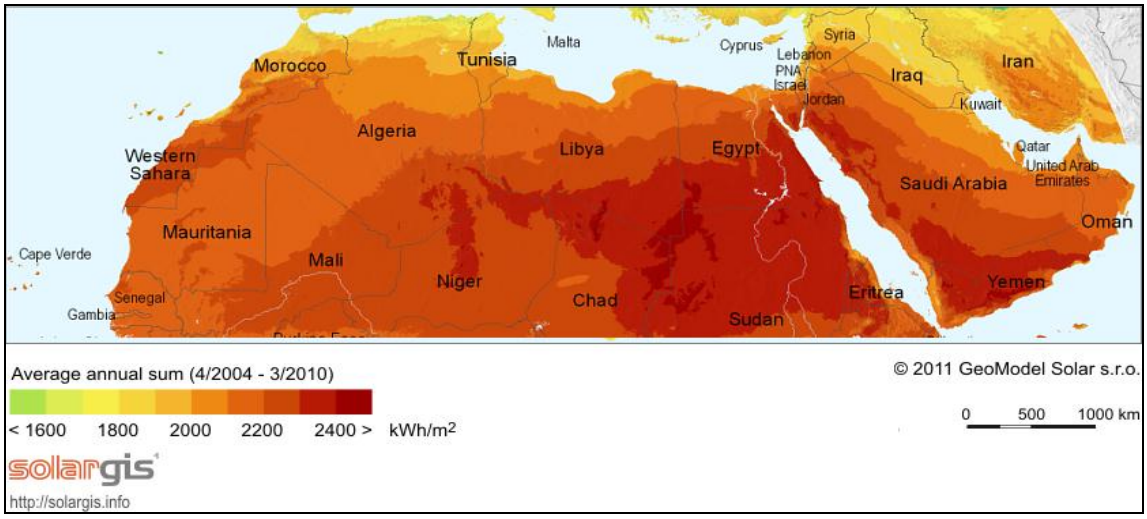

Figure 2. Direct-Normal-Irradiation (DNI) of North Africa [13]

There are several projects and initiatives that handle with the topic of providing Europe with solar power from North Africa. The DESERTEC project is one of the most popular.

The DESERTEC is a concept proposed by the DESERTEC Foundation to make use of solar and wind energy from the Sahara desert. The objective of the project is to supply 15% of the European electricity demand by 2050 from RES sources in the MENA region through High-voltage direct current (HVDC) lines. The expected investment of the project is roughly 400 billion euro over 40 years. [8].

Under the DESERTEC proposal, Concentrated Solar Power systems (CSP) and wind parks would be located on 17,000 km² in the Sahara Desert.

Table 1 illustrates the potential of electricity generation for renewable energy in EU-MENA.

Table 1

Potential for renewable energy in EU-MENA [9]

Renewable Energy	GWh/km²y	TWh/y
Biomass	0-1	1,350
Geothermal	0-1	1,100
Small Hydro	0-50	1,350
Wind energy	5-50	1,950
Solar energy	10-250	630,000

The current electricity consumption of the world is 17,000 TWh/y, of Europe-25 3,200 TWh/y, Poland 140 TWh/y and MENA 600 TWh/y. In terms of solar sources, DESERTEC project gives a feasible solution to meet the energy demand in Europe and Poland with clean energy. Now it must be analysed if the importation and the production cost of solar energy in North Africa can be competitive with the production cost of PV in Poland.

4. Analysis of the Electricity Production Cost between PV in Poland vs Solar Importation from North Africa

In comparison to other European countries Poland started late to support the PV market but recently it is introducing incentives for these technologies. Due to this development there are only two PV installations online with a total capacity of 0.012 MW in Poland [1]. Hence there does not exist long term studies regarding PV installations in Poland and Levelized Costs of Electricity (LCOE). In contrast neighbor countries like Germany or Czech Republic experienced the PV marked since more years. Hence for comparison purpose there will be used studies from these neighbor countries, because their geographical aspects are similar.

For Germany there are detailed and actual studies available. To estimate the LCOE in Poland the experience of German projects is essential. The initial investment, the hours of sun during a year and the general infrastructure from Poland is similar to Germany. Furthermore the total annual costs will be similar, because higher financing and insurance costs will probably even out the advantage of lower labor costs in Poland.

Figure 3 illustrates recent results from Fraunhofer Institut regarding the LCOE of Germany, France, Spain and North Africa for different types of PV installations.

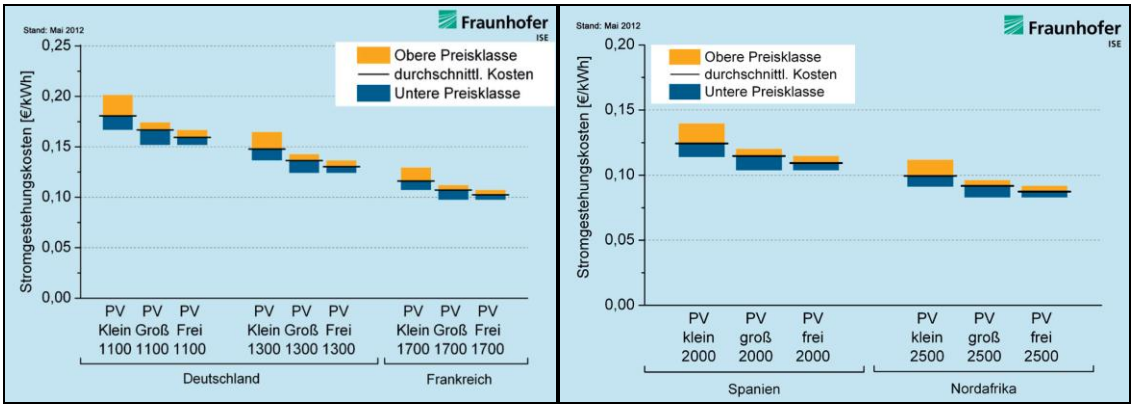

Figure 3. Comparison of PV LCOE – Europe vs North Africa [10]

Under the assumption that Poland has the same PV-LCOE than Germany, the LCOE in North Africa is 0.07 EUR/kWh cheaper than in Poland/Germany. The LCOE in Germany is 0.15 to 0.18 EUR/kWh (1,100 kWh/m²) and for North Africa is 0.08 to 0.11 EUR/kWh (2,500 kWh/m²)

4.1. Comparison LCOE for PV/CSP in Poland and North Africa

Regarding forecasts of Fraunhofer the LCOE for PV and CSP will continue to decline further in the future. Figure 4 illustrates the Fraunhofer forecast for PV and CSP for the next 30 years in Germany and North Africa. Additionally there are shown sales price estimations for Poland including the support of Green Certificates and without them.

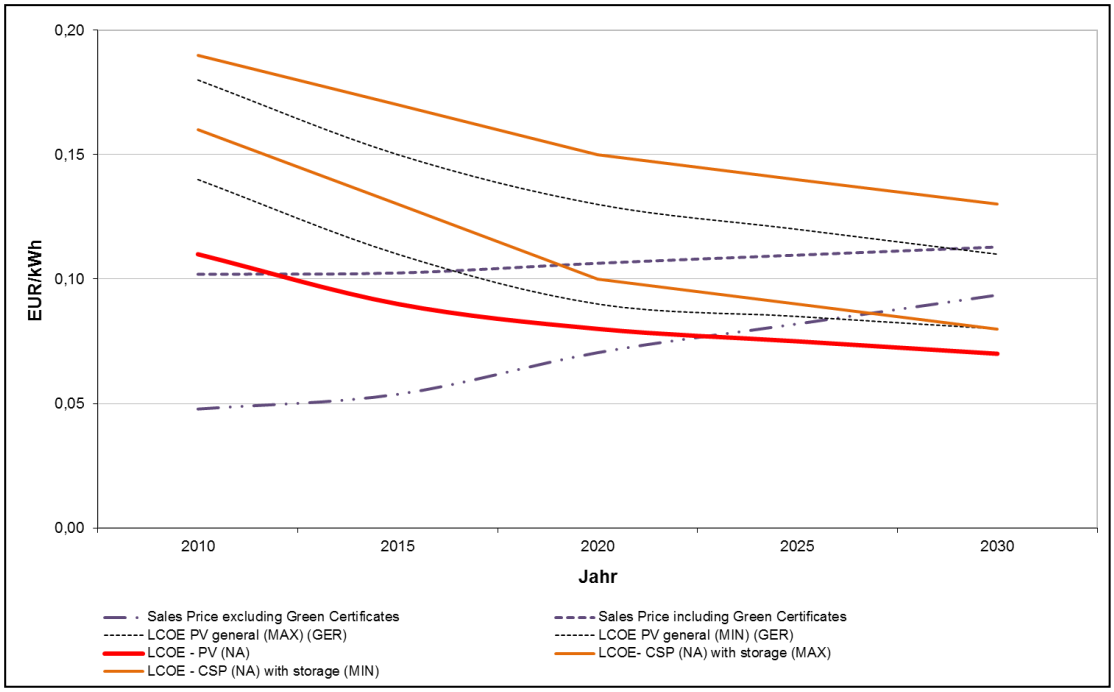

Figure 4. Comparison LCOE for PV/CSP in Poland and North Africa

Source: Developed values from Fraunhofer Studie Mai 2012

Figure 4 shows that the cheapest way to produce electricity from the sun is to use PV in North Africa. If dispatchable energy is needed storage systems are necessary, therefore CSP can be used.

PV in Poland is only competitive with support mechanisms or for customers who pay high prices for electricity e.g. private homes [11].

If the requirements of CO_2 emissions are not fulfilled, the LCOEs for coal fired power plants will increase by soft loans. To meet the quote and to reduce CO_2 emissions in electricity production big solar plants in the desert can replace coal fired power plants in Poland.

Dii expects for a completed DESERTEC-concept an advantage of 30 Euro/MWh in comparison with power generation in Europe [12]. The comparison with PV and CSP LCOE in North Africa shows that this is a real alternative to build PV plants in Poland.

4.2. Cost of Electricity Production by CSP

The DLR analyzed the cost of electricity production via CSP in detail. They did not distinguish the different types of solar technologies. DLR found out the dependence of the size of the CSP power station by using economies of scale it is possible to produce electricity at the same level or even cheaper than the conventional electricity production with carbon based energy sources. As you can see in the Figure 5, within an installed capacity of 400.000 MW it is possible to reach a cost level of 3 cents per KW/h. Nowadays nuclear power plants and lignite power plants produce also around 3 cents per KW/h [6].

With the installed capacity of 400.000 MW CSP power stations we can roughly produce 1/3 of the European electricity demand which shows that using economies of scales electricity production with the sun is even competitive with the conventional electricity production. Conventional energy consumption in this comparison has not to "pay" for the pollution coming from CO_2 sources (theory of external effects).

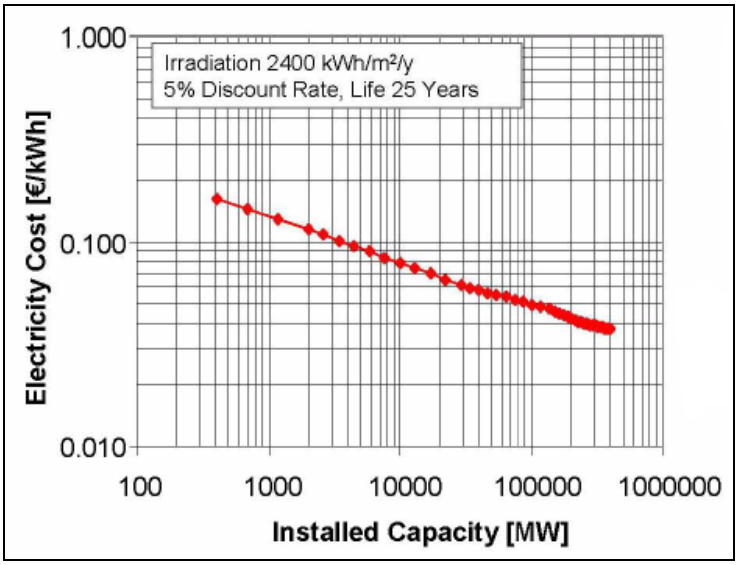

Figure 5. Production Cost for CSP [6]

5. Conclusion

The cheapest energy is currently CO_2-based, 0.08 cent €/KWh in comparison with other renewable energy. Within the next years the cost reduction in renewable energy will become competitive to fossil fired power plants.

The highest likelihood for 2025 is that Poland will still use coal and some government-funded on-site renewable electricity production.

One day coal has to be substituted or limited and it is better to act now than after the climate changes.

Poland has to fulfill the climate requirements of EU. That means the reduction of 15% of CO_2 emissions.

Nuclear power will stay the cheapest energy but it has uncontrollable impact to our environment and it is politically disputed.

CO_2-based and nuclear power does not include all real costs like pollution and nuclear waste. Therefore they just seem to be cheap but for the entire world they are much more expensive.

With donation PV and wind in Poland can start CO_2 free electricity production at once, but cannot reach CO_2 goals in total.

From all renewables there are some cheaper than sun but they cannot fulfill the high energy demand of the world.

The electricity Potential in Poland is close to 140 TWh/y – Desertec potential is 630,000 TWh/y so there is just one source huge enough to substitute the whole coal base electricity production: the sun in the desert.

"Power from the desert" by PV, CSP and Wind can be a really good option for Poland. Comparing LCOE including transport cost from NA will be competitive in the future, but grid connections should be organized and prepared soon.

Proposal for the concept for the participation of Poland in DESERTEC

Poland	DESERTEC
Poland's renewable electricity production will only survive with donations – this is no sustainable concept but short term controllable.	DESERTEC offers a long term solution for Poland but has short term still many question marks.
Poland needs to achieve EU-targets and has one of the worst position in Europe because of the long coal-position.	DESERTEC could help especially partners with the need of an "Energy revolution" where small steps are not sufficient.
Poland is willing to invest (now investing via green certificates the money of the electricity consumers).	DESERTEC needs partners with the willingness to contribute and to invest.
Poland cannot support DESERTEC alone – it needs partners in EU for a high installed capacity and for a solution for transportation.	DESERTEC offers partnership also with other partners in the EU but still is not powerful enough because of missing attendance.
Poland in comparison with other EU-states currently prolongs the fulfillment of EU-targets and comes last with regards to renewable activities and opportunities.	DESERTEC offers a solution to overtake others and to use the dire straits as an opportunity to be a leader of the sustainable change in Europe.
Poland is currently not taking part in initiatives like DESERTEC to solve their problems on an international stage.	DESERTEC is looking for engaged partners who support and contribute in the project.

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CLEAN ENERGY PROJECTS IN EMERGING MARKET ECONOMIES: IS AN ICELANDIC GEOTHERMAL EXPORT CLUSTER FEASIBLE?

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JEL classification: F21, G20, G32, O22, Q27, Q40

Abstract

Iceland's progress in utilizing geothermal energy for space heating and electricity production has received international attention and Iceland has already become a significant player in the global geothermal energy market. During the transformation to geothermal energy know-how has accumulated and a number of companies and institutions now have proven capabilities in, for example, exploring geothermal sites, drilling and building and operating geothermal power plants. The purpose of this article is to analyze and assess the potential of an Icelandic geothermal exporting cluster in engaging internationally in trade and investment. The focus will thus be on cross border activities of an organized exporting cluster to engage in the provision of consultant and advisory services, in construction and operators of geothermal power plants as well as sponsors and shareholders in geothermal projects. The objective is to answer the question: Is it feasible for an Icelandic geothermal cluster to engage in cross border activities in emerging markets, and if so, what type of engagement could be feasible?

Introduction

Iceland's progress in utilizing geothermal energy for space heating and electricity production has received international attention and in fact Iceland has already become a significant player in the global geothermal energy market. During the transformation to geothermal energy know-how has accumulated and a number of companies and institutions now have proven capabilities in, for example, exploring geothermal sites, drilling and building and operating geothermal power plants.

In November 2010 a conference in Reykjavík attended by about 900 participants discussed the potential of an Icelandic geothermal cluster to enhance Iceland's

competitiveness and create a new engine of Icelandic economic growth. Among the participants was the leading scholar on clusters, Professor Michael E. Porter at Harvard Business School. Other participants included the President of Iceland, Dr. Ólafur Ragnar Grímsson, as well as the minister of industry and representatives from the private sector (energy and financial sectors). The minister of industry expressed strong interest in and support for an Icelandic geothermal cluster. The president of Iceland made strong statements about Iceland's potential in this area with a primary focus on international or cross border engagement. During this conference the president expressed his confidence in Icelandic firms and experts to export their knowledge and skills to key emerging market economies including China, India and Russia.

Given that Iceland is a small country still recovering from a severe economic and financial crisis, and the potential partner countries are the largest emerging markets in the world, representing almost half of the population of mankind, the president's vision must be considered ambitious.

The purpose of this article is to analyze and assess the potential of an Icelandic geothermal exporting cluster in engaging internationally. The focus will be on cross border activities of an organized exporting cluster to engage in the provision of consultant and advisory services, in construction and operators of geothermal power plants as well as sponsors and shareholders in geothermal projects. This activities can thus both involve cross border trade and investment. The objective is to answer the question if it is feasible for an Icelandic Geothermal cluster to engage in cross border activities and if so, what type of engagement would be feasible?

The article will start by discussing what a cluster is, including some theoretical considerations. This will be followed by a section on the president's ambitions regarding Iceland's potential to engage cross border in the geothermal market. Then the article will provide an overview of some potential Icelandic candidates for this endeavor, companies and institutions. It will consider the structure of energy projects and partnerships for cross border engagement. Finally the article will discuss what instruments the international financial institutions offer for funding and risk mitigation of such projects as well as national risk mitigation via export credit agencies. Are those instruments a feasible and viable solution for Icelandic firms wishing to engage in energy investments in emerging markets and when doing so maximizing the rewards and mitigating the risks?

Clusters – Some Definitions and Theoretical Considerations

It is well known that economic clusters exist in virtually every industry and in every part of the world. But what exactly is a cluster? According to Professor Michael E. Porter, clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions in a particular field that compete but also cooperate (Ketels, 2010; Ketels and Memedovic, 2008; Porter, 1998, 2000, 2010).

It seems reasonable to assume that society and industry could reap some benefits of reaching critical mass in experience and interactions in one place in a particular field. Theoretically the assertion is that significant advantages accrue to companies from being in proximity to complementary products and service within reach of all the suppliers and partners

in the product value chain. The emphasis on location and geographic concentrations though seem to contradict the modern and global thought on the mobility of capital and knowledge. This seems like a paradox in an era of global competition. Here, however, the competitive advantages are gained through interconnected companies and institutions locally and competitiveness is driven by the strength of the cluster, not only the strength of individual companies. According to Czinkota, Ronkainen, Moffett, Marinova and Marinov (2009), cluster theory suggests that competition is altered in at least three ways when clusters form successfully: (i) by increasing the productivity of the companies based in the area; (ii) by driving and supporting the momentum of innovation in the area; and (iii) by stimulating the creation of new companies and new configurations of business in the area.

In this article the focus is on cross border engagement and the emphasis is thus on exporting clusters. The cluster would export its products and services, or make investments to compete outside the local area. The demand for the services of a local geothermal cluster in Iceland would inherently be limited by the size of the local market. An exporting cluster could grow far beyond that limit and in the case of the geothermal sector potentially expand to emerging market economies much larger than the Icelandic market is. In this case each industry in the exporting cluster would serve to reinforce the productivity, and therefore international competitiveness, of every industry within the exporting cluster. If successful the cluster could become an important force in increasing exports from Iceland.

Should the members of an exporting cluster decide to participate in cross border investments they will be met with a number of challenges. In fact geothermal power projects suffer from risks not found in other thermal power generation projects including higher up-front development costs associated with uncertainty as to site capacity (Delmon, 2009). Geothermal projects involve greater up-front commitment of capital compared to other thermal power generation and early phase of geothermal development may be highly dependent on equity financing.

The President of Iceland and Cross Border Engagement in Emerging Market Economies

During the geothermal conference in Reykjavík on November 1, 2010 the president of Iceland, Dr. Ólafur Ragnar Grímsson, made a memorable speech. It is worth quoting some of the statements he made to get a flavor of the ambitious visions expressed. When talking about India the president asked "Is it true that we can achieve enormous success in a relatively short time. I have talked to people in India for many years about geothermal energy," (Grímsson, 2010, p. 1). In his speech he also mentions China and Russia. "We have a window of opportunity for only the next five years or so. If we utilize it, there will be enormous opportunities, because it would take others years or decades to catch up while we keep running. But of course if we stop, they can do the same thing as we are now doing, and perhaps beat us" (Grímsson, 2010, p. 3).

According to the president a large part of the world is waiting for cooperation with Iceland when he says "China, India, East Africa, Central America, Slovakia, Hungary and parts of the United States are now eagerly and actively looking to Iceland and asking themselves the question: How can we cultivate this co-operation?" (Grímsson, 2010, p. 5).

It is clear that the president is talking about cross border engagement with Icelandic involvement – an exporting cluster – but he does little to define exactly what this engagement will involve. Some attempt is made when he says: "We can define our partnerships in many ways. We could obtain a small shareholder stake in these products. We could build what I sometimes call elementary district heating systems in so many Chinese cities that it would be difficult to count them. If we obtain just a tiny percentage of that transformation in China, it would amount to a major economic input into the Icelandic economy" (Grímsson, 2010, p. 5). It is hard to fully understand what exactly this means but being a shareholder would normally require not only providing advice or selling technical expertise but also cross border capital investment.

The president has been excited before. What did he say about the Icelandic banking sector in 2006? All Icelanders know from bitter experience how a huge overseas engagement in the banking sector brought the Icelandic economy to its knees in October 2008. In a speech at "The Kaupthing Seminar" in Helsinki in May 2006 the president said "Yes, the future does indeed offer fascinating opportunities – and the growing strength of the Icelandic banking sector will, as before, play a crucial role, both in itself and by providing valuable connections to the international banking community. The three leading Icelandic banks – Kaupthing, Landsbanki and Glitnir – are amongst the fastest growing banks in the world. And the largest of the three, Kaupthing, has already established a pivotal position in Northern European banking. It has been both a privilege and an education for me to follow the growth of their activities and witness the praise that the Icelandic banks have received from their foreign clients – to confirm how the Icelandic banks have become key players in international financing for prominent European and American companies" (Grímsson, 2006, p. 5).

About two years later all these banks collapsed. Future generations will have to carry the burden of their failure for years to come. But that does not stop the president talking about vast opportunities for Icelandic businesses on every corner in the world.

The failure of the internationalization of the Icelandic banking system does not necessarily mean that the internationalization of the geothermal sector will fail. However, geothermal energy investments are large, capital intensive and long term. There are risks involved here. The government of Iceland has done nothing to address those risks and is thus behaving just as it did when the banking sector expanded. Risk mitigation strategies for cross border energy investments were not among the issues discussed during the November 2010 Reykjavík geothermal conference.

Is an Icelandic Geothermal Cluster Realistic?

There are several Icelandic companies and institutions that possess knowledge and experience in utilizing geothermal energy for space heating and electricity production. They could form an Icelandic geothermal exporting cluster where they would not only compete with each other but could also cooperate and potentially enhance each other's international competitiveness. Some of those companies and institutions are listed in table 1 below. Companies in many different sectors would be involved, see figure 1 the Iceland Geothermal Cluster Map.

Table 1

Some possible participants in an Icelandic geothermal exporting cluster

GeoScience	ISOR, Mannvit, Vatnaskil
Technical Consulting	Mannvit, Verkís, Efla, Reykjavík Geothermal, Landsvirkjun Power, Reykjavík Energy Invest
Business Consulting	KPMG, Capacent Corporate Finance, Íslandsbanki
Drilling	Jarðboranir, Ræktunarsamband Flóa og Skeiða
Construction	ISTAK, ÍAV and Loftorka
Energy Audit & Law Firms	KPMG, Pricewaterhouse Coopers, Deloitte, Lex (law firm), Logos (law firm)
Financing	Arion banki, Íslandsbanki, Landsbankinn
Geothermal Research	ISOR, Mannvit, Vatnaskil, Utilities, Universities
Research Funding	Orkusjóður, Geothermal Research Group, Landsvirkjun's Energy Fund, Orkuveita Reykjavíkur Energy Fund, Rannís
Training and Education	University of Akureyri, University of Iceland, Reykjavík University, Reykjavík Energy Graduate School of Sustainable Systems, Keilir – Atlantic Center of Excellence, United Nations University – Geothermal Training Programme

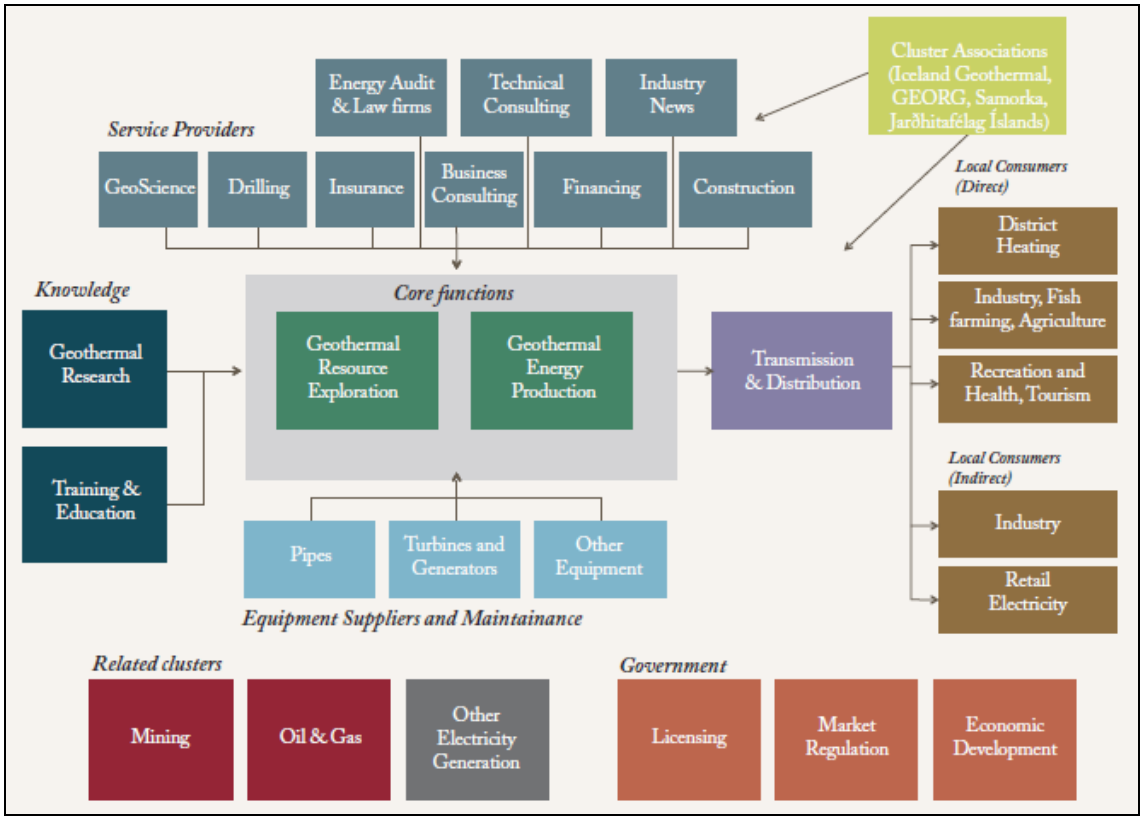


Figure 1. Iceland Geothermal Cluster Map

Source: Gekon, 2012

If some of the above players would cooperate in cross border operations they could engage in different activities or a combination of those activities, including as: (i) consultants providing advisory services, (ii) operators of power plants, including maintenance, (iii) contractors for construction, (iv) sponsors and shareholders.

Activities (i) to (iii) would not necessarily require cross border investment but (iv) would. In addition to providing equity capital, sponsors and shareholders would also often need to ensure that loans are available, for example, from investment banks, and provide adequate guarantees for lenders. It is not unusual for energy investments involving the private sector that 70 percent of the investment is funded by loans.

Creating an effective exporting cluster can result in opportunities and efficiency gains for the participating companies and enhance their competitiveness. However, there are also institutional challenges involving for example the simultaneous investments in various industries as well as coordination among companies providing goods and services within the cluster.

Overseas geothermal energy engagement can provide a global market opportunity for Iceland that could potentially result in stronger economic growth in the coming years. Several Icelandic companies are internationally respected, have highly experienced employees and have developed international networks over the years.

Among the weaknesses within the Icelandic geothermal cluster to engage overseas is limited production of machinery and equipment associated with the utilization of geothermal energy. One wonders if it would be possible to produce machinery and equipment within the cluster like has already happened in the fishing industry. In the fisheries sector Marel, a company that is headquartered in Iceland, is a major supplier of processing equipment and solutions for the food industry, including in fisheries.

To engage internationally, stakeholders from Iceland will need to develop a concerted strategy and an action plan for engagement. This is complicated, requires strong coordination and simultaneous investments. It is not obvious who will take the lead here and no formal platform for collaboration for overseas engagement currently exists. The government can only have a limited role here. It should avoid picking favored clusters or companies and get involved in defining priorities in a cluster action plan.

The Structure of Cross Border Energy Projects

It seems clear from the speech of the president of Iceland at the Reykjavík geothermal conference in November 2010 that he is talking about exporting clusters that would be engaged in cross border investments in emerging markets. This can be seen from his speech when he talks about “shareholder stake” (Grímsson, 2010, p. 5).

It is worth noting that the construction and operations of energy sector projects, including geothermal power plants, typically involve many different players: shareholders, grantors of concessions, offtake purchaser, input suppliers, construction contractors, operators, lenders, etc. They also often involve both public and private sector players who then form a public private partnership (PPP), see Figure 2 below. The sharing of the risks and the rewards is a great challenge in such complicated institutional frameworks and efficient risk allocation is key to success.

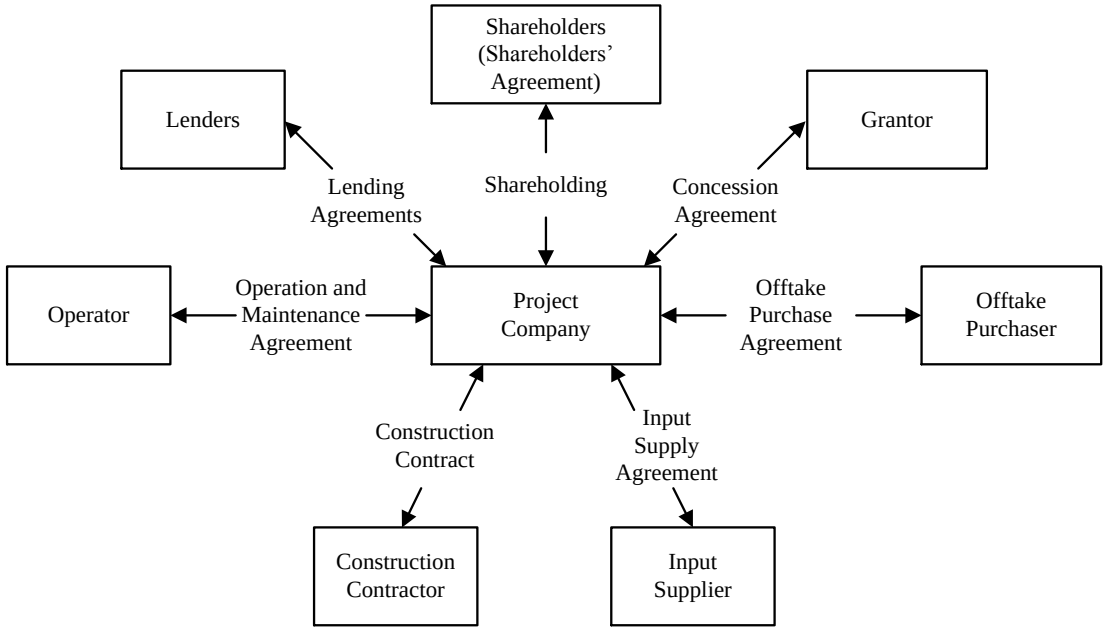


Figure 2. A typical PPP BOT project

Source: Delmon, 2009

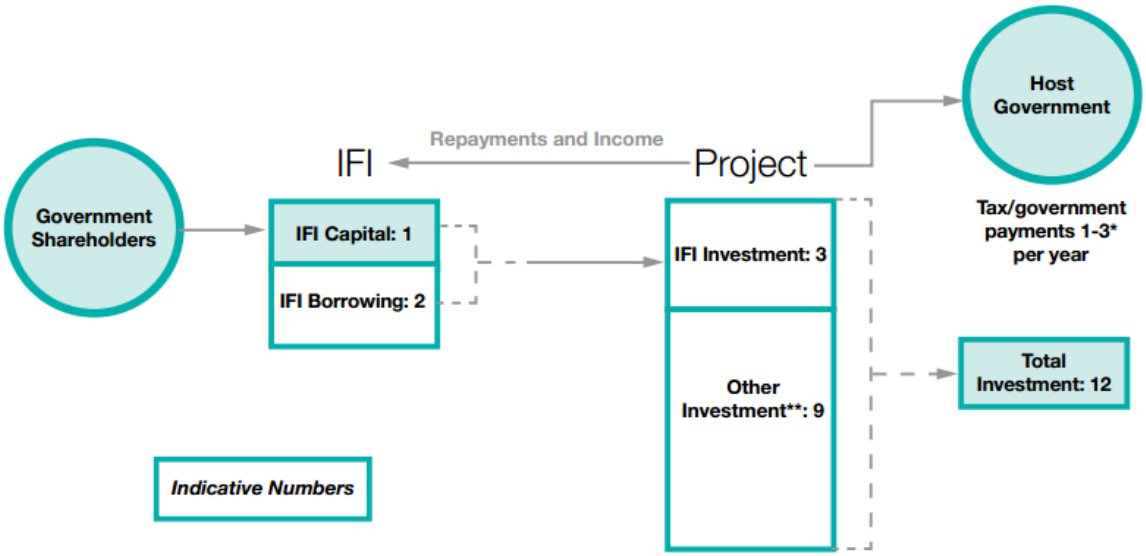
The institutional and financial challenges for companies from small countries that are engaging in such complex and capital intensive cross-border activities, as the energy sector projects typically are, have not been analyzed and assessed specifically for exporting clusters. Clusters require a concerted effort on the behalf of many different players, public and private. Such analysis needs to be done properly and in the case of engagement in emerging market economies it may include partnership with partners such as: other shareholders, private investment banks, export credit agencies, international financial institutions and foreign host governments. This represents both an opportunity and also a challenge for Icelandic companies since international financial institutions are now committed to and have plans to increase their engagement and investment in clean energy projects as part of the battle against climate change. It also is a challenge since many Icelandic companies suffer from weak financial structures and have limited ability to borrow from investment banks post-crisis and little experience in and limited capacity to work with international financial institutions. Icelandic companies also lack experience in forming consortia that often are necessary for energy investments that tend to be large, capital intensive with long payback periods.

Even the largest energy companies in Iceland, Orkuveita Reykjavíkur and Landsvirkjun, have difficulties. The fact that those companies have public ownership (including municipalities in the case of Orkuveita Reykjavíkur) can make their cooperation with international partners more complicated. The government of Iceland needs to clarify what those companies can do and what they cannot do in partnership with international players, both public and private as well as international organizations. In fact, it is highly questionable if companies owned by municipalities or by the central government should engage in risky overseas investments at all.

International Financial Institutions (IFIs) and Cross Border Engagement in Emerging Markets

If Icelandic companies that are a part of a geothermal exporting cluster engage in cross border investments in emerging markets, capital shortages will be among key challenges that they will face. Among the most obvious partners to help solve that problem are international financial institutions (IFIs) that offer equity, loans as well as guarantee instruments to support projects in emerging markets. The involvement of IFIs could also facilitate participation of international investment banks, export credit agencies, as well as potential co-sponsors providing equity capital (for more discussion about the structure of projects support by IFIs see Hilmarsson, 2012).

Capital shortages for cross border energy investments in emerging markets is not only a problem for potential Icelandic investors. This is a global problem. It is widely known that investment needs in clean energy in emerging markets and developing countries are huge. The IFC, for example, estimates that electricity sector investment needs in developing countries from 2007 to 2030 will be US$7.9 trillion (IFC, 2009). This is about half of the Gross National Income of the U.S.A. in 2009 (World Bank, 2010). Those investment requirements are so large that it is often necessary to pool private funding with official flows from IFIs as well as with host government resources. The international community is increasingly emphasizing clean energy investments for environmental reasons and as part of the battle against climate change. To promote those investments the international community uses the international financial institutions, including the World Bank Group.



* Tax payments are estimated based on payments tracked by EDFI and IFC (EDFI/Dalberg report, p. 29; IFC Annual Report, p. 29).
** E.g. commercial banks, owners' equity.

Figure 3. How IFI capital in leveraged with private capital

Source: IFC, 2011

Among the World Bank Group institutions are the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA) work with host governments and the International Finance Corporation (IFC) and the Multilateral Investment Guarantee Agency (MIGA) that support private sector investment. There are also IFIs with regional focus including the African Development Bank (AfDB), the Asian Development Bank (AsDB), the European Bank for Reconstruction and Development (EBRD), the Inter-American Development Bank (IDB), etc.

Partnership with private investors has always been a central part of IFI support of the private sector. Most IFIs limit their participation in a project investment to well under 50 percent, thus requiring partnership with other investors. As shown in figure 3, the structure of IFI finance substantially leverages the capital provided by governments. Not only do IFIs borrow significantly from outside investors to support their operations, but they also invest alongside private financiers and sponsors in projects. Indicatively, the net result is that one dollar of capital supplied to an IFI by governments can lead to $12 of private sector project investment (IFC, 2011).

The Nam Theun 2 Project is an excellent example of a successful leveraging of a multilateral guarantee mechanisms in a difficult business and investment environment. The risk mitigation instruments used by the World Bank Group were IDA PRG and MIGA PRI. The Asian Development Bank (AsDB) also provided a guarantee, see figure 4.

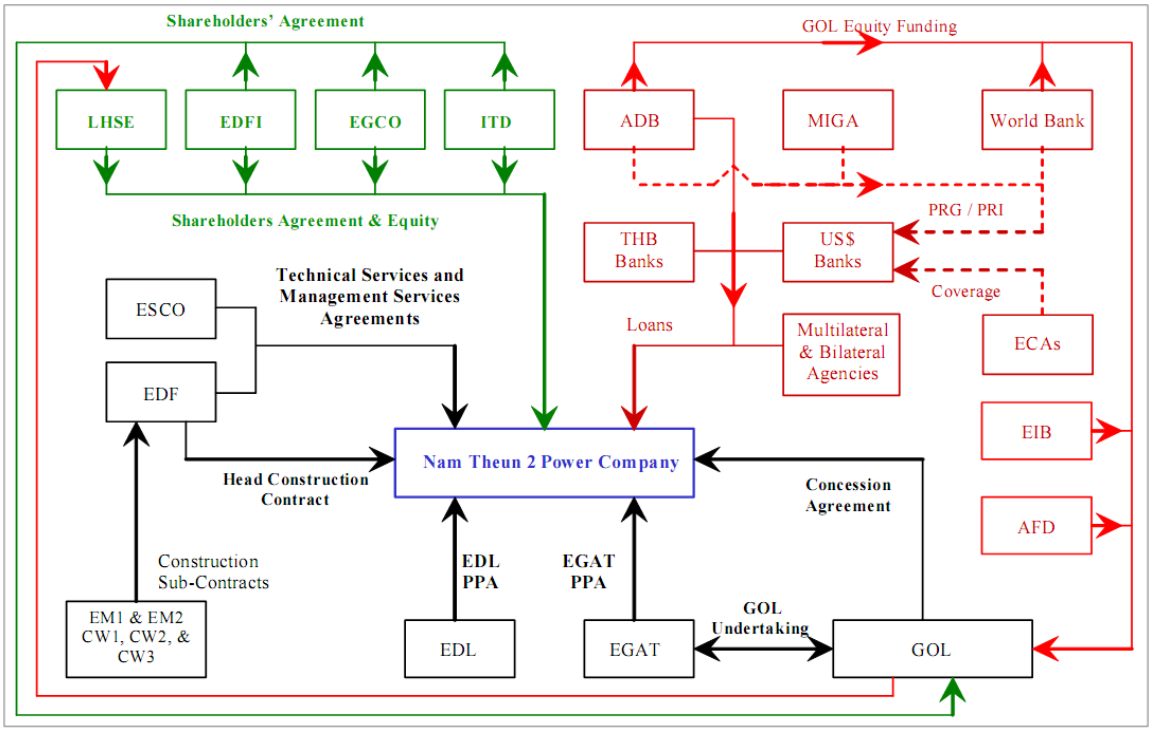


Figure 4. Nam Theun 2 Contractual Structure

Source: World Bank, 2005

If Icelandic companies sponsor a geothermal project in an emerging market, or maybe more likely, form a consortium with investors from other countries to sponsor a project, an IFI like the World Bank would be an ideal partner to help mobilize funds. Guarantees to facilitate the participation of private investors could be important here. However, Icelandic companies have so far not been successful in working with the IFIs that Iceland is member of i.e. the World Bank Group and the European Bank for Reconstruction and Development (EBRD). Furthermore Iceland is not a member of the regional development banks, i.e. the Asian Development Bank (AsDB), the Inter-American Development Bank (IDB) and the African Development Bank (AfDB).

IFIs generally need to demonstrate that their financing is essential, beyond what commercial finance would provide on its own, and that they can add value through risk mitigation and improved project design that leads to better overall development outcomes. They need to ensure that they crowd in investment and do not harm development of private financial markets. Most IFIs recognize this need, and many call their special role "additionality," that is, the value they bring to a project beyond what private sector financial institutions could typically offer (IFC, 2011).

One way to think about IFI additionality is shown in figure 5. IFI participation can help projects in two ways: (1) making them more commercially viable through, for example, better finance, improved risk mitigation, advice; and (2) improving their developmental outcomes by, for example, providing the advice and standard setting that lead to better operations, products, and services; stronger environmental, social, and corporate governance activities; or projects that are more inclusive (IFC, 2011). IFIs also tend to provide finance with longer maturities, which is generally beyond the risk appetite of private capital (IFC, 2011).

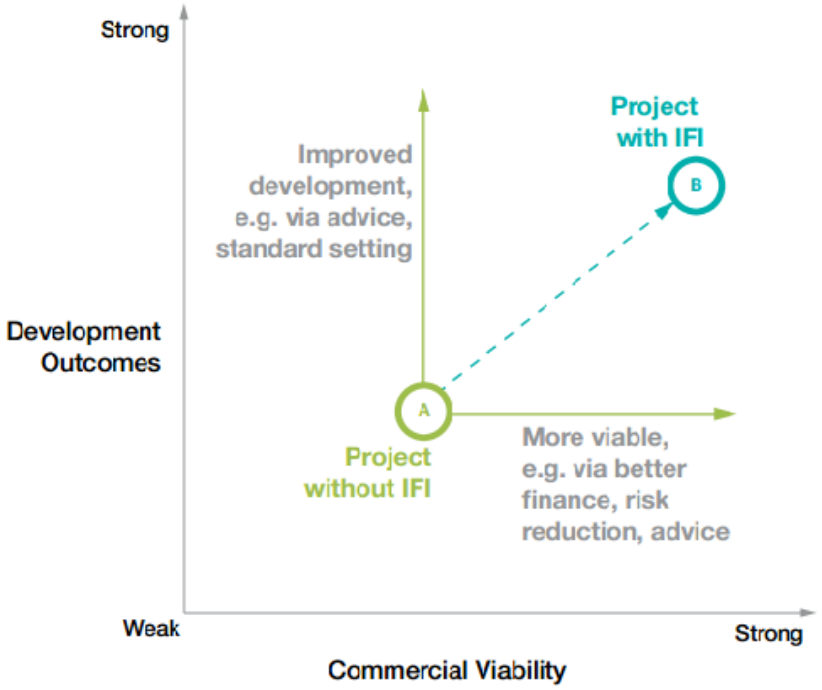


Figure 5. How additionality of IFIs can improves projects

Source: IFC, 2011

All the IFIs are large and carry out extensive feasibility studies before they move on with a project. They are bureaucratic and project approvals take time. It is doubtful that these long processing times fit well with Icelandic mentality. The president of Iceland described this well when he was praising the Icelandic banks that shortly after his speech collapsed. When talking about the Icelandic approach the president said "On numerous occasions I have also emphasized how Icelandic society, including our history and traditions, has produced a modern business culture that has proven to be very favourable when meeting the competitive challenges of our times" (Grímsson, 2006, p. 3). And then the president goes on to describe some of those qualities of the modern Icelandic business culture and talks about "The inclination to focus on results rather than a process: to go straight to the task and do the job in the shortest time possible" (Grímsson, 2006, p. 4). This would not fit well with the long preparation time often used by international financial institutions. The president goes on to say "The absence of bureaucracy and our lack of tolerance for bureaucratic methods. Perhaps because there are so few of us, we have never really been able to afford extensive bureaucratic structures" (Grímsson, 2006, p. 4). This approach proved to be extraordinarily expensive for Iceland in the case of the banking sector that eventually failed. If Icelandic investors want to gain the trust of international financial institutions and other reliable partners, this behaviour must change. They need to learn.

Conclusions

Icelandic companies could possible benefit from participating in and developing a geothermal exporting cluster to engage in emerging market economies. Iceland has made an impressive transformation from fossil fuel to clean energy and has a high share of geothermal energy in its overall energy use. The Icelandic geothermal companies and institutions have considerable experience in geothermal activities and exporting Iceland's know-how and experience could increase export revenues.

The global economic and financial crisis has severely affected the balance sheets of key Icelandic energy companies. Capital shortages will be difficult to overcome, especially for companies that intend to engage in cross border investments. Cooperation with international financial institutions remains a possibility but so far Icelandic companies have not been successful in forming partnerships with them and Icelandic membership in IFIs is limited. Iceland is not a member of the regional development banks.

The stakeholders in an Icelandic geothermal exporting cluster will need to develop a concerted strategy and an action plan if they intend to turn geothermal energy into a truly international opportunity. There is a lack of a formal platform for collaboration and coordination to form an effective exporting cluster that would have the capacity to engage in cross border investments in emerging market economies. An Icelandic geothermal exporting cluster would also require a concerted effort of many different players in Iceland, public as well as private, who engage in consulting, construction, finance, research, education, etc.

It will probably take years of organization and coordination before any significant benefits could materialize from an exporting cluster. Currently the possibility to engage in energy investments in emerging markets seems limited. This is due to the limited capacity and

experience that Icelandic companies have in forming international consortia and in cooperating with international financial institutions (IFIs) that Iceland is a member of. Such cooperation is particularly important to overcome the capital constraint that will severely affect many Icelandic firms post crisis. Cooperation with IFIs is also important for proper risk management. The government of Iceland has also neglected its relationship with IFIs and can provide little support or guidance on how to proceed. The absence of a functioning export credit agency is also an obstacle for Icelandic cross border trade in this area.

In the short term it seems more likely that Icelandic companies can sell geothermal expertise overseas, provide advice and possibly participate as operators, in maintenance or in constructing of geothermal power plants. This is unlikely to generate large revenues in the context of national accounts but it could certainly make a difference for individuals and companies. Cooperation with IFIs in cross border investments could be feasible in some cases but seems unlikely to materialize in the short term.

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DEALING WITH CULTURAL DIVERSITY IN GLOBAL VIRTUAL ENGINEERING TEAMS: LESSONS FOR CONSTRUCTION MANAGERS

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Abstract

Project managers within the construction industry have not kept pace with implementing Global Virtual Engineering Teams (GVETs) that are novel team-working structures taking advantage of Information Communication Technologies (ICTs).Nonetheless, recent times have witnessed the emergence of GVETs as an effective, efficient, and innovative team structure, which comprises of members scattered over different locations and time zones. Likewise, the existing literature highly recommends utilising GVETs in construction projects due to a number of well-recognised advantages. However, the desired outcomes via deploying GVETs heavily rest on meeting the requirements prescribed by antecedents and critical success factors associated with inherent idiosyncrasies of GVETs. On the other hand, it is widely recognised that when it comes to adopting GVETs, the cultural diversity dominating GVET working arrangements is usually problematic. This is because people from very different backgrounds and experiences bring different cultures, behaviours, routines and assumptions to the table. In addition, utilising information communication technologies as the main medium with the intrinsic limitations exacerbates the situation. To address the foregoing issues, this paper aims at critically analysing the challenges construction project managers face with respect to cultural diversity within GVETs. This draws from an extensive literature review followed by discussions providing a typology conceptual model in order to clarify the challenges associated with cultural diversity of members in the construction context. Utilising the *input-mediator-output-input* (IMOI), this study contributes to the body of knowledge by introducing an integrated conceptual

framework to assist dealing with the cultural diversity challenges within global virtual engineering teams.

1. Introduction

Business environment has pushed organizations towards globalization [1] and decentralization [2]. Consequently, the foregoing trend has culminated in the rise of new structures for teams in organizations. As a result, the industry has witnessed the rise of Global Virtual Engineering Teams (GVETs) as effective, productive and innovative team structures deploying members scattered in different locations and time zones taking advantage of Information Communication Technologies (ICTs) as the principal medium. Likewise, wide ranges of construction organizations are moving towards internationalization to harness the benefits of the mounting available global opportunities. Specifically, many construction companies in developed countries have transferred their operations to the emerging economies, with much lower costs, and much more available opportunities [3]. As a result, many methods reliant on internet have permeated into the working procedures of organizations within the construction industry (CI) [4]. One of the heavily internet-relied methods emerged within the CI are Global Virtual Engineering Teams (GVETs) structure deploying members that are not collocated and perform their assigned tasks utilizing the internet [5]. There is a broad consensus over the benefits of deploying GVETs in the CI [6]. Hence, many engineering teams are becoming GVETs gradually [7]. Similarly, construction project managers cannot ignore GVETs as a part of construction projects as CI is the sector of the industry with considerable potential to benefit from GVETs [8]. In addition, successful implementation of GVETs within the CI demands in-depth knowledge of their critical success factors (CSFs) and antecedents. Otherwise, the resources and the efforts allocated to implement GVETs in construction projects will end up in experiencing abject failures for construction managers [9, 10]. One of the major CSFs for using GVETs concern resolving the issues associated with the adverse effects of cultural and national diversity of the people gathered in the GVETs as the colleagues and members of the team. The managerial aspects pertaining the members of GVETs and concomitant issues such as cultural diversity have been recognized and addressed in non-construction sectors of the industry [11, 12]. Nevertheless, the CI has been criticized for the paucity of research on GVETs.

It seems that the existing studies in construction context have literally overlooked challenges stemmed from cultural diversity in GVETs within projects [13]. As will be discussed in following sections, research in the CI is in need of creating knowledge to alleviate and modify the aforementioned issues.

This paper attempts to address the foregoing challenges in the CI by clarifying the challenges facing construction managers and accordingly developing a conceptual framework as the foundation for further studies on the subject. Although major part of existing studies have overlooked the dynamic nature of influential constructs affecting cultural diversity matters in GVETs, our framework takes into account the necessity of considering the comprehensiveness and dynamism of the major influential constructs affecting performance of GVETs building upon a critical review of the existing literature and IMOI model. The paper concludes with a conceptual framework, which provides valuable guidelines for the practitioners in the CI along with showing a fertile ground for future studies on the subject.

2. Definitions

Due to the gradual evolution of definitions proposed for GVETs, even those sectors of the industry which are the pioneers in utilizing GEVTs suffer from the lack of a unified conceptual definition for GVETs [14]. Presumably, this is the case in a laggard industry such as construction. Indeed, having a formal conceptual definition is a prerequisite for developing conceptual frameworks [15].

As a result, we consider the below definition of GVETs within the CI as the basis for all the discussions presented in this paper: "Groups of geographically, organizationally and/or time dispersed intelligent workers with different skills and in different positions of the hierarchy heavily relied on ICTs to accomplish engineering tasks which for all are held accountable" [13, page 3]. The commonplace definition presented for cultural diversity refers to the racial, professional, organisational affiliation, and national backgrounds. In this paper, cultural diversity is here defined as heterogeneity of national cultures of team members in which national culture is defined as the culture belonging to the countries of residence of members of GVETs. We consider culture as ''the collective programming of the mind which distinguishes the members of one group or category of people from another[16].

3. Methodology

Wacker [17] enunciated that building good theories is not possible without critical literature reviews. Besides, building upon the results of literature reviews has been the sole method of several seminal works on virtual teams [18, 19]. As a result, literature review seems to be acceptable and appropriate to meet the requirements prescribed by the objectives of this paper. The keywords and the process to find and select the mentioned resources are similar to the procedure utilized in the recent paper by Hosseini and Chileshe [13] which entail extracting a comprehensive list of keywords within a wide range of relevant databases.

4. GVETs Benefits for Construction Projects

There are considerable benefits in deploying GVETs. Implementing GVETs in organizations would be a shift from failure to success [20]. Many studies have advocated for the aforementioned statement and the unprecedented increase in adopting them in wide range of projects[14]attests to the dominance of the similar perception within the industry. Major advantages of utilizing GVETs are stemmed from their remarkable abilities for crossing over geographical, organizational and temporal boundaries and having access to talents with multidisciplinary expertise [21]. Logically, the same advantages are applicable for the companies within the CI by shifting from conventional teams to GVETs. As shown in the relevant literature, utilizing GVETs can bring about many advantages for the CI which some of them are among the key performance indicators (KPIs) evaluating the success of construction projects. To underpin this statement, we can mention the envisaged benefits of GVETs for reducing the costs [3, 5, 22, 23]. In addition, capabilities of GVETs in improving the status of projects in terms of the quality [24] and timeliness of delivering projects [5, 10] have been approved within the literature. Moreover, construction companies will be able to resolve some of the lifelong challenges of the CI such as necessity of integrating isolated processes and participants of projects by deploying GVETs in their working procedures [25].

As a result, construction managers cannot ignore GVETs and should consider this system as an inseparable element of future construction projects. Nevertheless, success in implementing GVETs in construction context squarely rests on meeting the associated requirements prescribed by CSFs of GVETs.

5. CSFs of Implementing GVETs in Construction Context

It is acknowledged by many seminal works within the CI that failing in meeting the requirements of GVETs prescribed by the CSFs would culminate in disappointing conditions in which organizations might finish up dealing with teams with less performance levels while fronting more challenges [9, 10].There are limited studies addressing the CSFs for implementation GVETs within the construction context [13]. However, similar to the benefits envisaged for GVETs, there is consensus among existing studies within the CI over the CSFs and antecedents for the success of GVETs. Interestingly, majority of these studies have regarded the same list of factors as the determinants of success of GVETs within the construction context. Figure 1 illustrates the major CSFs of implementing GVETs within the construction context extracted from the existing literature [5, 9, 10, 13].

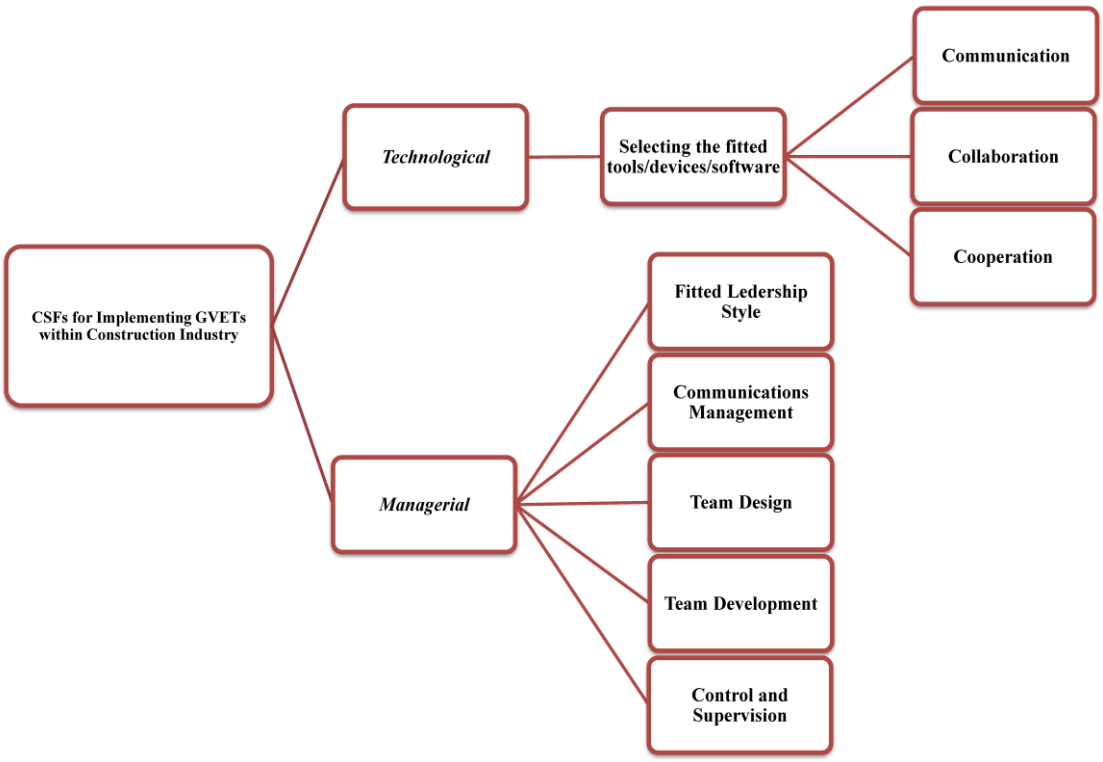

Figure 1. Major CSFs for implementing GVETs within the CI

Due to the hastened advancements in ICTs, the infrastructure able to fulfil the requirements of GVETs seems to be obtainable. Hence, technological CSFs do not seem to be

the primary sources of failures anymore [6, 8]. This is because the technological aspects of GVETs have been addressed within the existing literature [9] and some studies have provided the CI with practical solutions for GVETs [7]. In addition, technological CSFs have overlaps with other disciplines such as IT. Hence, the results of the research within other fields are applicable within the CI. Therefore, managerial CSFs stemmed from the inherent idiosyncrasies of GVETs such as geographical, temporal, organizational, and cultural diversity related issues are the major determinants in need of proper consideration by the researchers. In accordance to the objective of the paper, the following sections will focus on the cultural diversity aspects of GVETs affecting the appropriate policies of construction managers.

6. Cultural Diversity in GVETs within Construction Context

Gathering appropriate team members in a virtual team delineates a successful GVET project from a disastrous one [26]. Nevertheless, the body of knowledge concerning GVETs in non-construction industry still suffers from paucity of research on the subject. The major issues of cultural diversity in GVETs in wide range of industries could be categorised into the following three areas reflecting the interaction between the main CSFs of GVETs in figure 1 and cultural diversity of members gathered in the GVET:

- Direct cultural diversity issues
- Indirect cultural related impacts
- The collective effect of idiosyncrasies of GVETs and cultural diversity

6.1. Direct Cultural Diversity Issues

Sometimes organisations have to gather the members of GVETs from far different backgrounds. Presumably, each member of GVET brings different working cultures, behaviours, and routines to the team [18]. Therefore, most of the times implementing GVETs ends up in dealing with high degrees of cultural diversity. On the other hand, many evidences within the relevant literature have shown that the issues of cultural diversity directly affect the output of and the performance of GVETs in many aspects during the lifecycle and operational period of the teams. As postulated by Zimmermann [27] in non-construction industries, we would argue that the CI observes the same strong direct effect of cultural diversity on many features of GVETs including lowering the quality of communications in GVETs which directly reduces the performance. Some studies have reported on the deterioration of motivation level over the lifecycle of the team along with an increase of non-committed/unresponsive attitudes within virtual teams due to cultural diversity effects [12].

Research within the construction context confirms our assumptions as the results of the paper by Nayak and Taylor [22] regarded cultural diversity as one of the three major constructs significantly affecting the outcome of GVETs. In other words, direct cultural diversity issues are those aspects of the cultural diversity that have impacts on the outcomes of GVETs in terms of performance and effectiveness during the operation. The foregoing discussions are in alignment with the results of the previous studies stating that a strong and positive project culture should be developed in order to overcome the cultural diversity issues that often exist in construction project, especially in international arena [28-30].

6.2. Indirect Cultural Related Impacts

Cultural diversity of members affects many aspects of GVETs even before they embark on operation by changing the structure and design of the team and affecting the criteria and procedure necessary for selection of members by managers. Cultural diversity dominating GVETs mainly influence the appropriate composition for the team including the size of the team [20, 26] and limitations prescribed by the criteria for selecting members with cultural compatibility. The necessities prescribed by cultural diversity also affect the best leadership style that accordingly increases or decreases the performance level of GVETs. These criteria come from viewpoints presented in the literature about the essential characteristics for GVETs members with respect to socio-emotional aspects and the arguments implying the preferences of some cultures over other cultures in terms of effectiveness [11]. Hence, in this category, cultural diversity affects other features and characteristics of GVETs and consequently indirectly influences the performance and output of the team. This is the case within construction context as cultural backgrounds and competency of members of GVETs have been mentioned as the main criteria for assigning appropriate team members in construction projects[8, 10]

6.3. The Collective Effect of Idiosyncrasies of GVETs and Cultural Diversity

Presumably, unfamiliar people brought together in a GVET suffer from the lack of a shared language and common behavioural patterns. Their interpretation of observations and each other's reactions are different and somehow misleading [31]. They also might face problems in many aspects of team working including distributing the tasks, coordination, settling conflicts, and putting into effect common routines. Obviously these problems are exacerbated and somehow created by the necessity of deploying ICTs as the main medium with the lower quality of communications [32]. These kinds of issues could have been resolved in face-to-face teams but in case of GVETs, their collective effect seems problematic and it is not an easy task for managers[31]. The collective effect of cultural diversity and other features of virtual working has been confirmed by studies within the CI [13].

It is not an overstatement that cultural diversity is a determinant of success for GVETs within construction context due to many reasons described in the previous sections of this paper. The primacy of cultural diversity for GVETs has roots in the relationship between the cultural diversity of members, which is inevitable in most cases and the performance, and outcomes of GVETs for the stakeholders. As a result, cultural diversity is an inseparable feature of GVETs and there is no measure to circumvent the diverse effects of cultural diversity on the performance of GVETs for construction managers. The only feasible measure for construction managers is to modify the effects of cultural diversity on their teams rather than putting in effort to eliminate it. The fact is that the constructs effecting GVETs and cultural diversity are always interacting and change the patters of each other. For example, many evidences have confirmed that some specific types of technology fit certain cultures very well. Therefore, managers can consider it for moderating the negative effects envisaged for cultural diversity and technology deployment in GVETs. As examples, we can refer the interested readers to pursue the guidelines of Theory of Acceptance and Use of Technology (UTAUT), which define the factors affecting technology implementation by members of a team from different cultures. Besides, construction managers can take advantage of the fit between some type of tasks and special cultural backgrounds [33]. We are of the view that construction managers are able to configure teams in terms of member selection, technology and task types byselecting the best package of CSFs of

GVETs for alleviating the issues of cultural diversity and maximising the potential output of the GVET.A conceptual framework in the following sections has presented this proposition.

7. Discussions

To present our discussions in an organised manner we take advantage of the *input-mediator-output-input* (IMOI) framework [34] which is a commonplace strategy to discuss different aspects of GVETs by many authors in the field. In this model, *Inputs* include the basic conditions and resources provided to a GVET such as the structure of the team. *Mediators* that mostly reflect the conditions describing the procedures teams operate are of dynamic nature and vary as a function of the condition of GVETs. *Outputs* represent the results of a GVET project, such as the level of performance and satisfaction of stakeholders and members themselves.

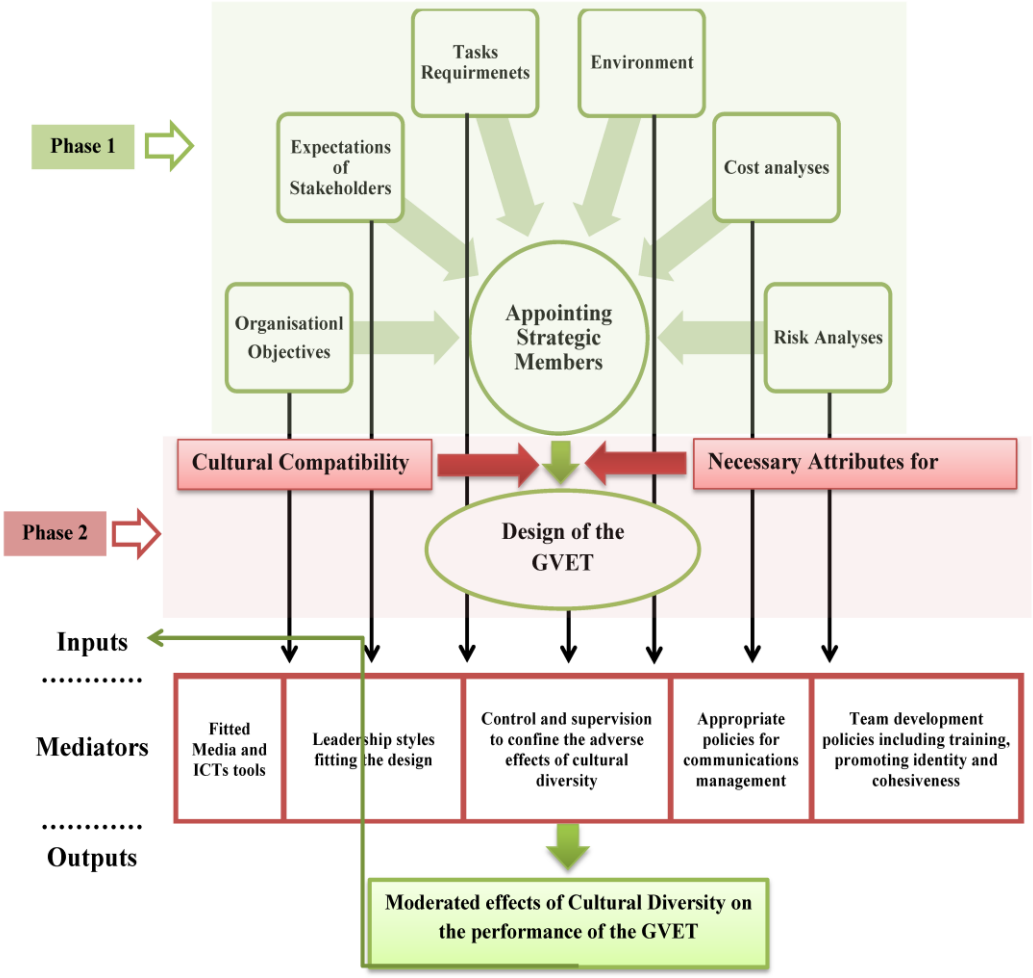

Figure 2. Conceptual framework for moderating the effects of cultural diversity in GVETs based on the IMOI model

Cultural diversity comes from the attributes of members of the team. Hence, as an *input*, it would be one of the main control tools available for managers of GVETs for confining the influences of cultural diversity by draws upon the features of members of GVETs. This includes selecting the appropriate members in inception phase along with promoting the positive attitudes and behaviours as the GVET is going further with the project. As another proposition, we hold the view that selection of GVTs members should not be finalised in one phase, rather the manager should select the members according to the following phases as a sequential procedure.

Phase 1 (appointing strategic members): The strategic members of GVETs are appointed on the virtue of their abilities to complete the delegated tasks under the effect of some other considerations such as the objectives, cost and the environment. It is because strategic staffs are not available for GVETs easily. They are presumably the best of their disciplines in other locations of the world.

Phase 2 (appointing remaining members): This phase literally includes designing the GVET considering the attributes of the strategic members. The non-strategic members will be appointed from cultures compatible with that of the strategic members of the team. Chen and Messner [10] have provided the necessary attributes of members of GVET that can be used for this phase by construction managers. At this stage, we have the design of the team, which comprises an element of the input for our IMOI model. Figure 2 illustrates the elements of the IMOI framework. The elements of *input* of the model are shown influencing all the matters that should be considered to select the *mediators* of the model.

The mediators section is comprised of selecting the most appropriate fitted CSFs related resolutions correctly. This includes addressing all the facets of leadership, supervision, control, training, developing, along with communication management of the GVET. It is evident from figure 2 that elements composing the GVETs also interact as a coherent whole. As an example, the kind of cultures existing in the team will dictate the kind of leadership appropriate, the technology and the communications channels required for implementing the selected leadership strategy along with the necessary training topics for team development. The foregoing elements will also confine the most effective supervision strategy for the manager. As a result, managers should tap into all the potential remedies available in any feature of managing GVETs in terms of the tools and devices available and the strategies to moderate the adverse effects of cultural diversity in GVETs. It should be noted that the main proposition of the paper is to address the issues from a holistic approach taking advantage of the synergistic effects of all available remedies to tackle the challenge of cultural diversity in GVETs.

8. Conclusions

Cultural diversity is an inseparable element of GVETs in many sectors of the industry including construction. On the other hand, the outcomes of cultural diversity could jeopardise the effectiveness and success of GVETs, thus managers should take measures to moderate the negative potential effects. As stated in previous sections, researchers within the CI have literally ignored the issues of cultural diversity in GVETs. Therefore, this paper is a rudimentary attempt to provide construction managers with some useful guidelines for overcoming the potential negative effects of cultural diversity. Drawing upon the holistic approach for addressing the issues and utilising the IMOI model, we have presented a conceptual framework for moderating

the effects of cultural diversity in GVETs. The summary of the guidelines are as the below items:

- Cultural diversity is a serious matter in GVETs and moderating the concomitant effects should be considered among the CSFs of GVETs;
- Managers should address the issue from holistic approach taking advantage of the synergistic effects of all the managerial and leadership potentials;
- The constructs of the model to tackle the issues of cultural diversity have been provided as the conceptual model in figure 2;
- Addressing the issues should be pursued as a sequential procedure.

As stated, the model provides guidelines for practitioners in the CI to increase the performance of their GVETs. In addition, the paper contributes to the area of research in construction context by providing the below grounds for future studies:

- Validating the veracity of the constructs and the relationships presented in the model;
- Ascertain the ingredients of each construct and the variables comprising the constructs;
- Evaluating the severity and the level of effects of cultural diversity in construction context considering the specific culture dominating the CI and the idiosyncrasies of the sector.

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PROJECT MANAGEMENT ISSUES OF FORMATION OF ENGINEERING COMPANIES ARCHITECTURE

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Keywords: project management, Projects in a Controlled Environment, PRINCE2 method

Abstract

The Russian market nowadays offers ample opportunities for companies of different industries. In particular, the market of engineering services is growing rapidly due to the rapid development of industrial and civilian construction and modernization. In these circumstances, many engineering companies are experiencing problems related to the fact that the existing enterprise architecture does not allow companies to grow at a pace set by the growing market. The aim of this paper is to develop approach to the formation of enterprise architecture of engineering company based on the principles of project management to meet growing business needs.

The change in approach to running a business in today's information society results in the fact that the advantage is enjoyed by that participant of the market who is better adapted to the changing environment and provides innovative solutions to meet the challenges of the market. The volume of economic activity that can be organized as a routine operation is becoming less, the modern economic environment implies a constant work with the changes. In these circumstances, many companies show a growing interest in project management as a method by which a business unit can work with unique challenges both for organization and implementation of the core activities.

On the one hand, many companies are aware of the need to revise the management system in order to bring into compliance business processes and strategic business objectives to provide an adequate level of performance. Such a change of the management system requires a special project (or complex of projects), aimed at reforming the enterprise architecture. The implementation of such projects is oriented to forming a balanced management architecture.

On the other hand, many companies are project-oriented in their nature, and their activity can be considered as a portfolio of projects in various stages of execution. Project-oriented companies can be found in such industries as engineering, construction, IT-sector, machinery manufacturing, consulting, banking, and many others. Such companies need to implement a unified corporate standard for project management in order to provide the quality of each project and effective management of a portfolio of projects as a whole. Implementation of a unified project management standard in such companies is a prerequisite for competitiveness, and project management principles are to form a foundation of the organizational management system of the company.

A classic example of a project-oriented company is an engineering company which serves primarily the needs of construction and manufacturing industry. In the past two decades, Russia has experienced a significant growth in the demand for engineering services caused, in turn, by

the rapid growth of industrial and civil construction, the need for the reconstruction and modernization of outdated facilities. Russian engineering companies are currently going through a specific stage in their development when the projects are relevant to them in both perspectives: individual projects for re-engineering their business architecture and projects as a form of servicing each customer order.

Current Status of Engineering Industry in Russia

As a separate form of commercial operations, *engineering* provides certain types of services such as design, construction and commissioning of the facility, the development of new production processes, improving existing production processes by one party (consultant) to another one (the customer). [7] As the definition indicates, engineering includes the provision of a whole range of services of industrial, commercial, scientific and technical activities. It determines the characteristics of the engineering projects: they are complex projects that require the involvement and coordination of the various types of resources (material, financial, human, etc.), the interests of all involved project stakeholders and the conditions of the institutional environment as well as high-quality IT-support at all stages of project realization.

The development of engineering industry in Russia has had its specific path. During the last 20 years, Russia shows the dynamic development of both building new facilities and reconstruction and modernization of outdated ones. Russia is a large and attractive market from the point of view of engineering services.

Western engineering companies (so-called, full cycle engineering companies), as a rule, include several divisions or subsidiaries involved in the provision of certain types of engineering services: surveying and engineering design, engineering and supply of set of machinery and equipment, installation of equipment at the facility, commissioning, supervision, financial consultation.

Full cycle engineering companies are still forming in Russia. This process requires a careful study of the approaches and principles for the formation of enterprise architecture of a particular industry. When forming an enterprise architecture it is necessary to consider both technological process of a particular service, determined by the nature of the industry, and the specific characteristics of the environment in which business is run. Both Russian engineering companies and the Russian market environment have their own characteristics and differences from the European and American markets.

The development of engineering services in post-Soviet Russia was based on the Soviet design institutes. Their activities, on the one hand, are characterized by rich traditions, strong theoretical background, involvement of qualified professionals, and as a result, high-quality execution of projects On the other hand, the processes of commercial and management activities are not completely integrated with the best practices worldwide, often there is no unified corporate approach to project management, organizational structure is not always balanced in terms of responsibilities distribution. In the meantime, the implementation of engineering projects which are usually information- and knowledge-intensive, and therefore require a high level of automation, in Russian companies do not have sufficient IT-support: partial and patchy process automation often takes place. As a result, many growing engineering companies are now at the stage of their development when the structure of their internal environment ceases to

meet the growing needs of the business, does not allow taking advantage of market opportunities and, factually, becomes an obstacle to further development.

The Russian market in general and particularly the market of engineering services has a high degree of uncertainty, which is determined by the nature of the institutional environment. That is why Russian companies should have a sufficiently flexible management structure, pay great attention to risk management and provide a mechanism for making decisions under uncertainty. Russian companies are generally well adapted to the external changes, but lose to foreign companies in the maturity level of project and process management.

The features enlisted above explain why many Russian companies today are seriously focused on the problem of enterprise architecture formation. The first step towards the enterprise architecture formation is a project to reform the business architecture.

Some Issues of Enterprise Architecture Formation Based on Project Management

Engineering activity is factually the process of managing dynamic portfolio of orders for engineering projects execution. Parallel execution of multiple projects requires the cross-functional and cross-departmental involvement of specialists with different skills and belonging to different levels of the hierarchy of organizational structure. In such circumstances, there should be a clearly-established procedure of interaction of all participants during project execution and project management, as well as clearly defined roles and responsibilities and clear lines of authority for making key decisions at different stages of the project execution, and finally the allocation of the strategic management level for controlling the entire project portfolio. The organizational structure with the properties mentioned above will optimize project performance and project management, will standardize some processes of project management, will allow including strategic business goals into the portfolio during its forming and, therefore, would increase the number of projects executed by means of the rational allocation of administrative and executive functions between all organizational elements. From this perspective, current function-oriented organizational structures of many engineering companies in Russia do not always meet business interests, and often do not allow companies to take full advantage of the opportunities provided by the growing market of this type of service.

As engineering industry is project-oriented, it seems reasonable to implement project management in engineering companies not just as a common standard used for execution of each particular project, but put some project management principles at the basis of the business architecture. The project of bringing the business architecture in compliance with the strategic goals of the business is the first step towards the formation of the enterprise architecture. While implementing such projects it is important to take into account features of the business processes system and features of a particular industry.

The organizational structure of an engineering company, on the one hand, should match the system of its business processes, providing its effectiveness, and, on the other hand, it should match the accepted system of project management, the standard of which should be the same for the entire company. For effective project management it is necessary to implement a project management approach that would allow creating a flexible, effectively-managed and controlled system of execution of single engineering projects and the portfolio of project as a whole, and would establish unified procedures project delivery and monitoring at various stages and levels.

The main reasons of the need of architecture restricting based on the projects of business processes reengineering and organizational structure reforming are the following:

1. Absence of the precise strategy of management architecture development;
2. Absence of an integrated architecture adaptability to market conditions;
3. Discrepancy between the organizational structure and increased business demands;
4. Discrepancy between the organizational structure of companies and organizational structures of projects;
5. Absence of common corporate standards of project management;
6. Absence of precisely prescribed roles and responsibilities in the current organizational structure;
7. Absence of detailed and transparent business processes;
8. Need for the implementation of the enterprise information system.

The project approach to business management has the following features:

- the project is considered as a unique combination of project delivery processes;
- rights and responsibilities for delivering the project results belong to project manager and project management team;
- a fixed budget of the project;
- implementation of a specific project organizational structure and motivation of project management team members;
- development and implementation of specific standards of performing project processes [2].

One of the possible effective project management standards that can be implemented in engineering companies is the PRINCE2 method which is known worldwide and acknowledged by the International Project Management Association (IPMA). PRINCE2 (**Pr**ojects **in** a **C**ontrolled **E**nvironment) is a structured method of project management based on thousands of best practices of successfully realized projects. This method has the following advantages:

1) includes the best practices that has proved its effectiveness;
2) can be implemented for any kind of the project;
3) is widely known and provide the common language for all the members of the project;
4) is oriented on strategic goals achieving;
5) sets certain roles and responsibilities for project management;
6) is oriented at delivery of project results. [1]

PRINCE2 method is a flexible tool for project management the elements of which can be and should be “tailored” for a specific company, a specific project. This principle – tailoring to the environment – has allowed realizing a project to reform the organizational structure of a particular engineering company.

For projects of business architecture reforming in engineering companies, related to the alignment of the organizational structure and the defining of principles for the distribution of management authority within this structure, principles, that declare a clear definition of roles and responsibilities and management by exception are particularly important. And the principle named “tailoring to the environment” allows taking into account the peculiarities of the particular industry and the particular company.

Practical Experience of the Organizational Structure Reforming Project in the Engineering Company Based on PRINCE2 Method

The top management of an engineering company (hereinafter referred to as the *Company*) initiated a project of management processes optimization in one of the divisions of the company (hereinafter referred as the *Division*). *Division* provides designing of infrastructure objects as a key service from engineering services complex. While developing, a positive business reputation has caused a growing demand for the *Division*'s services by the customers. The *Division* as an independent business unit faced the classic problem of growing companies: the existing business processes and roles and responsibilities did not allow meeting the growing demand for the services of the company, and therefore slowed down the growth of the business. Roles and responsibilities in the existing organizational structure were designed to ensure the quality of individual projects. In the mean time it was a lack of attention to the management level of the division as a whole, where a company's business interests are defined and controlled.

The top management of *the Company* has decided to implement a project to revise the existing business processes and organizational structure of *the Division* in order to optimize management processes to enable the continuous business growth. This objective implies such a re-engineering of business processes and reforming the organizational structure that will:

- provide compliance between the organizational structure and project management principles;
- create conditions for the further optimization of business architecture based on different criteria (such as the exclusion of redundant business processes and their segmentation within the various organizational units, minimizing organizational interfaces, improved internal and external communications, increasing flexibility on the market);
- create conditions for distribution of the approaches developed during the project for formation of business processes and organizational structure in other business units of the *Company*.

To realize this goal the following consequence of *objectives* was set:

1. Modelling and analysis of business processes and organizational structure ("as is");
2. Roles and responsibilities analysis including definition of non-core responsibilities;
3. Modelling of business processes ("to be"):
   a. Business processes reengineering (optimization of business processes on the criteria of business growth on the basis of review of the roles and responsibilities);
   b. Organizational structure improvement to provide the growth of business;
4. Implementation of the updated system of business processes and organizational structure in order to provide business growth.

The result of the implementation of defined objectives should be: an optimized system of management business processes, a reformed organizational structure, development and implementation of a standardized approach to project management.

For the purpose of architecture forming of an engineering company based on the revision of management processes and organizational structure, the principle of defined roles and responsibilities is particularly important. PRINCE2 allows creating a system of hierarchy and interaction of the participants of the project which form a well-functioning structure that takes into account the interests of all stakeholders of the project. [1] Such a structure provides certain

subordination levels of project management, each of which controls the interests of different levels, ultimately subordinate to the strategic goals of the business (Figure 1). Responsibility delegation to the higher level is performed according to the "management by exception" principle. This provides the lower levels with more management freedom and the higher ones are not involved into routine processes of lower level processes.

Corporate and program management – strategic interests of corporation/project program	
Project management team	**Directing** – business interests of the project
	Managing – project interests
	Delivering – project performing management
Project execution	

Figure 1. Project management levels (according to PRINCE2)

In addition to the distinction between levels of project management, the organization of the project team according to PRINCE2 implies specific roles and responsibilities, which allow avoiding function duplication, to provide a clear procedure of project control at all stages, as well as ongoing expert and administrative support to the project management team.

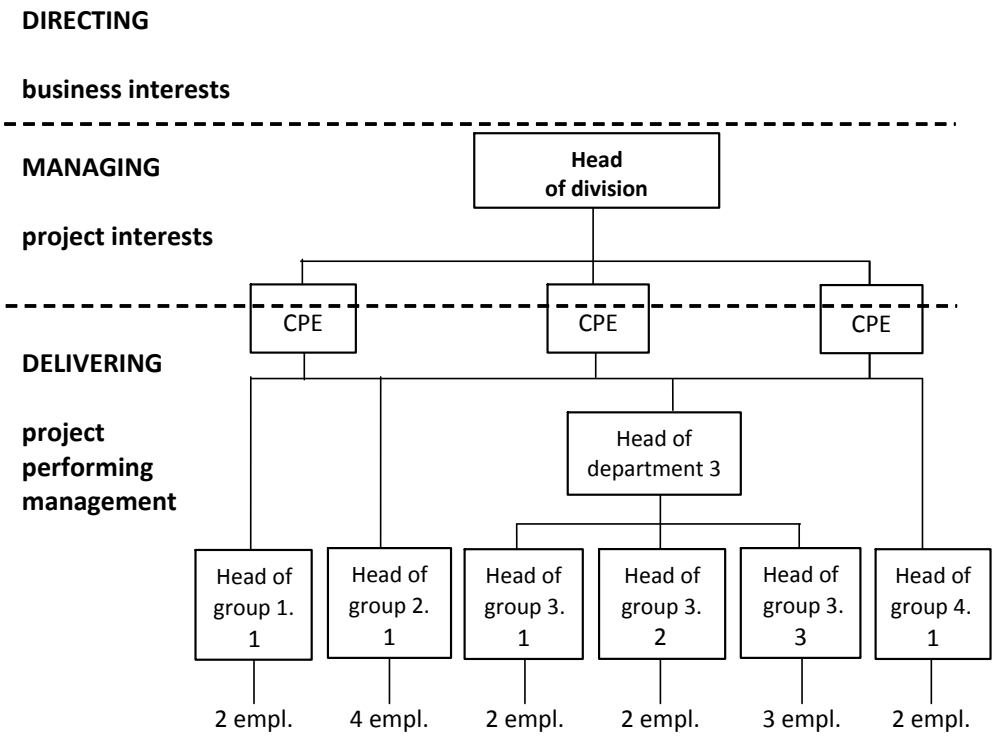

Figure 2. Organizational structure "as is" according to project management levels

Note: CPE – Chief Project Engineering

Interviewing of personnel of the different management levels has allowed describing, modelling and analysing the existing organizational structure (Figure 2), general scheme of processes based on Diagram of added value chain [3] (Figure 3) and detailed schemes of each business process. These activities made it possible to analyse and put into order management processes, as well as main and supporting business processes of the division, and to identify "bottlenecks" in terms of duplication and inconsistency of prescribed responsibilities for different roles in the business process management. [5]

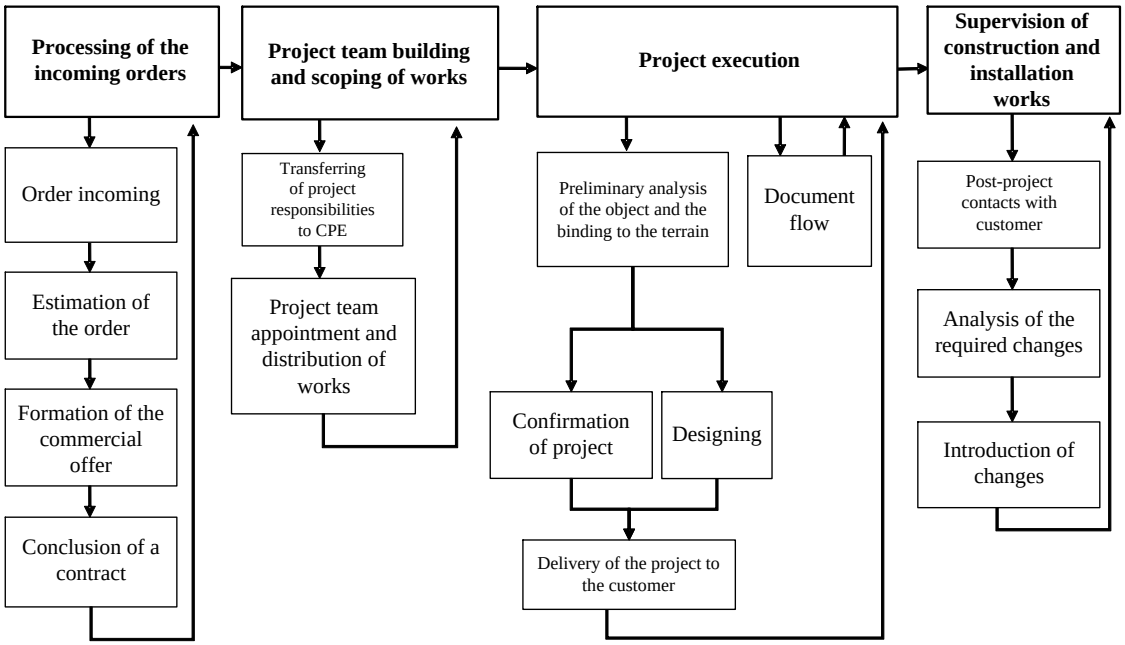

Figure 3. General scheme of processes based on Diagram of added value chain

The *Division* provides construction designing work in four areas: heating systems, electrical systems, ventilation and drainage, instrumentation and automation (Groups 1-4 in Figure 2). A customer order for the *Division*'s services can include any set of works from this list. Thus each project executed by the *Division* according to customer's specifications, requires the involvement of one to four project performing groups.

The decision about the feasibility of each project is made by the *Head of Division*; he is responsible for the success of each project and the success of the *Division* as a whole. After signing the contract for the project, the responsibility for the ongoing monitoring of its execution is transferred to one to CPE (CPE – Chief Project Engineering). Depending on the type of engineering services that constitute each project, the number of project performing groups is defined; all the activities of each group are directed by the *Head of the group*. Thus, after having agreed with the customer, each contract is distributed between management and executive levels of the organizational structure of the *Division*, depending on the composition of each project. Being really complex, engineering projects generate a large and complexly structured document flow and communications that require extensive consulting and

administrative support. In the existing organizational structure these functions are distributed between different management and execution levels of the project, and, factually, are non-core activities for the personnel who performs it.

The distribution of the project authority within the *Division* described above allows associating positions in the existing organizational structure and the roles and responsibilities proposed by PRINCE2:

Position in the existing organizational structure	PRINCE2 role
Head of Division	Executive, User project assurance
Customer	Supplier project assurance
CPE	Project manager
Head of group/department	Team manager

After having analyzed the existing organizational structure and current roles and responsibilities in the *Division*, the inconsistency in distributing responsibilities between the management levels and the discrepancy between the management organizational structure and project organizational structure were found. On the one hand, there is a lack of proper control from the point of view of strategic business objectives ("empty" *Directing* level – see Figure 2); on the other hand, there is duplication of functions and control at lower levels (double representation of management functions on the *Managing* and *Delivery* levels – see Figure 2).

In response to the identified shortcomings of the existing management processes the following corrective actions concerning distribution of roles and responsibilities were proposed:

1. To define clearly the project management roles between the "Directing" and "Managing" levels, prescribing responsibility for the business interests control to the manager of the upper level (Head of Division) and giving more management authority for individual projects to the middle-level managers (CPE);
2. To increase the number of managers in the "Managing" level (CPE) to enable the execution of a greater number of projects;
3. To introduce the role of administrative support of the project (Project Support) which is not performed in the existing structure in the centralized form and is dispersed among managers at all three levels
4. To introduce the role of expert support of the project (Project Assurance) which is not performed in the existing structure in the centralized form and is dispersed among managers at all three levels.

Taking into account all the proposed changes to the organizational structure after revising the existing roles and responsibilities, a new "to be" model was performed (Figure 4).Thus a clear management hierarchy was formed, around which key roles and responsibilities of the appropriate management levels are allocated.

The proposed model of the organizational structure "to be" has a number of advantages:

- It enables the use of common and proven approach to project management (such as PRINCE2);
- Provides a basis for distinguishing between the roles and responsibilities in the project management team and the organizational structure of the whole unit;
- Forms the organizational basis for further growth of the company in accordance with the strategic goals of the company.

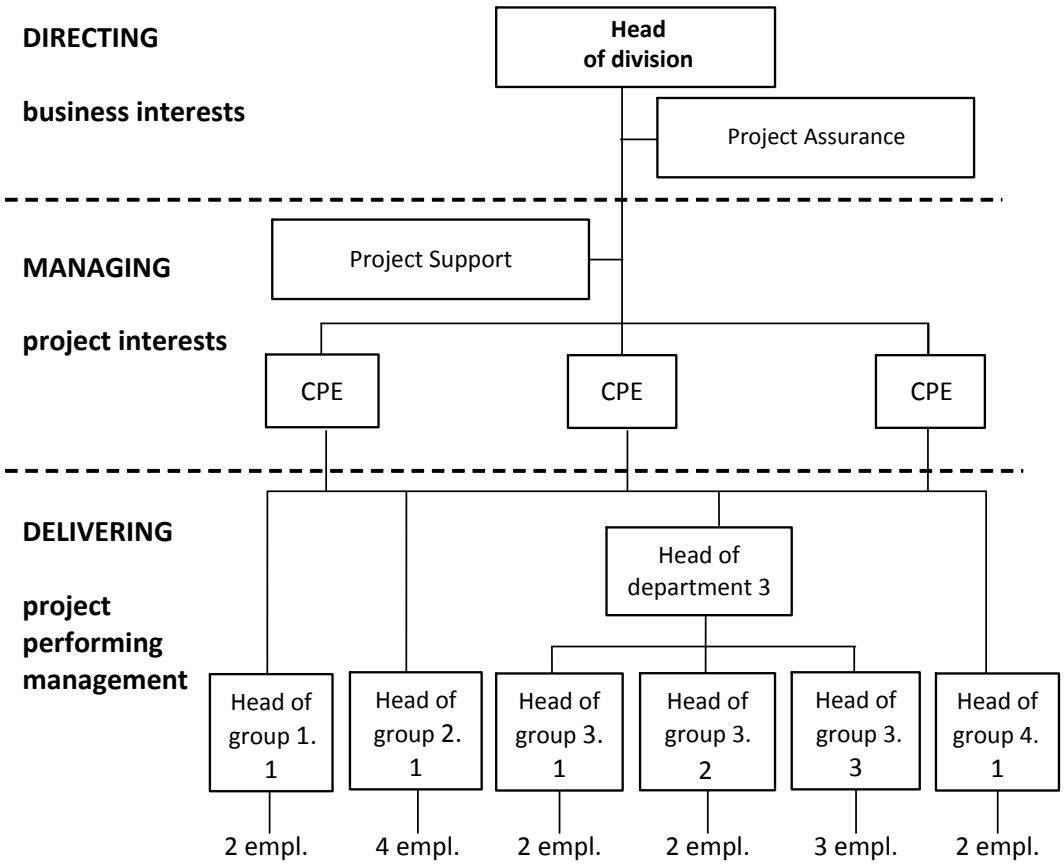

Figure 4. Organizational structure "to be" according to project management levels

The current paper describes the authors' approach to the formation of enterprise architecture of project-oriented company (based on the engineering sector example) on the basis of the principles of project management. This approach offers the opportunity to analyze and reengineer the system of business processes and build the corresponding organizational management structure. The basis of the proposed organizational structure is the revised system of business processes and the principle of roles and responsibilities allocation according to the project management approach. This will enable the top management of the *Company* to fill each management level with appropriate set of responsibilities, to ensure that the management processes and the organizational structure are in compliance with the *Company's* strategic goals and increasing business demands, both now and in the future. In addition, such system changes create the conditions for:

- further business processes optimization;
- the spread of this practice to other units of the Company;
- implementation of a corporate information system.

In this paper, the authors consider an example of the company, whose primary objective is to reform of the enterprise architecture in accordance with the requirements and market

opportunities. To solve this problem it was necessary to build a new organizational management structure, which was made by means of implementation of certain principles of PRINCE2 project management method – the principle of defining roles and responsibilities and the principle of management by exceptions. In the future, the implementation of other principles and aspects of PRINCE2 project management method. The authors suppose that for engineering industry in Russia particularly relevant aspects of PRINCE2 are risk management and change management aspects. As engineering projects are associated with a wide range of stakeholders and involve resources from different sources, the main risks (and therefore, the need for further implementation of changes in relation to the original agreed plans) are related to the lack of consistent information and consensus on the engineering objects and the lack of assigned responsibility for project management between the participants of the project. Implementation of risk management and change management aspects, as well as other aspects of project management and the "tailoring" them to the Russian engineering market environment is the subject of a separate study.

The approach of the formation of the business architecture of engineering company based on the project management principles proposed in this paper with the appropriate adjustments may be relevant not only for the engineering industry, but also for other project-based activities.

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THE CHALLENGES OF THE NEW 2014-2020 EUROPEAN UNION FUNDS PROGRAMMING PERIOD

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Abstract

Latvia as a European Union Member State has an opportunity to use European Union financial assistance that is provided by the European Union funds. The introduction of European Union funds in Latvia started in 2004 to 2006 planning period, it continues currently in 2007 to 2013 planning period, and it is expected to continue in 2014 to 2020 planning period, resulting in funding being a major source of investment and development.

One of prerequisites in order to ensure successful and efficient management of European Union funds projects is establishing of management and control system that is able to react and prevent or minimize in a timely manner the risks that endanger implementation of European Union funds, as one of the European Commission's requirements are adequate European Union funds management and control systems.

To provide timely start of European Union funds implementation in the beginning of 2014, the concept of the most effective institutional model must be developed, that would facilitate optimization of the system comparing to the European Union management and control system of current planning period. To determine that several key requirements should be taken into account – thematic concentration, the reduction of administrative burdens, the institutional concentration, the institutional succession, the linking to the budgetary planning [6].

Analyzing the possible institutional models of the new European Union funds programming period, that differ to the number of involved institutions, their level of responsibility and overall system command level, as well as assessing each model's advantages and disadvantages, optimal European Union funds management and control system will be identified as a result of the research.

First of all the author of the paper will analyze the existing structure of EU funds management and control system in 2007 to 2013 planning period and specifically the existing problems and changes to be considered for the next planning period. Next, the research on necessary changes in 2014 to 2020 planning period, as well as on the gaps in the current period's EU funds management and control system will be performed, using as a research method qualitative analysis of the audit results of Latvian Audit Authority as well as EU funds final beneficiary satisfaction survey, performed in current 2007 to 2013 EU funds planning period. Finally, a conclusion on the challenges and necessary actions of EU funds 2014 to 2020 planning period will be presented.

The literature used for this paper was mostly European Commission's and Latvian regulations and guidelines on European Union funds implementation [1-4, 7-9] and information available in the European Union funds management information system on project implementation and performed audits [10]. Another group of used literature [5, 6] – authors' books and publications on European Union funds – is very limited at this point of European Union funds' implementation, that is why the research in this paper was mostly based on practical facts on European Union funds implementation.

Introduction

As European Union (EU) member state Latvia has an opportunity to use financial assistance provided by the EU – European Regional Development Fund (ERDF), European Social Fund (ESF) and Cohesion Fund (CF), European Agricultural Fund for Rural Development (EAFRD), Maritime and Fisheries Fund (EMFF), to ensure EU economic, social and territorial cohesion.

To ensure EU funds' implementation in Latvia in 2014 to 2020 planning period it is essential to implement effective EU funds' management and control system, as a basis using experience of 2004 to 2006 and of 2007 to 2013 planning periods, as well as taking into consideration the importance of system improvements mentioned in the Nation Development Plan for 2014 to 2020 approved by the Cabinet of Ministers on December 4th, 2012 and EU regulations for 2014 to 2020 planning period.

Figure 1. Latvian institutional framework of the EU funds management in 2007 to 2013 EU funds planning period [6]

In the current 2007 to 2013 EU funds planning period management and control system (seen on Figure 1) is implemented according to the requirements of European Commission, while in 2011 and 2012 essential measures has been implemented to improve the system. One of the crucial improvements was changes in the Audit Authority's functions, concentrating all its functions at the Ministry of Finance. Another example of crucial changes was strengthening of Managing Authority's control and monitoring functions, providing grater assurance to European Commission on management and control system's correspondence to the requirements.

According to the information provided in the Figure 1 the management system of the EU funds in Latvia consists of multiple levels of authorities – beginning with the EU funds final beneficiaries who receive the financings. The most important tasks of the Responsible institutions are to define EU funds' project application evaluation criteria according to the planning document, to ensure proper evaluation and selection of EU funds' financed project applications as well as monitoring and control over projects' implementation, analyzing activities' and projects' implementation problems and coming up with the proposals on improvement to the Managing Authority.

Taking into consideration the fact, that similar management and control system has been implemented in 2004 to 2006 planning period, it is obvious that EU funds' administration bodies have relevant experience and capacity. On the other hand, the implemented management and control system is relatively complex and decentralized, which creates an additional administrative burden, especially for the control of delegated functions, follow-up, as well as the requirements for beneficiaries.

Accordingly, the system already in place does not need to change in 2014 to 2020, but rather to improve, thus avoiding duplication of functions, reducing the delegated functions and the number of institutions operating in the system, as proposed in the Latvian Strategic Development Plan and the Action Plan of the Government.

Latvian and EU Memorandum of Understanding provide that, as to 2014 to 2020 planning period, Latvia shall determine the main fields of EU funds investment and shall create optimal institutional framework for the administration of EU funds.

In the next planning period, the introduction of the system should contribute to more efficient EU fund administration in creating focused and effective human resource policies, planning more resources for human resource development, evaluation and analytical capacity lifting, for partnership, as well as the management and control system improvements.

Already in 2011 the Audit Authority has indicated to 2007 to 2013 planning period's decentralization review of delegated functions, thus shortening the testing, decision-making time and other EU funds management factors.

Successfully implementing the steps mentioned above, it is possible to provide better quality of services directly to customers – EU funds final beneficiaries, reducing the risks of interpretation, providing the unified approach.

Research

The research has been made in order to conclude on necessary changes in 2014 to 2020 planning period, as well as to find the gaps in the current period's EU funds management and control system. The research is based on 27 EU member states' as well as Latvian experience in

activities implemented in 2007-2013 EU funds planning period [10] and activities necessary for preparation for 2014-2020 planning period [4].

A research method was qualitative analysis of the audit results of Latvian Audit Authority, performed in 2007-2013 EU funds planning period, as well as EU funds final beneficiary satisfaction survey, performed in current 2007 to 2013 EU funds planning period.

To create a more efficient administration of the EU funds model, the research revealed that there is a need to improve the management and control system by solving issues such as:

- number of institutions involved in the administration;
- planning and analytical capacity of EU-wide funds management system;
- better planned aid coordination;
- cooperation between bodies involved, coordination and duplication of the functions, including ensuring the effective EU funds' activity planning process linking with objectives and deliverables mentioned in policy documents and ensuring inter-related activities and subsequent implementation of appropriate financial planning;
- effective monitoring and control systems, including e-government better implementation;
- synergies between different policy support schemes (EU funds planning documents at the level of investment coordination and reduction of the risk of double funding, creating a planned investment coordination mechanisms – working groups, etc.).
- strengthening of the role of evaluation and research;
- reduction of administrative burden for final beneficiaries and involvement of partners and non-governmental sector in EU fund planning and acquisition.

The evaluated EU member states' experience showed that ideal EU funds planning and implementation model should not only reduce the administrative burden for final beneficiaries and for funds administration institutions, but also to promote efficiency, thematic and institutional concentration and institutional continuity principles, as well as transparency and sound financial management principles.

Taking into consideration Latvian and other EU Member States' experience in EU funds implementation it is clear that functions of institutions involved should not be substantially changed. At the same time, according to the new period's guidelines a number of significant new focuses to the EU fund planning and implementation should be taken into account.

During the research it was stated that in contrast with 2007 to 2013 planning period, significant emphasis will be placed on the initial management and control system evaluation, in response to a question about the role of planned investment in the overall development of the sector and the reform strategy. As should be clearly defined the way to achieve maximum results with existing resources – both human and financial.

The research has also disclosed, that in the next programming period it is essential to focus not only on defining the objectives, but also on the quality of the performance appraisal system, ensuring that the planning of investments support clear and achievable goals, and that the results are measurable, comparable and achievable.

Unlike the current and previous planning period in the new planning period the assessment of goal achievement will be made. There is a risk that in the event of the negative interim results in 2018 and 2022 the payments could be stopped and financial correction implemented.

As for the ERDF, CF and ESF funds implementation European Commission published the proposals for regulations for each EU member state to determine:

- Managing Authority;
- Certifying Authority;
- Audit Authority.

According to the rules laid down by the European Commission for the 2014-2020 planning period, the Managing Authority [8] functions are:

- To support the work of the Monitoring Committee;
- To prepare and, after approval of the Monitoring Committee, send the Annual and Final implementation reports to the Commission;
- To intermediate and make available to the beneficiaries the information that is relevant to their activities;
- To develop and after approval to apply appropriate selection procedures and criteria;
- To provide the beneficiary documentation setting out the funding conditions for each activity;
- To check whether the co-financed products and services are delivered and the beneficiaries paid the expenses, they had declared;
- To establish a system to record and store the data in computerized form for each activity that is necessary for monitoring, evaluation, financial management, verification and auditing, as well as to ensure the data integrity, confidentiality and availability providing e-government implementation.

The Certifying Authority functions are defined as follows:

- To prepare and submit to the European Commission applications for payments and assure their reliability;
- To prepare an annual report, and to assure its reliability;
- To ensure the accounting of declared expenditure;
- To ensure accounting of debtors.

Another part of this research was based on EU funds final beneficiary satisfaction survey, performed in current 2007 to 2013 EU funds planning period [11]. Target groups of the survey were all ESF, ERDF and CF final beneficiaries having concluded contracts before October 31, 2009. As a result 492 respondents were reached via web questionnaire and 450 respondent answers were valid. The main conclusions of the research that should be taken into account, reaching potential beneficiaries in 2014 to 2020 planning period, are:

- The main source of information on possibilities to receive EU funding is the Internet. For beneficiaries of EU funding different information activities (seminars, conferences, etc.) appeared important. Also various forms of direct consultations were mentioned.
- The majority of the survey participants expressed satisfaction with the available information on possibilities to receive EU funding, but for 9.8% of the respondents the information seemed insufficient. The main reason why the available data seemed insufficient is the aspect of fragmentation of information.
- Different consultations seemed most valuable for survey participants, as well as topical information on the institution's homepage.

- Finding contacts and project application forms, as well as methodology of filling forms is not a problem for project applicants, although it is not so easy to find information on frequently asked questions.
- Regular topical information and details of the changes is the key relevant recommendation of respondents for the improvement of information on institutions' homepages. Furthermore, project applicants would like simpler, more understandable, less bureaucratic and more practical information – for example, more samples, practical examples; include a check list with enclosed documents; samples of form to be filled out and methodology of filling the forms; schedule with project tender opening dates; typical, more frequent errors and the error analysis; different contacts; funding rules, eligibility criteria, examples of high-quality projects, seminar presentation materials etc.
- For almost half of respondents the period from the project submission until the conclusion of contract seemed too long, and they are not satisfied with it.
- Project applicants are most worried about contradictions between information provided on EU funds – various professionals give diametrically opposite answers; information provided by different employees differs. Also, the information provided seemed incompetent or inaccurate, inconsistent with real situation, not quite convincing to several respondents. Some respondents were not satisfied that the answer is provided as a quotation from the Cabinet of Ministers regulations or as a reference to the information on the homepage.
- The most common responses on dissatisfaction with the cooperation with the institution in the project selection stage were received on staff incompetence, bureaucratic approach and the inconsistency of information provided, as well as various non-compliance with deadlines (too long revision of documents; everything was late; everything was done in rush, because the information was put too late on the homepage).

The main recommendations of final beneficiaries to the 2014 to 2020 planning period EU fund's managing instructions provided in the survey were:

- To reduce the project selection and processing periods;
- Timely inform about changes, project selection process is the next most important recommendation of respondents;
- More competent staff and less bureaucracy;
- To work faster;
- To provide information in an understandable form;
- More informative seminars and consultation activities, as well as to provide a contact person for each project;
- To improve communication speed and efficiency;
- Individual consultations / involvement of individual consultants;
- Polite and understanding staff; staff should speak briefly and concisely;
- To provide concrete information;
- To evaluate the error by its nature and not formally.

The recommendation mentioned above should be addressed and implemented before the beginning of 2014 to 2020 planning period in order to provide assurance to the European Commission on satisfaction on EU funds' beneficiaries.

One of the important topics of the research on challenges of 2014 to 2020 planning period was EU fund's Audit Authority. Taking into consideration that the management and control system structure of the new planning period should have been defined before the end of 2012, the most important issue is establishment of the Audit Authority, which would provide assurance to European Commission that Latvia is eligible for EU funds [7].

Unlike 2007 to 2013 EU funds planning period regulations [3], European Commission's requirement for 2014 to 2020 planning period at the point of this research is the Audit Authority's and Managing Authority's structural segregation if the cumulative amount of aid in all operational programmes exceeds 250 000 000 EUR (in 2007.-2013. total allocated EU financial amount in Latvia was 5.7 bln EUR). As the total amount of aid in Latvia most probably will exceed 250 000 000 EUR, the previously mentioned requirement should be met in the new Latvian institutional framework of the EU funds management.

The Audit Authority in the new programming period, as well as current programming period, should provide assurance to the European Commission on successful management and control system in Latvia, adequate audits of operations and audits of the annual accounts. Within six months of the acceptance of operational programme, the Audit Authority is required to prepare an audit strategy that sets out the audit and auditing methodology, certified expenditure audit selection and planning principles related to the current accounting year and the next two accounting years. Based on the performed audits and the results of audits, the Audit Authority has to prepare:

- The Annual Control Report [1, 2] for the previous accounting year's audits and audit findings;
- Opinion on the preceding annual accounts.

It is important to agree on the future of EU funds optimized institutional framework at the national level to ensure timely implementation of EU fund launch in early 2014 (or as early as possible). Thus, ensuring the country's timely EU funding, contributing to economic stabilization and development. If an agreement on EU fund institutional framework is not achieved and the preparatory steps are not taken in time, the country runs the risk of delaying the acquisition of significant financial support.

Therefore after assessment of a number of possible models of EU funds institutional framework it is essential in the research to identify the most effective institutional model of 2014 – 2020 planning period, which would contribute to the system optimization as compared to the current planning period.

The main principles of implementation of EU funds institutional framework are:

- Thematic concentration – the need to introduce a limited number of clearly defined and understandable thematic objectives by ensuring an effective policy objectives and quantifiable results;
- Reducing Administrative Burdens – orientation on delivering the results, reducing the proportion of the controls and audits in the implementation of funds;
- Institutional concentration – most centralized EU funds management and control system;
- Institutional succession – the maximum use of the experience, capacity and human resources in the field of fund administration from the previous planning periods.

During the research eight of the possible institutional system models known at the beginning of 2012 were analyzed. The models differ in overall system centralization level, the number of institutions involved and their level of responsibility.

In the model building the following fundamental principles were used:

- Removing control function duplication, while maintaining existing human resources;
- Managing Authority is responsible for the provision of the program management and implementation;
- Establishing the Audit Authority as an independent authority;
- The line ministries maintain an industry expert advisory role.

Analyzed institutional framework models differ in the overall centralization level, the number of institutions involved and their level of responsibility, as well as costs. In order to determine which one of eight proposed institutional frameworks is the most optimal, model analysis was performed based on the following criteria:

- Reducing the administrative burden;
- Institutional concentration;
- Institutional continuity;
- Relationship with budget planning;
- The impact on the budget;
- System advantages and disadvantages.

As the major benefit a unified approach to controls and monitoring has been evaluated, taking into account the criticism of the European Commission of the situation in the current planning period and reducing to a minimum the risk of termination of payments.

As possible Audit Authority variants the following bodies were identified: the State Audit Office, a newly created separate body, possibility to maintain the Audit Authority Ministry of Finance as an independent unit was considered, as well as the possibility that the Audit Authority's function will be performed by an internal audit division. Each of the options has both positive and negative aspects.

The research showed that in order to maintain the principles mentioned above the optimal Audit Authority as part of the EU funds management and control system would be preservation of the Audit Authority as an independent body at the Ministry of Finance. In this way the following benefits would be provided:

- Lower maintenance costs;
- Reducing the administrative burden both for beneficiaries and public administration;
- Institutional continuity.

As the result of the research the most effective model of the EU funds administration in Latvia in the next period is considered the introduction of a system that would be based on the thematic objectives and priority lines, defining one responsible authority for each priority. Meanwhile, Cooperation Institutions should concentrate in one place, thus avoiding the risk of administrative burden.

Conclusion

The main challenge of the 2014 to 2020 EU funds planning period in Latvia is the establishment of a perfect management and control system according to the new requirements of European Commission, using the resources available from the previous planning period.

For the Audit Authority to provide assurance on the compliance of management and control system to the European Commission a timely decision on the EU funds institutional framework's establishment is required, ensuring that it is not an obstacle to EU funds allocation planning and EU funds management system establishment.

Based on the experience of the previous planning periods it was concluded that the changes made to the management and control system should support the Audit Authority as part of the management and control system retaining as an independent entity of the Ministry of Finance. Thus, to avoid increasing the administrative burden in addition to the increased cost, providing institutional continuity, unified approach to controls, avoiding the need to delegate functions and carry out the monitoring of delegated functions.

Based on the survey of EU funds final beneficiaries it was concluded, that information provided on requirements for the 2014 to 2020 planning period should be current, accessible, simple and less bureaucratic.

The research performed by the author of the paper has proved that a unified approach to EU funds' management and control system would be the best way to meet the challenges of the 2014-2020 EU funds planning period.

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ROLE OF COMPANY CULTURE – IMPORTANT ASPECT FOR EFFECTIVE PERSONNEL MANAGEMENT IN A TELECOMMUNICATION COMPANIES

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Abstract

This research aimed at investigating the relationship that exists between organizational culture and employee commitment and motivational performance in telecommunication sector in Latvia. The study revealed that organizational culture has a direct impact on knowledge-workers commitment and motivation. The more energizing, encouraging and inspirational toward growth, the better organized in processes and more people oriented company culture is, the higher level of employees' commitment is expressed. Additionally it was observed that if such project oriented organizations develop strong culture of result and quality orientation, it could lead to increase motivation and employee performance. Results of extensive survey on personnel performance and company culture from telecommunication industry are used for analysis. For evaluation statements of commitments and job performance evaluation scale of 1 – 7 was used. For data processing indicators of central tendency or location as well as indicators of variability, regression analysis and factor analysis are used. Main contribution of this study is that a significant effect of culture has important influence on fostering organizational commitment, job satisfaction. As the current study didn't reveal strong link between culture and job performance authors propose hypothesis that organizational commitment enhances many desirable organizational outcomes, such as job satisfaction, performance, and reduced turnover intentions. That could be research question for further studies.

Introduction

Organizations and managers are trying to understand and willing to get employees commitment in order to improve employee's and overall company performance. As per

organizational development is concerned, employees performance consider as a back bone for the company success and growth. So organization's wants to get the committed and motivated employees towards organization. Motivation is the key component of organizational culture. Organizational culture plays a significant role in an organization regarding how people feel about their work, levels of motivation, commitment, and in turn job satisfaction. Strong culture has almost considered as a driven force to improve the performance of the employees. It enhances self confidence and commitment of employees and reduces job stress and improves the ethical behavior of the employees [17 and 19]. The issues are researched world-wide more often as real competition brings on agenda for companies and especially to telecommunication companies.

Research Objectives

The primary purpose of this article is to examine the relationship that exists between organizational culture and employee commitment and performance in telecommunication sector in Latvia. The objective of studying organizational culture is to help understand organizational life more. Understanding organizational life is important as it is widely acknowledged that organizational cultures have an impact upon company performance. Telecommunication industry can be defined as both service and high-technologies industry. From this perspective telecommunication industry is viewed as one who is dealing with high profile knowledge workers therefore there is crucial to clarify greater understanding on knowledge-worker job performance.

Organizational Culture

Culture plays an important role in affecting motivation and behavior at work. Schein [18] defines organizational culture as 'a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems' [6]. Organizational culture is the set of values, beliefs, behaviors, customs, and attitudes that helps the members of the organization understand what it stands for, how it does things, and what it considers important. Hofstede [9] posited that the culture of organizations is the collective programming of mind that distinguishes the members of one organization from another. According to Boddy [2] and later developed by Sokro [20], organizational culture has an important and direct influence on behavior of the people of an organization. He believes that organizational culture can either encourage an employee to give out his best for the sake of organizational goals or it can discourage or demoralize people which can be dangerous for the performance of the organization. The notion of 'culture', has to do with sense-making devices that are carriers of meaning, such as rules, codes, stories, rituals, rewards and leadership. Some aspects of the culture are visible and tangible; some operate at an unconscious level. Continuing this thought, it appears management of most organizations seem to associate performance of their team or employees to some unique cultural practices in their organization while others think individual targets are the main driving force in improved performance.

Sample and Data Collection

The population for this study was all employees of two local companies of telecommunication industry. Online survey methodology and self-selection as sampling method was used to collect the data. Questionnaires from 473 respondents were found valid for further analysis. Mean respondent age was in range between 25-40 years old, male and female respondents numbered 48% and 52% respectively, 70% of the respondents were at least high school graduates, and 70% of the respondents has more than 4 years experience in telecommunication industry.

Measures

Data was obtained from employee self-evaluation on self-performance, commitment and motivation, as well evaluation of the focal company's internal culture. Each of concepts was measured using multiple items taken, whenever possible, from previous validated measures. Demographics of gender, age, work experience, education was collected. Data was analysed using SPSS 17 and simple descriptive, factor and linear regression analysis were run to analyse the data.

Dependent Variables – Job Performance

Job performance is one of the criteria by which employee performance is judged and involves the degree to which an individual completes assigned tasks or task goals developed by Brouther, et al, [3]. Job Performance is the level of productivity of an employee, relative to his or her peers, on several job-related behaviors and outcomes. To evaluate employee's productivity /effectiveness authors used 6 item scale to assess overall productivity. However, to reduce the likelihood of bias in the self-reporting of one's own job performance, the referent for each item was changed so that respondents provided the performance rating from the perspective of their supervisor rather than from their own perspective. Accordingly, an example item in this study was „*If your direct supervisor would be asked to evaluate your overall productivity how he/she would rate your productivity (1) as less productive in average at your organization and 7 – as the most productive at your organization in comparing with others".* The utility of having respondents provide a performance rating from their supervisor's perspective is supported by the results of recent research by Schoorman and Mayer [22] who found that such ratings are more highly correlated with actual supervisory ratings than are direct employee self-reports of one's own performance. Employee self-efficacy was measured using three out of five items of scale which were adapted from an instrument of work-related expectancies [22], by assessing probability that effort would lead to good performance (*I always achieve my targets in time and in good quality, I feel fully confident on my skills to perform this job according to highest expectations, Job quality and volume that I perform daily usually fits with or even exceeds expectations towards me).* Job performance is affected by work-related variables including role stress and work/non-work conflict [11] therefore we included also measurement statement of stress resistance (*I stay positive and energetic in stressfull situation at work).* Emotional competence is crucial for employees in working environment characterized by stress, intensive load, job autonomy and high self-responsibility. Emotional competence refers to individuals' perceptions of their own emotional abilities on four dimensions:

understanding ones emotions, understanding others' emotions, regulations one's emotions and utilization of one' emotions. As suggested by Jordan, Ashkanasy and Hartel [10] employees with low emotional competence are not well equipped to deal with affective consequences of job-related tension and are likely to react in way that not contribute overall performance [11]. Therefore authors propose to include one's ability to direct emotions toward constructive activities (utilization's dimension) in knowledge-worker productivity's evaluation scale. (*I am fully confident on ability to solve problems in my daily work).* All the scales were measured using seven point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (7).

Dependent variable – Commitment

Organizational commitment is defined as an employee's involvement in and identification with the organization [23]. Highly committed employees accept the goals and values of the organization and are willing to devote personal effort to achieve such goals. Thus, organizational commitment is defined herein as an employee's involvement in and identification with the organization, and intention to devote personal resources to achieve the organization's goals, which is termed affective commitment in Meyer and Allen. [13] In the context of this study, we also defined organizational commitment as multifaced concept. When composing our understanding of the concept we adapted and formulated items covering several angles of the concept. First, we brought loyalty idea from conceptualization of affective commitment as it explains attachment to organization (loyalty means both unwillingness to leave – *I would prefer to stay with my current company even if someone offered another good job*, and readiness to identify oneself with organization – *I am ready to recommend my company where to work).* We included also two items of overall job satisfaction as it is component of loyalty. Job satisfaction is important attitudinal variable that reflects an evaluative judgment of one's work circumstances [1] (*In general I feel fairly rewarded, I am satisfied with my current job).* Second, as committed employees are more willing to participate in 'extra-role' activities, such as being creative or innovative [1] we mirrored this enhancing power of proactive. All the scales were measured using seven point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (7).

Dependent Variables – Organizational Value

A common way by which organizational culture can be operationalized is through values O'Reilly, Chatman, &Caldwell [15]. Organizational values are collective beliefs about what the entire enterprise stands for, takes pride in, and holds of intrinsic worth [8]. Embedded within this conceptualization of culture are the organizational values, which are the primary focus of this research.

For defining list of values authors used an approach of researchers Kumar [12] and Robbins [16] who developed typology of company cultures and suggested seven characteristics that, in aggregate, capture the essence of organizational culture. To obtain profiles of the cultures of firms, we identified sets of key informants with broad experience and asked them to sort the initially 33 items in terms of how characteristic each was of their organization's culture. Final list contained 23 most relevant values to these companies. Table 1 summarizes characteristics of organizational culture, behavioral description of the organization and proposed values or cultural dimensions for survey proposed by several authors, including Sokro [20]. This part of the questionnaire realized for telecommunication companies in 2011 "My Company's

Organizational Values" asked respondents "How characteristic is a particular value of the value system of the company you currently work for?". Respondents were ranging 23 organizational values using scale from 1 (not at all *characteristic)* to 7 (most *characteristic).*

Table 1

Cultural typology of organizations and values used in the survey

Characteristics of organizational culture	Behavioral description of the organization	Proposed values or cultural dimensions for survey
Innovation and risk taking	the degree to which employees in an organization are encouraged to be innovative and risk taking	Inspirational, Creative, Freedom/Democracy, Dynamic
Attention to detail	the degree to which employees are expected to exhibit precision, analysis, and attention to detail or task	Orientation on Quality Systemic (controlling)
Outcome orientation	the degree to which management focuses on results or outcomes rather than on the techniques and processes used to achieve these outcomes	Oriented on profit Oriented on customer relationships
People orientation	the degree to which management decisions take into consideration the effect of outcomes on people within the organization	Freedom/Democracy Contributing individual development Encouraging learning Encouraging involvement Honest Fair
Team orientation	the degree to which work activities are organized around teams rather than individuals	Structurized Problem recognizing and solving attitude
Aggressiveness	the degree to which the people are aggressive and competitive regarding their work rather than easy going	Ambitious (oriented on great targets) Demanding (on persons performance)
Stability	the degree to which organizational activities emphasize maintaining the status quo in contrast to growth	Stability

Source: Prepared by authors based on Sokro E., *Analysis The Relationships that Exists between Organizational Culture, Motivation and Performance*, Problems of Management of 21th Century, 2012, Vol. 3, p. 108, pp. 106-119.

Data Analysis

By analyzing organizational culture in telecommunication companies (Table 2), it can be concluded that the most inherent values in these companies are orientation on profit, stability, orientation on quality, demanding towards employees performance and ambitiousness (respectively, mean assessment above 6 points from 7). The results of the study show that

telecommunication companies exhibit the desire to achieve excellence and make progress toward reaching challenging goals what in turn can lead to higher performance.

Table 2

Employees' evaluation on embedded values in telecommunication companies

No.	Organizational value	Telecommunication industry (mean)
1.	Oriented on profit	6.3
2.	Stable	6.3
3.	Oriented on quality	6.2
4.	Demanding (on persons performance)	6.1
5.	Ambitious (oriented on great target)	6.1
6.	Oriented on customer relationship	6.0
7.	Honest	6.0
8.	Systematic (controlling)	5.9
9.	Energetic	5.8
10.	Structurized	5.8
11.	Dynamic	5.8
12.	Responsive	5.8
13.	Providing unique professional experience/Encouraging learning	5.7
14.	Fair	5.7
15.	Problem recognizing and solving attitude	5.6
16.	Inspirational	5.6
17.	Creative	5.5
18.	Contributing individual development	5.5
19.	Flexible	5.4
20.	Encouraging involvement	5.4
21.	Open	4.8
22.	Providing freedom	4.7
23.	Informal	4.7
	Sample size	473.0

Source: Authors' calculations based on survey data (Survey method – online, sample method – self-selection, sample size – total 473, 2011)

In order to evaluate the impact of organizational values on the commitment and effectiveness for motivating employees, factor and principal component analysis with a Varimax rotation was carried out. Factor and principal component analysis was necessary for decreasing the number or variables for the regression model and to avoid multicollinearity which therefore improves the usefulness of the overall results (Appendix 1 and 2). Factor loading of each item on single-dimension ranges from 0.51 to 0.88, exceeding the minimum loading criterion of 0.5. This shows a acceptable convergent validity and single-dimension. For this particular study we used two factors – commitment and job performance for further analysis.

Factor analysis did provide rather good structure of factorial solution on values and performance and commitment. The questions, where respondents self-evaluate their own behavior in the context of their organization, obtained such factors as "commitment" which

summarized the following attributes – job satisfaction, overall fair evaluation, readiness to recommend one's company, pleasant atmosphere in work collective, a company that inspires, best job to do. Second factor "job performance" summarizes the following attributes – qualitatively and on time reached goals, ability to independently solve problems, self-evaluated productivity, stability in stressful situations, confidence about skills and abilities. Factor solution on 23 values' statements were resulted in 5 factors – Inspired, Well-organized, Open, People oriented, Quality oriented, Profit oriented organizational culture.

From the regression results (Table 3) we can conclude that the job performance in telecommunication companies is mostly affected by profit oriented culture (β 0.27) and inspirational atmosphere (β 0.32) there. All cultural dimensions are found positively associated with job performance, all with exception of one factor –people oriented were statistically significant. However, given cultural dimensions explain only tiny part of efficient behaviour of employee, namely 6% (adjusted R^2) variation in the dependent variable or job performance can be explained by five involved cultural factors. The second regression analysis was run for estimation an impact of cultural values on organizational commitment. Model has good explanational power, almost 50% (adjusted R^2) of variance in commitment can be explained by variations in five independent variables. We found all cultural dimensions to be significantly and positively associated with commitment. Three factors – inspired (β 0.497), well-organized (β 0.397) people oriented (β 0.249) are the most significant factors affecting employees' commitment.

Table 3

Results of regression analysis on cultural dimension impact on commitment and job performance

Independents	Dependent variables			
	Commitment		Performance	
	Standartized β	Std. error	Standartized β	Std. error
Inspired	0.497	0.562	0.133	0.220
Well organized	0.397	0.462	0.028	0.116
Open/People oriented	0.249	0.314	0.0521*	0.140
Quality/process oriented	0.137	0.202	0.010	0.097
Profit oriented	0.063	0.128	0.234	0.322
R^2	**0.699**		**0.276**	
Adjusted R^2	**0.483**		**0.066**	

* Significant at the level of $p<0.05$

Source: Authors' calculations based on survey data (Survey method – online, sample method – self-selection, sample size – total 473, 2011)

Conclusions and Limitations

Most of the organizations today seek to perform according to full potential by maximizing the commitment, satisfaction and intrinsic motivation of employees by focusing multiple cultural domains. The results of this study also add to our basic knowledge of the relations between company values and employees' behaviour. A main contribution of this study

is that a significant effect of culture on fostering organizational commitment, job satisfaction. As our study didn't reveal strong link between culture and job performance authors propose hypothesis that organizational commitment enhances many desirable organizational outcomes, such as job satisfaction, performance, and reduced turnover intentions. That could be research question for further studies.

Regression analysis of the study tells that inspirational culture can mostly impact commitment, although values of inspirational culture are not the ones that are embedded in telecommunication companies. Thus, if valuing openness, creativity and encouraging employee' involvement in organization as driving force for change and innovation, then from our study can be concluded that these values are not leading ones and might not serve as a motivator to think of new ideas and express them in telecommunication companies.

A potential limitation of this study is that it is based on limited list of values. Yet, this limitation is partially countered by the reliance on proposed list of values of human resources specialists of involved companies that didn't expose full picture of values.

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Appendix 1

Factor and Principal Component Analysis on Job Performance and Commitment

Rotated Component Matrix(a)

No.		Com-mit-ment	Job perfor-mance	Tech-nical support	Moti-vation/ Enga-gement
	Initial values	**7.272**	**2.487**	**1.521**	**1.008**
1.	I am satisfied with my current job	0.80			
2.	I would prefer to stay with my current company even if someone offered another good job	0.78			
3.	There is a energetic working atmosphere (culture)	0.74			
4.	In general I feel fairly rewarded	0.73			
5.	This is the best job to do	0.71			
6.	This company inspires to do the best I can (culture)	0.70			
7.	Colleagues at my team are energetic and positive (culture)	0.67			
8.	Internal values and culture in my company fits my personal values	0.57			
9.	I am ready to recommend my company where to work	0.51			
10.	I always achieve my targets in time and in good quality		0.74		
11.	I am fully confident on ability to solve problems in my daily work		0.73		
12.	I feel fully confident on my skills to perform this job according to highest expectations		0.73		
13.	My direct supervisor might evaluate me as productive employee		0.70		
14.	Job quality and volume that I perform daily usually fits with or even exceeds expectations towards me		0.65		
15.	I stay positive and energetic in stressful situation at work (excluded)		*0.57*		
16.	In my job I am provided with technical, and other support necessary for job content			0.88	
17.	In my job I am provided with technologies for job content			0.87	
18.	All necessary management and quality systems are provided in my job			0.56	
19.	The future success of my company means a lot to me				0.70
20.	I am ready to go the extra mile to make my company successful				0.62
21.	I help my coworkers with my expertise and knowledge				0.52

Expectation Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
[a] Rotation converged in 5 iterations.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.90845789	Reliability Statistics	
Approx. Shi-Square		4329.8527	Cronbach's Alpha Based on	N of Items
	df	210	0.9021489	21
	Sig.	0		

Appendix 2

Factor and Principal Component Analysis on Organizational Values of Telecommunication Companies

Rotated Component Matrix(a)

No.	Component	Inspired	Well orga-nized	Open/ People oriented	Quality oriented	Profit oriented
1.	Creative	0.74	0.20	0.28	0.16	0.15
2.	Contributing individual development	0.74	0.27	0.31	0.19	0.03
3.	Guarantee unique professional experience	0.73	0.22	0.12	0.13	0.11
4.	Inspirational	0.72	0.28	0.28	0.19	0.20
5.	Dynamic	0.71	0.22	0.24	0.19	0.19
6.	Energetic	0.62	0.32	0.22	0.32	0.17
7.	Flexible	0.60	0.25	0.51	0.09	0.20
8.	Structurized	0.32	0.72	0.08	0.24	0.12
9.	Honest	0.29	0.72	0.26	0.17	0.18
10.	Fair	0.31	0.68	0.33	0.24	0.03
11.	Responsive	0.43	0.56	0.39	0.24	0.15
12.	Problem recognizing and solving attitude	0.42	0.51	0.30	0.41	0.03
13.	Informal	0.20	0.07	0.78	0.05	0.04
14.	Freedom/democracy	0.22	0.28	0.74	-0.19	0.17
15.	Open	0.30	0.11	0.68	0.24	0.02
16.	Encouraging involvement	0.47	0.34	0.56	0.12	0.07
17.	Systemic (controlling)	0.18	0.21	-0.02	0.77	0.20
18.	Demanding (on persons performance)	0.32	0.18	0.03	0.66	0.35
19.	Oriented on customer relationships	0.28	0.40	0.21	0.51	0.22
20.	Oriented on quality	0.13	0.47	0.12	0.49	0.38
21.	Oriented on profit	0.07	0.02	0.15	0.32	0.75
22.	Ambitious (oriented on great targets)	0.22	0.14	0.12	0.37	0.63
23.	Stability execution	0.30	0.49	-0.07	-0.04	0.60

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
[a] Rotation in 14 iterations.

KMO and Bartlett's Test

Kaser-Meyer-Olkin Measure of Sampling Adequacy		0.96119861
Bartlett's Test of Sphericity	Approx. Chi-Sq.	6829.56583
	Df	253
	Sig.	0

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PROJECT MANAGEMENT CHALLENGES IN LOCAL GOVERNANCE LEVEL IN THE TRANSITION COUNTRIES – KOSOVO CASE

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Keywords: projects, public sector, evaluation, monitoring, local government, efficiency

Abstract

Project management, project monitoring and evaluation are crucial components of local government institutions in Republic of Kosovo. The application of Project Management (PM) tools and techniques in local governance level within public sector is gradually becoming an important issue in developing economies. The research paper examined the challenges and opportunities that local governance level in Kosovo is facing toward the application of the best project management practices. The research was carried out in capitol Pristina because of its metropolitan role and rapidly growing economy. The paper revealed that application of best project management tools and techniques as an essential management approach that tends to achieve specified objectives within specific time and budget limits through optimum use of resources in the local public sector level. Furthermore the research aims to notify that there is lack of in-depth knowledge of those project management tools and techniques in public sector institutions. The paper uses mixed methodology that consists of field research through questionnaires to generate primary data and descriptive analysis based on past decade challenges that local governance level was facing in Kosovo.

The paper argues about challenges facing project preparation, monitoring and evaluation in Kosovo local governments and recommends categorical steps to be taken such as capacity building in project initiation, formulation, execution and insistence on innovative change of local government or its personnel in order to continue to struggle to make any useful impact on the people's life.

Introduction

Project Management as a distinct management concept has been used as a management tool by organizations across all sectors to achieve abroad spectrum of objectives. In the field of development economics, project management has been used as a vehicle to drive the economic development aspirations of developing countries like Kosovo. Project management is useful for both private sector and public sector development. Hinson [1] has, for instance, noted that there has been an 'expansion and intensification of competition' in Kosovo's banking sector. With an increase in competition in Kosovo's business sector, astute project management practices could

easily become a source of differential business advantage. Projects are themselves comprised of many inter-related elements including the tasks to be performed, methods to be employed, resources to be committed, and the environment in which the project is being implemented. These elements are also integrated within the successive phases of a project life cycle (PLC). To ensure their proper functioning, the pieces have to be brought together to form workable systems which will promote and enhance the attainment of a project's objectives. However, several problems, resulting from the meshing of the different parts of these systems, sometimes hinder the effective and efficient functioning of projects. The causes of project failures span the whole spectrum of the project lifecycle; from concept, formation, planning and control, to implementation factors. This research is exploratory and qualitative in nature. It investigates the project management practices in the public sector of a less developed country. The main objective of this research is to identify the governance and management practices of the public sector in a less developed country.

Kosovo and its Local Public Sector

Kosovo represents an important link between central and southern Europe and the Adriatic and Black Seas. Kosovo has an area of 10,908 square km. It lies between latitudes 41° and 44° N, and longitudes 20° and 22° E. The border of Kosovo is approximately 602.09 kilometers long. Kosovo is located in Southeastern part of Europe and it shares borders with Serbia, Montenegro, Albania and Macedonia. The public sector organizations in Kosovo are divided into two broad categories of Central and Municipal level organizations. The Central level organizations are entrusted with the task of managing and providing the services throughout the country whereas the Municipal level organizations are confined in providing services to their respective municipalities. In less developed countries, the public sector organizations are inundated with corruption, inefficiency, bloated size and other such factors which have negatively affected the performance of the public sector in these countries. Unfortunately Kosovo also suffers with these kinds of problems. These factors can vary depending upon the socio-economic situation of the country.

Kosovo's Commitment to Decentralization and Local Self-Governance

Over the last years, Kosovo has become increasingly committed to a strongly decentralized framework of governance and service delivery, culminating in the recent Law on Local Self Government which transfers to municipalities sole or shared responsibility over a very broad range of service sectors – including not only the more common local services such as street paving, potable water, and sanitation – but also many sectors that are normally considered among the more difficult services to decentralize – including health care, education, and social services. To better understand the nature of the challenge currently facing the Government, it is important to remember that Kosovo's decentralization process is grounded in a very unusual set of geopolitical circumstances. Unlike most other countries, in Kosovo decentralization did not arise as a grassroots demand for empowerment from a majority of local communities. It was proposed, top down, by the international community as a vehicle for reengaging the minority ethnic Serbian communities into the political process. This strategic geopolitical purpose took on increasing importance as Kosovo moved into discussions on a Status Settlement, culminating

in the Ahtisaari Proposal in early 2007 which, with the latter purpose in mind, proposed an aggressive local empowerment agenda aimed more at placating international geopolitical demands than at ensuring effective and sustainable local service delivery on the ground.

Evolution and Use of Project Management

The difference between traditional management and project management Project management as a distinct organizational concept has its roots in World War II when complex war-related operational problems needed to be solved. It arose as a response to particular perceived needs. Traditional organizational structures and management techniques were insufficient to handle project-type work effectively. The traditional functional organization tended to be mechanistic, product directed and functionally oriented, whereas in project organizations, intense focus is on objectives. Project is defined as a temporary endeavor undertaken to create a unique product or service, temporary means that the project has a definite ending point, and unique means that the product or service differs in some distinguishing way from all similar products or services (PMI, 1996, p.4). Project management is defined as an application of knowledge, skills, tools and techniques to project activities to meet project requirements. The art of project management has been described by Young (1996) as "the dynamic process utilizing the appropriate resources of the organization a controlled and structured manner, employed to achieve a change clearly defined with specific objectives identified as strategic needs". Below is presented the project life cycle according to the Kosovo experiences as guideline for project implementation in Local governance sector in the country.

Research Objectives, Research Questions and Research Methods

The rationale developed in the above section leads to the following research objectives:

Investigate the issues related to the public sector development projects in the country and explore the current practices of funding of public sector, as well identify the current practices of selection and governance of the projects within country's public sector in order to compare the current practices of managing the project in a less developed country's public sector with the best practices [2].

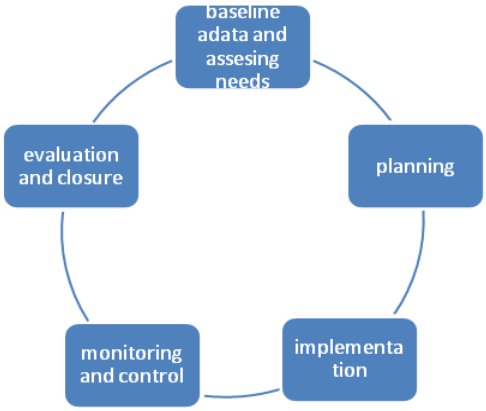

Figure 1. The elements of a project life cycle

The research objectives above are translated into the following research questions: How the projects are identified and selected in a less developed country's public sector? What is the funding mechanism of the projects? How the projects are approved? How the projects are governed and what are the issues and constraints related with the project management processes in country's public sector organizations?

The aim of the research is to identify above mentioned objectives and answer the questions thereof we the appropriate methodology for there search was based on qualitative and quantitative research methodology that is exploratory and is useful(3).

Project Management in Public Sector-Understanding Public Sector Organisations

Public sector organizations are structured as pyramids: the policies and decisions are formulated at the top, responsibilities and tasks are also decided at the upper level of the pyramid and assigned to the lower levels through a hierarchical chain of command. Power rests at the top of the hierarchy. Public sector organizations are different than their private sector counterpart because of the complex organisational environment, goals, structure and managerial values (5).

Table 1

Differences in Public and Private Sector Organizations in Kosovo
(Adapted: I.Krasniqi, 2009)

Public sector organization (PSO)	Private sector organization(PrSO)
Ownership: PSO are owned by political community members	PrSO are owned by entrepreneurs or stakeholders
Funds: Funded by taxation from public	By costumers
Control: PSO are controlled predominantly by political forces	PrSO are controlled by the market forces
Complexity: Variety of stakeholders	Number of stakeholders are limited
Permeability: open systems that are easily affected from outside	Less influenced
Competition: less pressure	More competitiveness
Goals: Distinctive and multiple goals	More focused goals
Structure: more formal and less flexible	Flexible and risk analytical approach

Local Public Sector Environment in Kosovo

Global competition and market liberalization, the information technology revolution and the emergence of knowledge society have created an unpredictable and complex working environment for public sector organization everywhere as well in Kosovo. Public sector organizations are experiencing continuing pressure from the public to modernize and to make government more efficient [6]. To eschew this pressure, public managers try hard to enhance performance through the implementation of various modernization and change reforms [7, 8]. These reforms are often termed as re-organization, re-engineering and as organizational change in the literature 9, 10]. In public sector in Kosovo the government is trying to delegate and

decentralize the responsibilities in order to improve the project based work in the field however there are still problematical factors as follows:

- the fiscal crisis of government,
- poor performance of the public sector in different arenas,
- bureaucracy,
- lack of accountability,
- corruption,
- change of people's expectations and
- the emergence of better alternative forms of service delivery.

Project Management in Public Sector in Kosovo

Even with all those obstacles the public sector requires that its projects be managed with simplicity and with minimum possible costs. However, public sector organizations tend to be conservative, with slow response time and with bureaucratic culture as discussed in the section.

Planning and Procurement / Contracting Strategy in Public Sector Projects

Effective and accurate planning is required at the start of the project for the project to be successful. In public sector projects the planning and decision making inevitably become political activities (11, 12). Planning consists of a set of procedures whereby decision makers attempt to: identify and define major problems and goals, analyze relevant environment and strategic conditions, project trends, needs, opportunities and constraints, transform goals into operational targets, identify alternatives course of action for achieving goals and targets, calculate cost and benefit of each alternatives, estimate the probabilities of future events, projected trends occurring, determine the potential non-economic gains, losses and consequences of each alternative, choose the optimal alternatives or set of actions and integrate the chosen course of action into a comprehensive plan. Having in mind all those the research states that by choosing a properly matched contracting strategy the chances of projects success can increase. They further describes that the needs assessment is more than important step in the process.

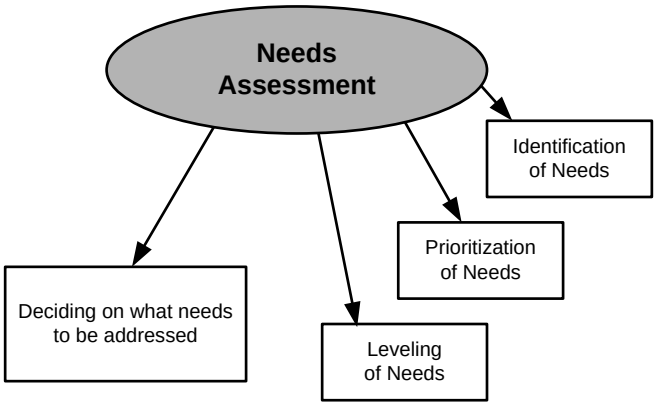

Figure 2. Needs assessment strategy for public sector projects in Kosovo

Local Public Sector Project Environment in Kosovo

The research indicates that success or failure of projects in less developing countries depends on factors in the general environment outside the direct control of the project manager. Some of these problems listed in the study are as follows:

- A shortage of local funds that the government has promised for the project,
- The inability to hire and retain qualified human resources,
- The ineffective transfer of technology and difficulty in building institutional capacity,
- Difficulty in changing the policy environment,
- Inadequate accounting, financial management systems and auditing.

Project Management Practices in Kosovo Public Sector Organizations – The Planning Sector Context

Project management process in Kosovo public sector organizations starts with the identification of the project. The first phase is to formulate the project in the form of a project proposal by the executing department. This proposal is referred to as Planning Commission. There are different kinds of such commissions depending of the respective sectors where the project is realized.

Current Coordinates Status

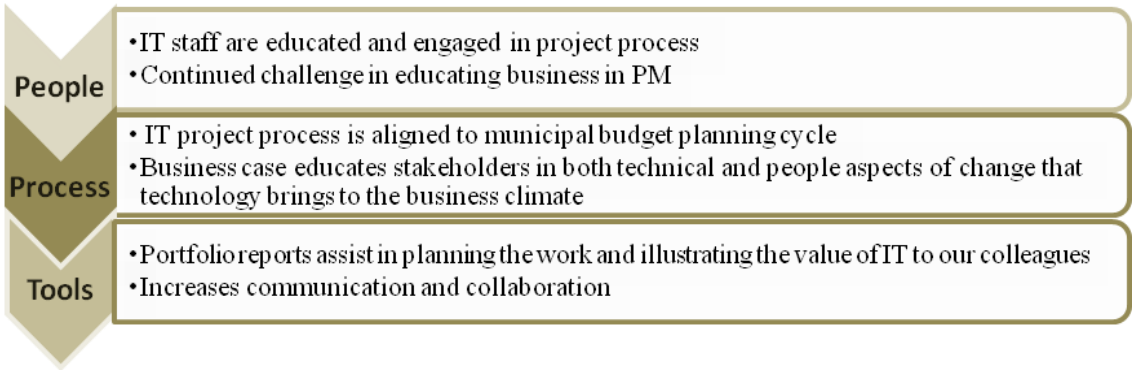

Figure 3. Coordination status for public sector projects in Kosovo

The next stage is to carry out feasibility studies if the project is a mega project. A report has to be submitted in the form feasibility study. It includes the name of the project and the administrative authorities, feasibility of the project and the expected results of the project. A consulting firm is hired most of the time to prepare this report [14]. This happens due to a lack of qualified manpower in the department. This is a practice that usually takes an additional 3-6 months in the project.

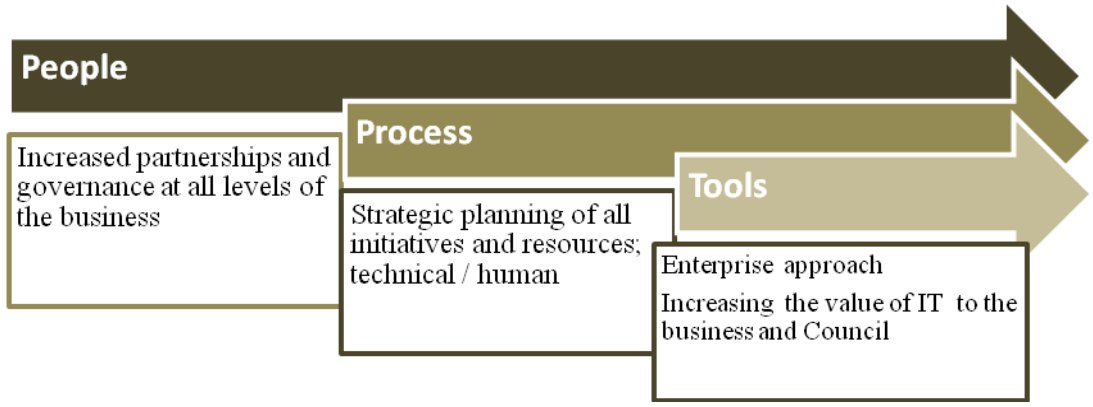

Figure 4. Steering Towards / Future Direction in local governance projects in Kosovo

The next phase is the approval of the project. This is based on the value of the project. The highest approval body is the executive committee of the local authorities that are according to the constitution and law in Kosovo case this power is given to the Mayor of respective municipality. The project proposal becomes the project charter after approval and is sent to the executing department which formally accepts the approved project. The project then moves into execution phase.

Executing, Controlling and Monitoring Phase

Once the project is in the execution phase, the respective departments of local authorities are required to send another type of document referred as report that includes information about the progress of the project on monthly/quarterly basis. In addition to this, it also includes the information on the funds allocated and utilized. Furthermore any major milestones achieved by the project are also mentioned in this report. Usually the funds are released by the finance department of organization on a quarterly basis to the service sector organizations.

Closing Phase

A close out report is required from the executing departments at the end of the project and this is called as final report. This report includes name of the project, the implementation period (actual and planned), capital cost (actual and planned),quantifiable benefits of the project, financial/economic results based on actual cost, (16) impact of the project on the target group, lessons learned from the project and any suggestions for similar future projects.

Issues in Project Monitoring Process in local governance in Kosovo

The issues faced by the local organizations in monitoring the public sector projects in Kosovo are as follows:

Lack of Staff

The main issue with the monitoring staff is that they are overworked. So it affects the progress of the monitoring staff.

Misleading Information

The service sector organizations tend to provide misleading information to local governance organization during the monitoring process. The service sector organizations do this in order to satisfy the local sector organization criteria to release the funds for the next phase of the project.

General Issues

During the case study the participants revealed some interesting issues which although not directly concerns the working of local governance organization however they do effect the overall system.

Project Conceptualisation, Definition and Selection in Kosovo	Planning, Scheduling and Control	Poor/wrong Project Organisation	Nonexistence of a Project Team	Monitoring, Termination and Evaluation
• Lack of a clearly stated project policy • Frequent design and modification changes • Insufficient consultation among players • Incomplete/ inaccurate project description • Protracted negotiations over project selection, objectives, etc.	• Ineffective use of project management tools • Lack of an appropriate risk management function • Lack of adequate and effective methods of control • Untimely communication of pertinent information	• Inaccurate/ incomplete definition of positions • Undue reliance on procedural matters • Ad-hoc project organization	• Unavailability of trained personnel • Poor managerial expertise in technical environment • Ambiguous division of authority and responsibilities	• Lack of an inspection and quality assurance function • Lack of an appropriate risk management function • Lack of an adequate maintenance system • Contradictions and inappropriate applications of codes and regulations

Figure 5. Problems of Project Management in Kosovo local governance

Steps Undertaken by Local governance Organization in Kosovo to improve Public Sector Project Management

Public Sector Local Organization are trying to improve the project management process in these steps are discussed below:

1. Those organization have had circulated an order in recent years that any big scale project which will be more than 1 million euro must have an independent project director and all the financial and the administrative powers should be delegated to the project director.
2. It is encouraging different municipalities to have their own project management unit (PMU). This PMU must have the monitoring people, planning people, financial people, supervisors, engineers and project directors.
3. It has to start a massive training program in the public sector to train the project directors to manage the projects using the new tools and techniques.
4. It has to introduce an incentive program for project directors in which firstly they will have market based salaries, secondly the project director will be appointed on a contract basis for the entire life of the project and the project director could not be transferred during the project duration, and thirdly the project director is empowered so that he/she could take the appropriate decision in regard to the project.

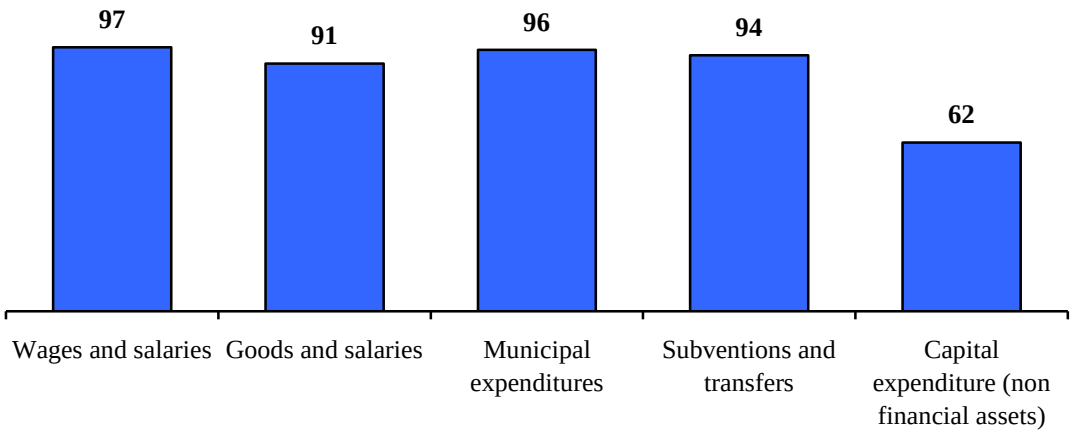

Figure 6. Presentation of municipal expenditures in Kosovo for 2011

Conclusions and Recommendations

Project management has evolved into an accepted scientific way of managing programmes, projects and entities in a way that is different from traditional management but which meets the objectives of its practitioners. It has become an important and relevant tool for driving Kosovo's local economic development aspirations. However, the attempt to use projects as a tool for realizing the local development objectives has not been as successful as anticipated. The management of projects in Kosovo has been plagued by a myriad of problems, some of which have been discussed in the preceding sections.

Therefore the research proposes a set of project improvement factors identified by officials of local-governmental organizations, project beneficiaries, government ministries, donors and other support institutions within the local public and private sectors as being crucial to the successful implementation of projects in Kosovo. Some of the strategies for improving project performance suggested include:

The preparation of meaningful implementation plans for all projects. This would allow for adequate budgetary allocations to permit the completion of projects within their estimated completion dates.

For specific loan-tied programmes, there is the need to project and forecast an annual matching fund element per project per sector in order to facilitate loan disbursements. Subsequent loan financing should also include the matching fund element.

Comprehensive project plans and designs must be prepared in order to cater for variations in the project during implementation. In order to avoid disputes and ensure the efficient handling of variations, all variations must be agreed upon and signed off by all project stakeholders.

Project implementation contracts must be based on the project life cycle. This will enable projects to be scheduled and implemented in natural phases, the start of which must not be affected by the weather. As an adjunct to this point, the project contracts themselves must be awarded through the 'open tender' system in order to encourage the participation of qualified agencies.

Project monitoring units within municipalities, departments and agencies should be strengthened through training and the provision of equipment. They should also be empowered to enforce corrective actions on implementation issues arising out of their monitoring activities. A system of interim reports using a prescribed format should be introduced as a pre-requisite for the payment of funds. This will aid the tracking of funds released to project implementing agencies. The only operational system currently in place relates to the road construction sector. Concrete and definite evaluation procedures should be prepared for all projects to measure the attainment of all project objectives. Donor governments and agencies should include good governance and project measurement as requirements in their project application procedures and, finally, projects and programmes selected and presented for funding should dovetail into the country's development policy framework.

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CHALLENGES OF PUBLIC PROCUREMENT IN PROJECTS WITH MULTIFUNDING

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Keywords: project management, public procurement, multifunding

Abstract

Article explores challenges of public procurement in projects with multifunding. Results of theoretical modeling authors test on Daugavpils City councils projects in creation of Mark Rothko Art centre. The main aim of the project is to renovate cultural object – national architectural monument in Mihaila Street 3, Daugavpils (Artillery Arsenal Building, build from 1810 till 1833). Project is financed from three project sources: "Development of Creative Industries in the Latvia–Lithuania Cross Border Region" Latvia – Lithuania Cross Border Cooperation Programme; "Reconstruction of Artillery Arsenal building in order to create Rothko Art Centre"; "Reconstruction and improvement of the territory of Daugavpils Rothko Art Centre". Several public procurements where done during the implementation of the project to achieve common goal with variety of funding sources. Analyzing EU legal framework (Directive 2004/18/EC of The European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts) and Latvian legal framework (Public Procurement Law) – authors suggest their own view to the following issues: Determination of the Estimated Contract Price, Margins of Contract Prices, Procurement Conducted by Centralised Procurement Institutions, Provisions for Implementation of a Contract, Documentation and Notification of the Procurement Procedure, Criteria for Selection of Tenders, Procurement Contract Provisions etc.

This article can be useful to project managers and public procurement specialists who are involved in the implementation of the projects with multifunding.

Introduction

Mark Rothko Art Centre will be opened in Daugavpils on 24th of April 2013. This will be the only place in Eastern Europe where world famous artist, founder of abstract expressionist Mark Rothko original works will be presented. During Art Center opening day the II International Tourism Conference will be held in Daugavpils.

Mark Rothko Art Centre for Contemporary Art will be a multifunctional complex situated in Artillery Arsenal (at Michaela St. 3) in Daugavpils fortress. At the Centre will be opportunity to see Mark Rothko's art originals and reproductions, asses' digital exhibition of the artist's life and works. Besides the video room, Rothko silent room, cultural history exhibitions, temporary art exhibitions of Latvian, European and world artists' will be available at the Art Centre.

The center has premises for artists' studios and residences, seminars and conferences, assembly room. For your good feeling and elegant dining Rothko's restaurant will be opened.

Building up the Art center was possible because of investments from three EU project programs:

1) "Development of Creative Industries in the Latvia–Lithuania Cross Border Region" Latvia–Lithuania Cross Border Cooperation Programme;
2) "Reconstruction of Artillery Arsenal building in order to create Rothko Art Centre";
3) "Reconstruction and improvement of the territory of Daugavpils Rothko Art Centre".

All three projects are financed from one EU financial source ERAF.

The Project "Development of Creative Industries in the Latvia–Lithuania Cross Border Region"

The project "Development of creative industries in the Latvia–Lithuania Cross border region" was designed to implement instrument Priority I – Encouragement of socio-economic development and competitiveness of the region. 1 objective "Facilitating Business, Labour Market and Research and Technology Development" of the programme "2007-2013 Latvia – Lithuania cross-border co-operation". This priority promotes entrepreneurship, labour market and R&T development and improvement of internal and external accessibility of the border regions. The project applicant – Daugavpils City Council. Project partner – the Utena Local Lore Museum of Utena. The project encouraged cooperation between the two cities in Cross-border region – Daugavpils (Latvia) and Utena (Lithuania).

Creative industries are today considered to be one of the fastest growing sectors in the global economy, outperforming traditional economic sectors. They have their origin in individual creativity, skill and talent with a potential for wealth and job creation through the generation and exploitation of intellectual property.

The overall objective of the project is to create favorable environment and develop a support programme for starting creative entrepreneurial activity and building of competitive creative industries in the Latvia–Lithuania Cross border regions.

The project will provided an adequate creative industries support system in the cross border region. In order to commercialize the creative potential, multifunctional clubs of creative industries will be established in the premises of the studio-residence block of the Rothko's Art Center in Daugavpils and at the building of Utena branch-museum in Leliunai. Creative industries Club will provide a range of services:

- a wide range of infrastructure,
- master-classes,
- library,
- consultations dealing with such themes as establishing of a company, registration, marketing, attraction of investments, bookkeeping, business plan preparing etc.

The support portal will provide comprehensive information about support and development facilities in the spheres of creative industries, a common database containing information on creative offers in the cross border region will be formed, the products will be mowed to the market with the means of the on-line selling.

Daugavpils Creative industries club will continue the cooperation with the Creative industries club of Utena, by organizing various exhibitions, seminars, creative laboratories, plein-airs for the representatives of creative spheres and managers.

An important part of the project is the building of studios and residences for the artists, where the centre will offer space for the creative process, an opportunity to live and work for some period of time, meet other artists, an opportunity to participate in the creative projects organized by the centre – in various festivals, seminars, plein-airs, workshops for exchange of experience etc.

The Project "Reconstruction of Artillery Arsenal Building in Order to Create Rothko Art Centre"

The second project "Reconstruction of Artillery Arsenal building in order to create Rothko Art Centre": Operational program "Infrastructure and services" // 3.4. priority "Providing qualitative living environment and economic activity // 3.4.3. measure "Socioeconomic impact of culture" // 3.4.3.2. activity "Restoration of significant socioeconomic cultural heritage".

Mark Rothko, one of the United States' greatest mid twentieth-century painters, was born in Dvinsk on September 25, 1903 in what is now Daugavpils, Latvia [1]. Mark Rothko's parents immigrated to Portland, Oregon when he was a young boy. He took art classes in high school and was also drawn toward music, literature, mathematics and theatre. He continued his studies at Yale University, which he left after two years to move to New York City. There, throughout the 1940s, as he developed as a painter, his work moved increasingly from stylized, content-driven canvases to arrangements of abstract forms. By 1950, he had developed the essence of what he would explore for the rest of his career: one or more rectangular forms floating on a field of color.

Rothko is often identified with the American Abstract Expressionist movement of the 1950s and with the Color Field movement of the 1960s, though he steadfastly denied that his work was either. His color palette in the 1950s was bright, often vibrant reds, yellows, oranges, and pinks. In the late 1950s, and continuing through the following decade, he began using darker, more somber colors.

It was in the late 1950s when Rothko was commissioned to create a permanent installation of a group of paintings for the Four Seasons restaurant in the new Seagram Building designed by the German architect Mies van der Rohe. Before they could be installed, however, Rothko decided that he would not deliver the paintings, as he believed they would only provide a decorative backdrop. It was this dramatic suite of paintings that the de Menils saw in Rothko's studio and that ultimately informed their decision to commission the powerful murals in the Chapel. Rothko created the paintings in his 69th Street studio in New York, where he built mock walls of the size he desired for the chapel. He devised a pulley system so he could adjust the height of the canvases to establish the configuration. And in the more than two years of experimentation and work, he arrived at a new look for his work: seven canvases with hard-edged black rectangles on maroon ground, and seven purple tonal paintings.

Mark Rothko died in 1970 before he could see his masterpiece installed. His legacy to all who encounter his work in the Rothko Chapel is the transformative power of art.

In early November 2005 Rothko's 1953 oil on canvas painting, *Homage to Matisse*, broke the record selling price of any post-war painting at a public auction, at US$ 22.5 million [2]. In May 2007 Rothko's 1950 painting *White Center (Yellow, Pink and Lavender on Rose)*, broke this record again, selling at US$ 72.8 million at Sotheby's New York. The painting was sold by philanthropist David Rockefeller, who attended the auction [3].

In May 2011 Christie's auctions sold a previously unknown Rothko painting, accounting for the work as #836. The work was added to the existing Rothko catalogue of 835 works after expert authentication. The newly discovered painting, *Untitled, #17*, created in 1961, came to light when a private collector put it up for sale, claiming he bought it directly from the artist. A seven-foot-tall oil on canvas in red and pink on an ochre background, the painting opened with a house bid at US$ 13 million and sold for US$ 30 million, plus sellers and buyers fees (US$ 33 million, all inclusive) [4].

In May 2012 Rothko's 1961 painting *Orange, Red, Yellow* (#693 in Anfam's *catalogue raisonné*) was sold by Christie's, New York, for US$ 86.9 million, setting a new nominal-value record for a post-war painting at a public auction [5].

The painting had formerly been in the collection of abstract expressionism built up by David and Gerry Pincus [6].

In October 2012, Black on Maroon, one of the paintings in the Seagram series, was defaced with writing in black ink while on display at Tate Modern, by Wlodzimierz Umaniec. It was estimated that restoration of the painting might take up to 18 months to complete. The BBC's Arts Editor Will Gompertz explained that the ink from Umaniec's marker pen had bled all the way through the canvas, causing "a deep wound not a superficial graze" and that the vandal had caused "significant damage" [7].

The project purpose: to increase appeal of the region of Latgale, to raise level of economic and social welfare of Daugavpils, to provide long-term development of the region, to restore the arsenal building.

The Project "Reconstruction and Improvement of the Territory of Daugavpils Rothko Art Centre"

The third project "Reconstruction and improvement of the territory of Daugavpils Rothko Art Centre": Operational program "Infrastructure and services" // 3.6. priority „Polycentric development" // 3.6.1. measure "Support to sustainable development of urban environment and urban regions" // 3.6.1.1. activity "Support to growth of national and regional development centres for balanced country development".

The building of Rothko Art Centre is located at the Dinaburg fortress. After the initial design, the Dinaburg fortress consisted of two parts: the main part was located on the right bank of the Daugava River while the bridgehead was on the left one. The bridgehead was formed by two bastions, or bulwarks, two caponiers and a semi-caponier, two demi-bastions and three lunettes. The main part of the fortress (citadel) was formed by the rampart with eight fronts (front lines) and eight bastions located between them. The defensive scheme was supported by stone curtains between bastions. In front of the citadel a defensive line consisted of ravelins, reduits, counterguard, and redoubts. The main rampart had a specific significance in the

defensive scheme. In course of the fortress construction it was decided to strengthen the rampart with a heavy granite covering – escarp. The construction of the escarp wall lasted for eight years from 1819 till 1827 and resulted in strengthening the rampart at its full length – 5154 meters. In May 1822, General Lieutenant of the Prussian Royal Service Gustav von Rauch inspected the fortress. The visit was marked by a memory stone immured into the wall which is preserved till now. An esplanade, a free open space in front of the fortress, was of special importance in the defensive system. When the fortress lost its military significance, the esplanade was gradually developed. New city districts were built on in the area – Esplanade and Northern.

Casemates constituted a significant part of the fortress buildings. These closed fortification works were built from high-strength materials and protected from artillery direct hits. One can see various types of casemates in the Dinaburg fortress. The majority of them were used as warehouses for military supplies (gun-powder and ammunition magazines) and food resources (food stores and warehouses). In secure casemate constructions, garrison barracks and passages were arranged. Casemates constructed in the main fortress rampart (cannons casemates and arms galleries), were used to place the arms and fortress defenders and to ensure the firing system. In 1837, the casemate redoubts were constructed after the draft design of 1825. At the same time, a two-storey defensive barrack was constructed in the bridgehead. It contained 142 casemates to accommodate a military battalion with its headquarters and all the relevant resources [8].

The project purpose: to promote preservation of cultural historical value of the Dinaburg fortress, to provide reconstruction and improvement of the territory of Daugavpils Rothko Art Centre.

Challenges of Public Procurement

Project management includes developing a project plan, which includes defining and confirming the project goals and objectives, identifying tasks and how goals will be achieved, quantifying the resources needed, and determining budgets and timelines for completion. It also includes managing the implementation of the project plan, along with operating regular ‘controls’ to ensure that there is accurate and objective information on ‘performance’ relative to the plan, and the mechanisms to implement recovery actions where necessary [9].

Projects follow major phases or stages, including: feasibility, definition, project planning, implementation, evaluation, support/maintenance. Planning the general project, it was extremely difficult to balance the following basic terms:

A) Goals (specific accomplishments that must be accomplished in total, or in some combination, in order to achieve some larger, overall result preferred from the system);
B) Activities (the methods or processes required in total to achieve the goals);
C) Objectives (specific accomplishments that must be accomplished in total to achieve the goals in the plan);
D) Tasks;
E) Resources (the people, materials, technologies, money, etc., required to implement the strategies or processes).

A common failure in many kinds of planning is that the plan is never really implemented. Instead, all focus is on writing a plan document. Too often, the plan sits collecting dust on a shelf [9]. We overcame this problem strictly observing 10 basic principles [10]:

- Adopt practices for exploring a variety of perspectives;
- Stay close to your customer;
- Take care of your project team [11];
- Keep your eye on the overall project promises;
- Build relationships intentionally;
- Tightly couple learning with action;
- Coordinate meticulously [12];
- Really collaborate;
- Listen generously [13];
- Expect the unexpected [14].

Project managers carefully studied researches of the Professor of Project Management Andrew Price: Relationship between value and duration for construction projects (1991) [15]; Conceptual phase of construction projects (1995) [16]; Risk and Risk Management in Project Related Finance (1997) [17]; Ethics Training on Multi-Cultural Construction Projects (2006) [18]; Framework for managing multicultural project teams (2009) [19]; The effect of integration on project delivery team effectiveness (2011) [20]. Early research focussed on construction productivity and the motivation and development of human resources. This evolved to include several project management related topics, including integrated design and construction, integrated supply chains, partnering and less adversarial long-term relationships. In recent years, the focus has moved towards measuring and improving the socio-economic aspects of construction performance, this has included: construction value, sustainability; performance improvement; Total Quality Management; and benchmarking. Current research includes: innovative design and construction solutions for health and care infrastructure; continuous improvement; and sustainable urban environments [21].

Common procurement for these projects: reconstruction works; author supervision; reconstruction works supervision.

Form project management point of view it is challenging to harmonize different fund administrators rules such as Joint Technical Secretariat (Latvia – Lithuania Cross Border Cooperation programme), State Regional Development Agency and Central Finance and Contracting Agency.

Even if they are administrating one EU fund and have one implementation law there are still some slight differences (for example, report forms, applications etc).

The main aim of the project is to renovate cultural object – national architectural monument in Mihaila Street 3, Daugavpils (Artillery Arsenal Building, build from 1810 till 1833). In order to do renovation works at Artillery Arsenal Building in accordance with DIRECTIVE 2004/18/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts and with Public Procurement Law.

The purpose of this Law is to ensure: A) openness of the procurement procedure; B) free competition of suppliers, as well as equal and fair attitude thereto; and C) effective use of State and local government funds, reducing the risk of the commissioning party to the minimum.

In each case it was very important to define procedure of necessary purchase correctly. The Public Procurement Law means such procurement procedures: 1) an open competition; 2) a closed competition; 3) a price quotation; 4) a negotiated procedure; 5) a design competition.

One of the major moments is the correct determination of the estimated contract price. The estimated contract price shall be determined as the total planned payment by the commissioning party for implementation of the contract. The commissioning party, when planning the total payment, shall take into account any selection opportunity and any supplements to the contract.

It shall not be allowed to divide public work projects, foreseeable supplies or services in order to avoid the application of the relevant procurement procedure. It shall not be allowed to use such method for the determination of the contract price, which is aimed towards the non-application of the procurement procedure specified in the law.

Low-quality planning of purchases and the wrong determination of the estimated contract price could cause certain problems.

The estimated contract price of public works contracts shall be the total value of all works or structures, including the contract price of the supplies or services necessary for the implementation of the contract and which are intended to be performed or provided by the commissioning party to the provider of works. The commissioning party shall not add the estimated contract price of the supplies and services, which are not necessary for the implementation of the specific public works contract, to the estimated contract price of the public works contract, if thus the application of the requirements of this Law may be avoided to the relevant supply or service contracts. The procedures for determination of the estimated contract price for a works contract shall be determined by the Cabinet.

If the possible subject-matter of a public works or service contract may be divided into parts, when entering concurrently into contracts for each of the parts, the estimated contract price shall be determined as the total amount of all the parts. The commissioning party shall apply the requirements of this Law to each part, if the total amount of the parts is equal to or exceeds the margins of the contract price referred to in Section 8 of this Law. The commissioning party is entitled to apply such procurement procedure. which would relate to the estimated contract price for the parts in accordance with Section 8 of this Law, to those parts, for which the estimated contract price is less than the margins of contract prices specified by the Cabinet, if the total estimated contract price of the relevant parts is less than 20 per cent of the total estimated contract price of all parts.

In view of the estimated contract price, open competitions were the main method of purchase. Thus, it was necessary to include in documentation of each purchase:

- the identification number of the procurement;
- the name, address and other details of the commissioning party;
- the location, date, time and procedure for the submission and opening of tenders;
- tender security, if any, and the type thereof;
- the requirements in relation to the documentation and submission of a tender, the type of financial tender, as well as information regarding the language or languages, in which the tender is to be submitted;
- the description and amount of the subject-matter of the procurement;
- the technical specifications;

- the time and location of the implementation of the contract;
- other information regarding the subject-matter of the procurement;
- the requirements, which are specified in accordance with Section 39 of Public Procurement Law, as well as the information to be submitted, which is necessary in order to evaluate the applicant in accordance with the Section referred to;
- the requirements in relation to the capacity of an applicant to perform professional activities, the economic and financial situation and the technical and professional abilities of the applicant in accordance with the requirements specified in Sections 43 and 44 of Public Procurement Law, as well as the information to be submitted, which is necessary in order to evaluate the applicant in accordance with the requirements referred to;
- the selection criteria and evaluation criteria of a tender in accordance with Section 46 of Public Procurement Law, as well as a reference whether the applicant may submit variants of tenders in accordance with Section 19 of Public Procurement Law;
- the draft of the procurement contract or the framework agreement.

Carrying out public purchases for needs of the project, is always closely integrated into management of the project. Professor of Project Management Lynn Crawford specify the following. Using a model conceptualized from the literature on strategic management, an analysis of four organizations that have made significant investments in project management over the past 5 years supports the hypothesis that the degree of fit between an organization's strategic drivers of value and the configuration of its project management system influences the value it obtains from project management [22].

Conclusion

The project managers and public procurement specialists, who are involved in the implementation of the projects with multifunding, have to understand that carrying out purchases in such projects becomes responsible and difficult process. Planning the general project, it was extremely difficult to balance the following basic terms: goals, activities, objectives, tasks and resources. In each case it was very important to define procedure of necessary purchase correctly. One of the major moments is the correct determination of the estimated contract price. Low-quality planning of purchases and the wrong determination of the estimated contract price could cause certain problems. To minimize problem situations, the project managers and public procurement specialists have opportunity to get acquainted with the corresponding scientific literature and to consult to more skilled colleagues.

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SIZE OF BUFFERS IN CRITICAL CHAIN METHOD – CASE STUDY

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Keywords: critical chain, project buffers, feeding buffers, project uncertainty factors

Abstract

The buffers are used in the Critical Chain Method as a tool for protection against risk of delaying projects completion. In the literature there are many methods of determining the size of buffers, however it is not known which method should be applied in which case. The approaches are described in very general terms and take into account neither the characteristics of a particular project nor its activities features. In this paper the results of the analysis of the use of the Critical Chain Method and various buffers sizing methods, among other new methods proposed by the authors, in several real-life infrastructure projects is presented. These projects are/were implemented by Polish institutions, funded partly by the European Union and the private sector in Belgium. The analysis was carried out during or after the projects implementation. It shows which factors have to be taken into account in buffers sizing and in which way so that the use of the Critical Chain Method in each particular project is as efficient as possible.

Introduction

The Critical Chain Method is widely known as a modern method in project management, allowing to take into account both the uncertainty of time estimations, the human factors influencing these estimations and their credibility. The main unique feature of the Critical Chain Method is removing safety time incorporated in predefined activities durations and aggregating it in the form of a safety buffer at the end of the path (called, after resource balancing, "chain") which consists of these activities. The buffer's function is the protection of the project due date from delay which can be caused by uncertainty and variation of activity durations. The author of the Critical Chain Method, E. Goldratt, assumes that the size of the buffer should be equal to 50% of the total safety time removed from all the activities of the particular chain [1], and other researchers have added other solutions or proposals as to the buffer size [4]. Although there exist a wide range of available approaches to buffer sizing, a few practical attempts to examine the different methods in a critical way show that it is not known which method of buffers sizing to choose in which case.

In our opinion the known buffer sizing methods are too general and too isolated from the nature of the concrete projects under consideration. That is why in [5] we proposed an approach

of buffers sizing linked to the characteristics of a given project and its activities. In this paper we show how the method [5] can be implemented in real world projects.

The outline of the paper is as follows. In section 1 we sum up the state of the art of the problem of buffers sizing, criticizing it for being too detached for the nature of projects under consideration. In section 2 we shortly describe the theoretical foundations of a new approach to buffers sizing proposed by us in [5] and, what is the goal of the present paper, we discuss a real world application of our approach. The paper finishes with conclusions and further research outline.

1. Different Methods of Buffer Sizing – a Critical View of the State of Art

In the literature there are many approaches for buffers sizing in the Critical Chain Method. However, the methods proposed are described in very general terms, rather as a philosophy than strict algorithms, and additionally they base on assumptions which are often impossible to verify or can be interpreted in many ways. In [2] we applied most of the know buffers sizing methods to a real world project with the research question: "Does it make a big difference which buffers sizing method is selected? "The answer is: "Yes, I does". The application of eight different methods resulted in obtaining eight significantly different schedules. To illustrate this fact, the example of two considerably different schedules for the same project are presented (Figure 1a. and 1b.).

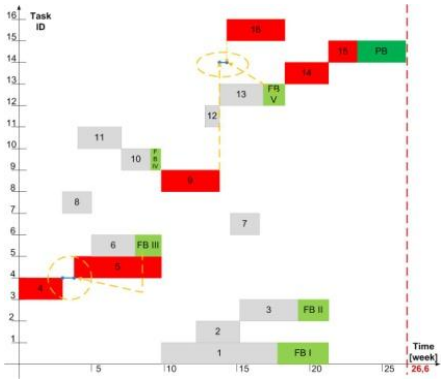

Figure 1a. Sum of squares method schedule [2]

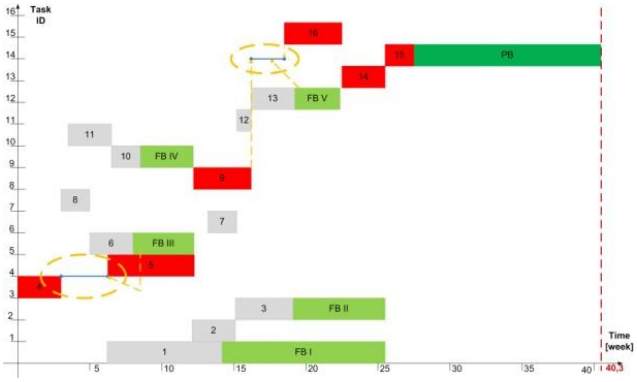

Figure 1b. APRT method schedule [2]

Source: own elaboration

When we focus on the two presented schedules, we can easily observe that they differ in the size of the inserted buffers. Obviously the bigger buffers sizes, the more extra time to neutralize negative consequences of unexpected events, thus a better project deadline protection. However it needs to be remembered that in reality the companies often have to be competitive and propose a project due date which will be attractive for the investor – but sometimes the competitiveness is not an issue, the reliability of the project deadline plays a more important role, sometime the stability of the schedule, or of some of its parts, is extremely important. Therefore, the goal is to find an optimal project make span – not too short, not too long. Hence, it obvious then that project activities durations should be estimated and also the buffers sizes

should be computed in such a way which reflects well the reality of the particular project. A method which fulfils this condition will be shortly described in the next section.

2. A New Approach to Buffers Sizing

In [5] we proposed a method for buffers sizing which is strongly based on the characteristics of the project in question. This method will be shortly presented here and then applied to real world projects. The method is based on the identification of some uncertainty factors of the given project, which has to be carried out individually for each project. These factors are then used in the formulae for buffers sizing. First we will give the theoretical background for the uncertainty factors [5].

2.1. Uncertainty Factors

The inherent uncertainty associated to many project activities causes that estimating time, effort, resources requirements is one of the most difficult tasks for each project planner. Sometimes a relevant estimation even seems to be impossible. Uncertainty may be caused by various factors and what is even more, uncertainty in one aspect may lead to uncertainty in another aspect: e.g. uncertainty of the activity duration causes that the total renewable resources requirements are uncertain too. All these different sources of uncertainty and links between them bring on a need of taking them into account during project scheduling. They should be incorporated in the activity duration estimations and then further in the definition of buffers absorbing negative consequences of that uncertainty [5].

At the beginning some basic terms [5] need to be explained. The uncertainty factors are defined from two different perspectives. One of them is the general setting in which the project in question is performed (the project team as a whole, the company, the technology, all the stakeholders, the region, the country, the market etc.). The other one is the perspective of each individual activity (the specific requirements of the activity, the specific features of its executors etc.). From now on we will call the first group of uncertainty factors "project execution settings" and the other group "activity attributes" (Figure 2a. and 2b.).

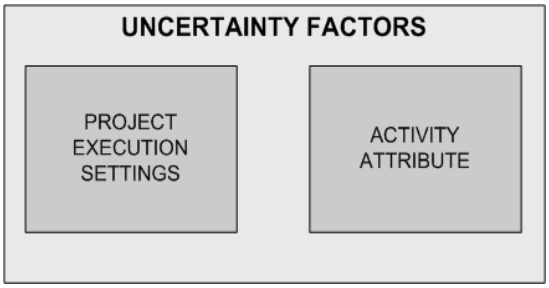

Figure 2a. Uncertainty factors

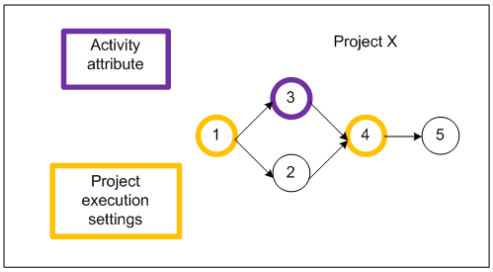

Figure 2b. Project execution settings and activity attributes

Source: own elaboration

The project execution settings refer to project characteristics which are relevant for more than one project task: e.g. availability of a crane which is used in activity no 1, as well as, later,

in activity no 4 (Figure 2b).All the project execution settings have to be identified and listed. Then, each activity should be given, for each project execution setting, one of the values from Table 1. The value V_i^k says whether the *k*-th project execution setting is important (and to which extent) for the *i*-th activity execution. Then the *k*-th project execution setting in the context of the *i*-th activity has to be given a weight W_i^k from Table 2, showing to which extent the *k*-th project execution setting is important for the outcome of the whole project if seen from the perspective of the *i*-th activity. All these information will be taken into account while estimating the buffer size.

Table 1

Importance of project execution settings for activities execution

Name	Possible values and their significance
V_i^k	0 – completely unimportant for the activity execution 1 – rather not important for the activity execution 2 – rather important for the activity execution 3 – important for the activity execution 4 – very important for the activity execution

i – the activity number
k – the project execution setting number

Source: own elaboration

Table 2

Importance of project execution settings in the context of individual activities for the project outcome

Name	Possible values and their significance
W_i^k	0 – unimportant 1 – not so important 2 – important 3 – very important

i – the activity number
k – the project execution setting number

Source: own elaboration

The other group of uncertainty factors are defined from the activity level by describing the activity as seen from the angle of five attributes presented in Table 3.The number associated with each piece of description in Table 3 expresses the degree the which the activity in question possesses the corresponding attribute (the same notation as above will be used for this degree – V_i^k, where *i* is the activity number and *k* the attribute number). Additionally, each attribute linked to an activity will be associated with a weight W_i^k ,which expresses the importance of the *k*-th attribute in connection with the *i*-th activity for the project outcome (like in Table 2). These two pieces of information will be incorporated while computing the size of buffers in the Critical Chain Method ([5]).

Table 3

Description of project activities attributes and the possible degrees of their presence in activities

Activity attribute	Degrees to which the activity may possess the attribute
Novelty	0 – scope of work is very well known 1 – scope of work is known 2 – scope of work is rather known 3 – scope of work is rather unknown 4 – scope of work is unknown
Complexity	0 – very simple 1 – not complex – less than 5 parties involved 2 – rather complex – 5 till 10 parties involved 3 – complex – 10 till 15 parties involved 4 – very complex - more than 15 parties involved
Resources newness	0 – resources very familiar 1 – resources used before 2 – resources used before but with there is a new feature 3 – new resources used 4 – it is not known yet what kind of resources will be used
Resource availability	0 – resources always available 1 – resources operable 2 – resources rather operable 3 – constraint resources 4 – very constraint resources
Resource reliability	0 – resources 100% reliable 1 – resources reliable 2 – resources rather reliable 3 – resources rather unreliable 4 – resources unreliable

Source: own elaboration

2.2. Proposed Approach for Buffer Sizing

The uncertainty degree in a project is strictly related to how innovative its scope is. It is rather obvious that some details of many activities which need to be performed in a very innovative project are for the project team unknown. Lack of experience in executing the given sort of work implicates that it is impossible to identify ex-ante all the possible risks of project duration and budget overrunning and to quantify them. However, the fact that it is almost impossible to define potential risks for this kind of projects does not mean that their existence and, what is even more significant, their possible impact, can be ignored([5]). In our opinion the application of the uncertainty factors, as defined in the previous section, can be useful to estimate the risk in the project and place in its schedule buffers whose size would be adequate to protect the project effectively, but without exaggeration, against completion delays.

The values and weights of uncertainty factors, i.e. of projects execution settings and activity attributes, in individual activities, will be incorporated into the formula for size of project and feeding buffers in the Critical Chain Method. The buffer sizes in the Critical Chain Method are always a function of some characteristics of a certain sequence of activities, called chains (the

buffer is supposed to protect this chain – the project buffer size is a function of the characteristics of the project critical chain, the feeding buffer size is a function of the characteristics of a feeding chain). But in the classical Critical Chain Method the activity characteristics are simply the activity buffers, whose size is given by the future activity executors and which may or may not take into account all the important and relevant uncertainty factors. We propose to include implicitly the uncertainty factors into these activity characteristics. Thus, the buffer size in our approach will be a function of the values defined in the previous section.

Let LB_Z denote the size of the buffer which is meant to protect the chain Z (it may be a project critical chain or a feeding chain), composed of n_Z activities. Additionally j_i denotes the number of the uncertainty factors relevant to *i*-th activity. We propose to calculate LB_Z according to the following formula ([5]):

$$LB_Z = \sum_{i=1}^{n_z} d_i \frac{\sum_{k=1}^{j_i} V_i^k * \frac{W_i^k}{\sum_{k=1}^{j_i} W_i^k}}{j_i} \tag{1}$$

subject to:

j – number of the uncertainty factors, $j \epsilon N$;

k – uncertainty factor $k = 1,\ldots j$, $j \epsilon N$;

d_i – *i*-th activity duration, $i = 1, \ldots n$;

W_i^k – weight of uncertainty factor *k* of activity *i* $k = 1, \ldots j$, $i = 1, \ldots n$;

V_i^k – value of uncertainty factor *k*, $k = 1,\ldots j$, $i = 1, \ldots n$.

2.3. Identification of the Uncertainty Factors. Case Study

In this section we will discuss the application of the proposed method to real world projects. First a brief overview of the projects will be presented. Two projects implemented by the Polish public sector and one carried out by the Belgian private sector will be described. The projects in question are very big, complex investments. Therefore, to clarify the proposed method´s application, only parts of these projects will be analyzed.

The scope of the first project, called further project A, is the development of a water supply network in a Polish city whose number of inhabitants is close to 40.000. The project is financed and performed by a municipal sewerage company in cooperation with the local government. The work on the project started on 22 May 2007and is still in progress (January 2013). The scheduled due date is the end of 2013.

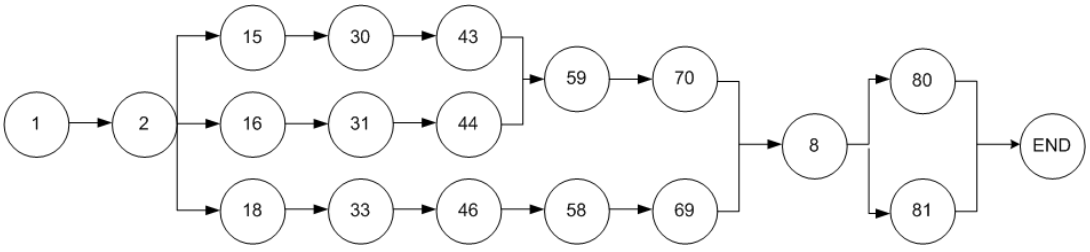

Figure 3. Network of project A

Source: own elaboration

An investment carried out by a public transport company in collaboration with the local government is the second analyzed project in this study, called further project B. Its scope is the construction of a street along with the tram tracks in a 75.000 inhabitants Polish city. The project is completed. Originally it was planned that all the work would be completed between 20th of January 2010 and 21th of April 2011. However, due to occurred problems, the project ended up with a four-month delay.

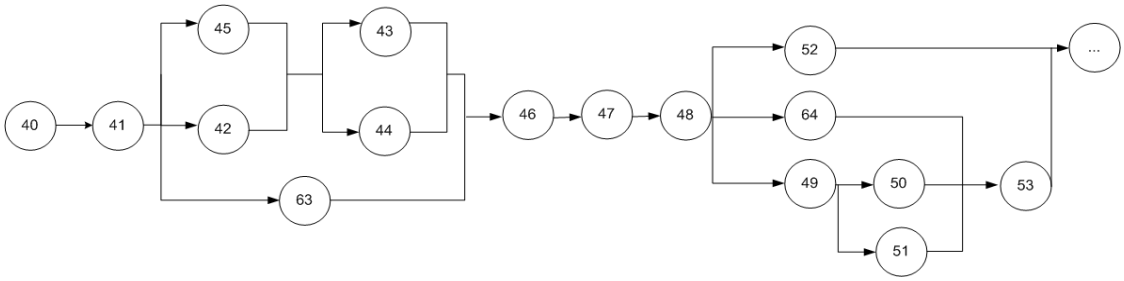

Figure 4. Network of project B

Source: own elaboration

The last analyzed project is project C, initiated and financed by the Belgian branch of an international waste utilization company. The project was launched in order to construct the RDF line (RDF – "refuse derived fuel"). From the refuse waste the company derives a 'green' fuel for the Belgian cement industry and bio-energy plants. The project is completed. It was finished in eight months, although originally it was scheduled for seven months.

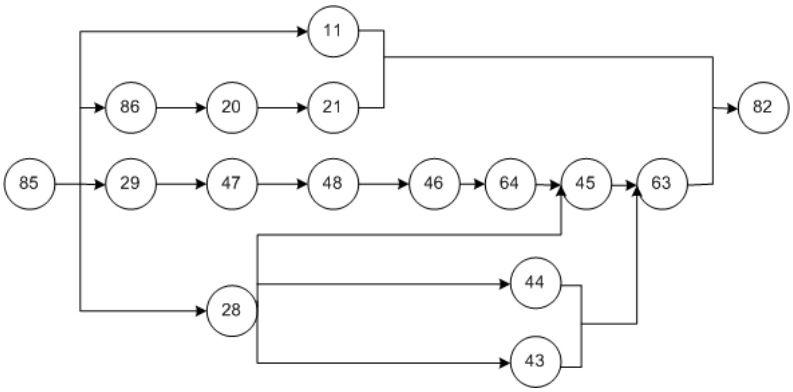

Figure 5. Network of project C

Source: own elaboration

First the uncertainty factors for each projects have to be identified. Then the corresponding values defined in the previous section have to be estimated for individual activities.

The project execution settings are defined from the project level, which means that they can be relevant to more than one task. It is necessary to say that not all project execution

settings which occurred in the analyzed projects are presented here. For the sake of simplicity, the authors decided to choose only some of them.

Table 4

The project execution settings for the analyzed projects

ID	PROJECT EXECUTION SETTINGS		
	PROJECT A	**PROJECT B**	**PROJECT C**
1	Obtaining administrative decision from the relevant body	Impact of groundwater	Subcontractor 1
2	Condition of the existing installation	Weather condition	Subcontractor 2
3	Impact of groundwater	Impact of archaeology findings	Weather conditions
4		Protests of inhabitants	Supplier 1
			Gaps and mistakes in the construction plans

Source: own elaboration

In the further presentation, the example of project C will be used. Table 5 and 6 contain the necessary estimations for the selected part of project C, obtained with the help of experts from the respective companies.

Table 5

The project execution setting for the project C

ID (k)	PROJECT EXECUTION SETTINGS	PROJECT C						
		Activity (i)						
1	Subcontractor 1	**No**	**20**	**21**	**85**			
		$\mathbf{V_i^k}$	1	3	3			
		$\mathbf{W_i^k}$	3	3	3			
2	Subcontractor 2	**No**	**11**	**82**	**86**			
		$\mathbf{V_i^k}$	3	3	3			
		$\mathbf{W_i^k}$	1	2	1			
3	Weather conditions	**No**	**20**	**28**	**29**			
		$\mathbf{V_i^k}$	3	2	2			
		$\mathbf{W_i^k}$	2	1	1			
4	Supplier 1	**No**	**43**	**44**	**45**	**46**	**47**	**48**
		$\mathbf{V_i^k}$	3	3	3	3	3	3
		$\mathbf{W_i^k}$	3	3	3	3	3	3
5	Gaps and mistakes in the construction plans	**No**	**63**	**64**				
		$\mathbf{V_i^k}$	2	2				
		$\mathbf{W_i^k}$	3	3				

Source: own elaboration

It can be noticed that the all the project execution settings are relevant for more than one activity. This phenomenon is ignored in most approaches to risk management and project buffer sizing methods.

Table 6

The project C activities' attributes

PROJECT C										
Acti-vity id	**Novelty**		**Complexity**		**Resources newness**		**Resource availability**		**Resource reliability**	
	W	**V**	**W**	**V**	**W**	**V**	**W**	**V**	**W**	**V**
11	1	2	1	1	2	1	1	2	2	2
20	2	3	2	3	1	2	3	3	1	2
21	4	3	2	2	1	2	1	2	1	2
28	1	2	1	2	1	2	1	2	1	2
29	1	2	1	2	1	2	1	2	1	2
43	4	3	4	3	3	2	1	1	2	1
44	4	3	4	3	3	2	1	1	2	1
45	4	3	4	3	3	2	1	1	2	1
46	4	3	4	3	3	2	1	1	2	1
47	4	3	4	3	3	2	1	1	2	1
48	4	3	4	3	3	2	1	1	2	1
63	4	3	4	3	2	1	2	1	2	1
64	4	3	4	3	2	1	2	1	2	1
82	2	2	2	2	2	1	1	2	2	2
85	4	3	2	2	1	2	1	2	1	2
86	1	2	1	1	2	1	1	2	2	2

Source: own elaboration

Let us now explain the estimation process of several of the above values. The whole reasoning and all the arguments used in the estimation process cannot be presented here because this would go beyond the size limits of this paper.

The work on the analyzed part of the project began (Figure 5) with activity no 85 ('Installation of central cabinet'). For the execution of this task an external subcontractor was hired, also for the tasks no 20 ('Transformer') and no 21 ('Low-Voltage Distribution System (NSHV)'). The company used to work with him before while launching other projects and both sides were satisfied with the cooperation, thus this was not a potential uncertainty factor. However, the whole project was an innovative initiative, thus a lot of work which needed to be done had never been done before. As far as activities no 21 and 85 are concerned, the subcontractor had some experience with a similar installation, but in the planning phase it was not known whether this experience would be sufficient. Therefore, in spite of the efficient cooperation with the subcontractor in the past, the value of the project execution setting 'Subcontractor 1', expressing difficulties in the tasks entrusted to him, was estimated as V_{21}^1= V_{85}^1=3. That project execution setting was crucial for the success of both tasks, therefore it was agreed to associated it in both cases with the highest value of weight, namely W_{21}^1=3 and W_{85}^1=3.The situation looked differently in the case of activity no 20. The subcontractor had a high experience with executing that sort of task, both in cooperation with the project C investor and other companies (V_{20}^1 = 1), although the quality of his work was very important also in this activity case (W_{20}^1 = 3).

In a project performed earlier, the subcontractor mentioned above ('Subcontractor 1') was responsible for the whole part related to the electrical installation. However, because of the innovative scope of work in the activities no 21 and 85 and the important role of that subcontractor for their completing, it was agreed by both sides that for the basic electrical works, such as electrical cable installation, another subcontractor should be hired. Therefore, a new company was taken for the execution of activities no 11 ('Electric cable for central cabinet'), 82 ('Electrical installation') and 86 ('Electrical cables for Trafo and NSHV from power grid'). The scope of work in those activities was known, not too complex and the other resources (e.g. the investor workers and suppliers) were reliable, available and efficient in a cooperation – what is reflected in the values of the attributes of those activities (Table 6). However, the fact that it was the first time when the investor cooperated with this subcontractor became a source of uncertainty. This fact was incorporated in the analysis by defining a project execution setting ´Subcontractor 2´. Because the hired company had rather good references as far as this kind of work was concerned, it was decided that $V_{11}^{2} = V_{82}^{2} = V_{86}^{2} = 3$. Its role for the successful activities execution was limited in case of tasks no 11 and 86, thus $W_{11}^{2} = W_{86}^{2} = 1$. Their skills were rather important for completing activity no 82, hence $W_{82}^{2} = 2$.

The constructed production line was supposed to be placed under a roof which was built at the beginning of the project, therefore most of the work was executed inside. It seemed that for the project execution that fact had a very important implication – it was thought that the weather conditions would have very little impact on completing e.g. the activities no 28 and 29 (respectively 'Steel constructions for lifting over band magnet' and 'Steel constructions for fine screen'). It was decided that the value of the project execution setting ´Weather conditions´ for all those activities would be $V_{28}^{3} = V_{29}^{3} = 2$. A reason for which neither value 0 nor 1 was chosen was the fact that it was known that those activities would be performed in the summer and the main part of the work was welding. In Belgium there is a law which states that if the temperature reaches a certain level, the workers hired for heavy tasks, like welding, have the right to more and longer breaks. This fact could potentially cause a little delay in those activities completing. However, in the previous year this situation did not occur too often, thus $W_{28}^{3} = W_{29}^{3} = 1$.

Although it is beyond the scope of this paper, it is worth mentioning what happened in reality. The case of the project execution setting ´Weather conditions´ shows very well how difficult to it is define a priori the impact of all the uncertainty factors on the project execution. As it was expected, a heat wave did not occur, but instead there were two weeks of very heavy rain. It made water get inside and disable the work on activities no 28 and 29 for 14 days.

As it was mentioned before, the presented project was a very innovative initiative. For this reason a big part of the work and also of the required supplies were an important source of uncertainty. In order to build the production line, most of the elements needed to be specially designed and manufactured. It was very difficult to find a company which would be able to supply the required elements, especially as far as conveyer belts were concerned, whose installation was within the scope of activities number 43, 44, 45, 46, 47 and 48. A system of conveyer belts which needed to be prepared was very complex, therefore it was easy to make construction mistakes which would cause a significant delay of those activities. Finally a right supplier was found. However, because of an innovative, complex scope of these activities and the fact that it was the first time that the investor cooperated with that supplier, it was decided that $V_{43}^{4} = V_{44}^{4} = V_{45}^{4} = V_{46}^{4} = V_{47}^{4} = V_{48}^{4} = 3$. This factor, called 'Supplier 1', was very important for all those activities execution, thus $W_{43}^{4} = W_{44}^{4} = W_{45}^{4} = W_{46}^{4} = W_{47}^{4} = W_{48}^{4} = 3$.

The novelty of the project was again a reason of uncertainty, expressed in the other project execution setting, namely 'Gaps and mistakes in the construction plans'. The investor made a great effort to prepare a project documentation of high quality, plans of installation included. However, in the design phase it was impossible to verify some construction details. This was possible only during the construction of the production line (activity no 63´Overband magnet´ and 64 'Trisomat-fine screen'). The probability of this kind of design mistakes was rather low, thus $V_{63}^{5} = V_{64}^{5} = 2$, but if they would have occurred then they would have caused a significant delay, thus $W_{63}^{5} = W_{64}^{5} = 3$.

Next, the practical application of the method proposed above will be presented. The numbers from Table 5 and 6 were used in formula (1) for all the buffers needed according to the Critical Chain Method for project from Figure 5. The calculated buffers sizes are given in Table 7. The procedure resulted in the obtaining the schedule presented in Figure 6.

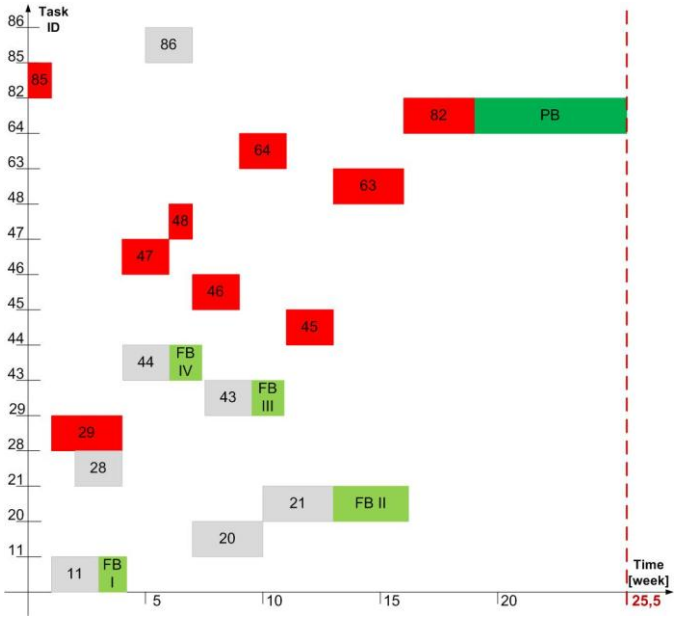

Figure 6. The schedule of project C with inserted buffers

Source: own elaboration

Table 7

The buffers sizes for project C

Buffer	Size [weeks]
Project buffer	6.5
Feeding buffer I	0.6
Feeding buffer II	3.2
Feeding buffer III	1.4
Feeding buffer IV	1.4

For the sake of a better illustration, the procedure of computing the size of the feeding buffer FB II will be presented. The role of buffer FB II is to absorb the delays in the feeding chain consisting of activities number 86, 20 and 21. What is important, the activities number 86 and 21 are linked to 6 uncertainty factors each (5 activities attributes and 1 project setting). The activity number 20 is linked to 7 of them (5 activities attributes and 2 project settings).

Therefore:

$$LB_{II} = 2 * \frac{3 * \frac{1}{8} + 2 * \frac{1}{8} + 1 * \frac{1}{8} + 1 * \frac{2}{8} + 2 * \frac{1}{8} + 2 * \frac{2}{8}}{6} = 3.20 \text{ weeks} \quad (2)$$

Although Figure 6 may look like a schedule prepared according to the original Critical Chain Method, it is important to remember that the underlying philosophy of calculating the buffer sizes is completely different. We no longer rely on the rather mysterious way of thinking of the future activity executor, who "somehow" determined his "private" buffer, which is later used in the calculation of the project and feeding buffers, but try to explicitly identify the factors which may cause the need and the bigger or smaller size of the buffers.

The approach was on the whole positively evaluated in the studied companies, although the process of uncertainty factors identification and quantification was perceived as difficult. The experts said it was not systemized and required an efficient procedure and a continuously updated data base.

Conclusions

In this paper we present the first application of the new approach to buffer sizing in the Critical Chain Method we had proposed in another paper. The proposed approach takes into account the specific project characteristics during the project planning phase, both of the project as a whole and of the individual activities. Therefore the obtained schedule is tailored for the particular project. The approach requires a systematic identification and quantification of project and activities uncertainty factors. Thanks to this the buffers are sized optimally to protect the project from delays: they are longer if the uncertainty factors have a higher impact and lower if the uncertainty factors are less important.

We have to emphasize that our approach differs essentially from the original one by Goldratt. In the latter the buffers are sized using only the information about the "private" buffers the project team members revealed in the activity duration estimation process. In such a procedure it is not known why the buffers should have this and not a quite different size. The size of the buffers of individual team members may be the result of their psychological or private characteristics, problems or fears and may have little to do with the characteristics of the project in question. We propose to make the buffer sizing procedure more transparent and more objective.

The practitioners who took part in the first practical application of the method as experts evaluated the approach positively. However, the experiments were too time consuming for them to become a normal praxis. Further research is required in order in develop an efficient procedure of uncertainty factors identification and quantification, supported by a computer system and a data base, in which check lists of factors from similar projects would be stored. Also, further experiments with real world projects are needed to fully verify the method's usefulness.

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DECISION SUPPORT SYSTEM FOR SALES OF CUSTOM DEVELOPMENT SOFTWARE PROJECTS

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Keywords: project management, software projects, decision tree, project sales

Abstract

Custom developed software projects are the ones with the highest failure rates from project management perspective. According to Standish Group's 2011 CHAOS Report more than half of software projects conducted between 2002 and 2010 were either described as challenged or complete failures and just 37 percent were classified as successful. Important part of all decisions influencing future of custom development software project success is made during project sales process. Meanwhile project sales personnel are not always aware of all risks associated with their taken decisions about project during sales process.

The aim of this paper is to develop decision tree to support software project sales process for custom development projects. We expect to define key decisions made during sales process in order to estimate project price and their correlation to project implementation success. Research will be conducted as quantitative survey of custom development software project managers.

This research will contribute to decision making process about software project portfolio and software project sales. Research results could be used for sales and project managers of software development companies and organizations planning to implement custom software development projects.

Introduction

In today knowledge based economy organizations mostly is project oriented. And it defines need for better project management and continuous increase of project overall success

rate. In IT industry custom development projects in Latvia relatively small market competition is quite high.

There are 2 basic factors used by managers for project success or failure analysis. First is how project was sold. Second how project was implemented. Numerous researches on this topic shows that there are a lot of factors that influence project and literally project manager must do everything well to get project successfully done. It puts high pressure on project manager competencies.

In this research authors try to identify some significant factors existing in sales and implementation processes.

Also authors try to find out impact of information asymmetry that existing between sales and implementation teams. And possible ways to avoid it.

There is 3 factors in sales process analyzed in this research: Industry, technology and legal conditions. Industry is important because it defines specific business knowledge and competencies what is required to approach project in some industry (e.g. competencies in banking processes if company selling project to bank etc).

Technology factor defines what impact of technology decisions is during sales process.

Legal conditions usually includes formal procedures of an organization. Legal conditions formally defines scope of project.

Authors define hypothesis to test during research:

1. It is very difficult to sell successful custom developed IT software project.
2. There is very small probability that there will be success.
3. Project manager is the most influencing project success.
4. Sales process is the influencing project success.
5. Decisions taken during custom development IT project sales process influences project profit.
6. Quality of communication process between customer and Project team influences.

Methodology

The research is limited to the custom software development projects and project managers in Latvia. Data was collected by questionnaire that included measures of project sales process – industry knowledge, technology, legal conditions. And measures of project implementation process – information transfer from sales to project team, project plan, resource use during development process, project customer satisfaction. Those constructs were taken from published research and during initial interviews with custom development IT project managers.

There were 17 questions included into questionnaire, where 3 questions were about experience characteristics of project managers which were measured using ratio scales. 14 questions were about project sales process and project implementation process measures. The constructs were measured using interval scale from strongly unfavorable to strongly favorable.

Nonprobability judgment sample was used in the survey. Authors selected sample of 43 professional custom development software project managers in Latvia based on criteria, that their experience in custom development IT project management should be at least 3 years. Project managers were selected from IT companies specializing in customer development

software projects and end customers implementing projects in their organizations both segments public and commercial. Questionnaire was published online and each respondent received individual e-mail with request to reply on survey.

Results

36 out of 43 project managers involved into survey responded to questionnaire. Average years of experience in custom development IT projects of survey participants was 8.75 years, most frequently were represented project managers with 10 years' experience. Average number of implemented custom developed IT projects is 13.03 among survey participants and most frequently were represented project managers who had implemented 15 custom developed IT projects. In survey there was asked question about number of countries where projects have been implemented, average of participants is 2.75 and most frequently in survey participated managers who had implemented projects in 2 countries.

14 questions were about project sales process and project implementation process measures. Mean, median and standard deviation scores are represented in the Table 1.

Table 1

Summary of sales process and project implementation measures

Question Item	Mean	Median	Standard deviation
Sales Decisions			
Known industry	4.67*	5	0.47
New Industry	2.25	2	0.68
Known technology	4.25	4	0.60
New technology	2.36	2	0.71
Standard agreement	3.83	4	0.69
Custom agreement	2.19	2	0.66
Implementation process			
Information transferred	4.47	5	0.69
Information partly transferred	1.50	1	0.73
Precise planning	4.58	5	0.64
Overall planning	2.03	2	0.80
Implementation according the plan	4.25	4	0.68
Resources overspent during implementation	1.69	2	0.66
Customer satisfied	4.69	5	0.46
Customer unsatisfied	1.94	2	0.62

* Items were measured on a 5-point scale, where 1 – strongly unfavorable; 2 – unfavorable; 3 – neither unfavorable or favorable; 4 – favorable; 5 – very favorable.

In order to calculate distribution probabilities of responses, results were converted into z-scores of normal distribution and Chi-square goodness of fit tests (χ^2) run for all questions.

Discussion

Impact of Sales Process to Project Success

IT custom development project success or failure analysis usually focuses on project implementation process, during which actual work is done, like analysis, programming, testing etc. Sales process analyzed as whole without analysis of separate factors that exist in sales process as well.

During this research authors analyzed impact of sales process to overall project success. Taking in account that sales process is always before project implementation and sets its direction and overall boundaries (scope) of the project. For example, in this research authors analyzed 3 factors that most influence customer development IT project implementation process and those factors origins are in sales process. These factors are: industry where project will be implemented (e.g. manufacturing, finance, public sector etc.), technology that will be used for project implementation and legal conditions.

Industry knowledge means that company has previous experience in particular industry. It could be some specialization or some previous projects that are completed in industry where company currently selling project. Well known industry specifics helps reduce uncertainty in IT projects which is main reasons for failure mentioned in numerous researches.

Answers of respondent's shows that there is 46% (less than half) of probability that project in known industry will have very favorable and favorable impact on project success., see Illustration 1. This means that project managers don't think that previous experience with project in particular industry not significant factor for successful project. In opposite project managers rated possible failure of project with probability of 45% in case project will be in totally new industry. In worst case scenario impact is very high for projects in new industry.

Second factor is technology or technology components that will be used for project implementation. Respondents pointed out that in case if known technology will be used for project implementation then probability of project success is 55%. In this factor estimates we could find diversification. In worst case scenario possible negative impact is 42%. This factor valuated with largest impact on project success in sales process.

Best scenario			
Know industry	Know technology	Know legal conditions	Probability of success
46%	55%	48%	12%
Worst scenario			
New industry	New technology	New legal conditions	Probability of success
45%	42%	46%	9%

Figure 1. Probability of success according to sales process

Third factor that authors analyzed during survey is legal conditions. Influence of legal conditions is not just warranties and penalties. Authors discovered that legal conditions contains some of best practice of the project implementation. Legal condition structure represent formal thinking structure of the project in organization. Respondents marked this factor with similar impact as project industry. Therefore it marked as 48% probability of positive influence to the project. That is by 7% lower than technology positive impact.

Illustration 2shows that worst scenario factors are on similar level while success factors show differentiation. Technology is most significant factor with positive impact.

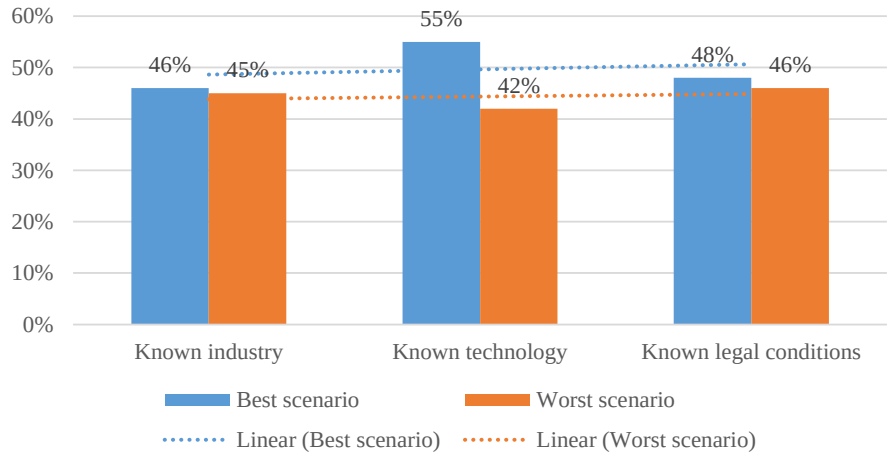

Figure 2. Influence of factors in sales process

Authors calculated best and worst scenario during sales process (see. Illustration 1). Calculation results shows that in best scenario when all positive factors present, probability of positive impact on project is **12%**. It calculated by multiplying probabilities of all factors. This result means that if project will be in known industry, with known technologies and known legal conditions then it will influence project successfully by probability of 12% that is quite low it could be explained by uncertainty level of the IT projects. Despite that in worst scenario there is only **9%** probability that project could be successful.

Impact of Implementation Process to Project Success

Well known theory of project management and best practice in the IT industry define main stages of the project e.g. initial analysis and information transfer, planning, implementation and deployment which results as client satisfaction. During each phase are created artifacts that will be used in next phase. For example during planning phase plans are created and architecture blueprints as well. Even proof of concept could be done during this phase. Influence of each phase significantly impacts next project phases.

Best scenario				
Information transferred	Precise planning	Implementation according resource plan	Client satisfied	Probability of success
62%	59%	59%	45%	10%
Worst scenario				
Information partly transferred	Overall planning	Resources spent more than planned	Client unsatisfied	Probability of success
63%	57%	59%	52%	11%

Figure 3. Probability of success according to implementation process

This research shows that project implementation starts with information transfer from previous process – sales. Impact of this factor is most significant due to larges difference between positive and negative output. Respondents pointed out that if information is incompletely transferred in worst scenario it will have very negative influence to whole project implementation. In this case there is 63% probability that with poorly transferred information project will fail, see illustration 4. Taking into account that it is first step of the overall project implementation impact to whole process is even greater. Even planning process and deployment not marked so high. Authors conclude that information transfer as most important factor in both sales and implementation processes. In custom developed IT projects where mainly software is created or implemented core process is implementation according resource plan, because this is most resource consuming process and if we look at project financial goals then this part make larges impact on project finance bottom line due to largest resource consumption proportion in whole project. Intuitively most resource consuming part must be most important influencer. But this research shows that management aspects as information transfer which will be used for planning and resource allocation is more important.

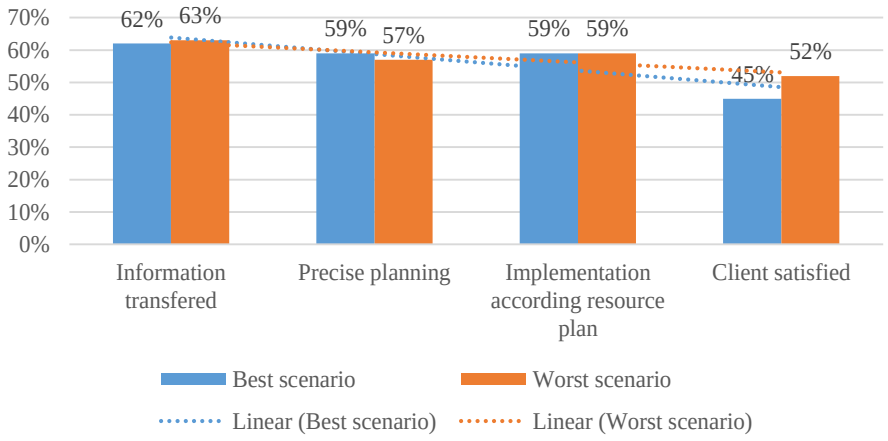

Figure 4. Influence of factors in the project implementation process

Comparing best and worst scenarios in the project implementation process we don't see any difference, see illustration 5. In best case scenario probability to finish project successfully is 1%. In worst case scenario probability is also 1%.

Best scenario		
Sales	Implementation	Probability of success
12%	10%	1%
Worst scenario		
Sales	Implementation	Probability of success
9%	11%	1%

Figure 5. Best and worst scenario comparison

Authors conclude that implementation process as core process for project implementation is more significant than sales process as impact to overall project success. But sales process is very significant and impact is huge to project success because it is at the project start.

Information Transfer between Sales and Implementation Processes

Most significant factor that influences overall project success is initial information transfer from sales process to implementation process. Respondents mostly pointed out it as most important and with most negative impact in case of poor information transfer. During sales process a lot of the project artifact created: proposal with initial analysis and solution architecture, contract with legal conditions. Despite existence of written information there are a lot of mutual agreements and assumptions from both client and developer side. Project manager receives from sales department written artifacts and start to understand and prepare for the project. There exists information asymmetry between sales team who knows much more than written in artifacts. And sales assume that risks will be identified and carried out by the project manager. This explains why respondents pointed out information transfer as factor with most negative influence.

Conclusions

1. This research shows that uncertainty in custom developed IT projects is very high and IT professionals rate factors with similar impact in worst case and best case. There almost no differentiation between worst and best cases. That's means there is no one or couple factors that carried out well in the project will guaranty project overall success. Project team must focus on all aspects of project during all project sales and implementation period.
2. As most significant factor out of research is information transfer from sales process to project implementation process. It is done with assumption that project manager typically starts his work after sales process is done. We could see that negative impact of poor information transfer is huge (63% probability that it will negatively influence project).
3. Calculating best and worst scenario for combination of both processes outcome is very interesting. In combination sales and implementation scenarios probability there no differentiation and probability of success or failure is 1%. Its again shows uncertainty level in IT project and project tend to be in middle not dramatically bad or dramatically successful.
4. Authors want to point out technology factor in sales process, which is rated with highest positive impact. Intuitively in sales process it is most non business factor. Because industry choice usually means specific business knowledge and legal conditions means risk management and finance competencies. That means technology factor in sales process is most important and directly influence implementation, because implementation will be done with choice technology on later project stage. Therefore it is necessary to involve technical people during sales process to assure that right technology offered to client.
5. Sales process itself is not most important and there is no huge differentiation between sales factors that means there is high level of uncertainty. Influence of sales process exposes in moment of information transfer between sales and the project implementation process. There is asymmetric information situation between sales team and project implementation team.

Impact of information transfer is even greater if there is small amount of formal artifacts that created during sales process (e.g. detailed proposal, blueprints, proof of concept etc.).

6. In Latvia IT projects are relatively small and therefore companies tries to keep sales process short and lean as possible.

Authors conclude that there is two ways how to avoid information asymmetry between project sales and implementation processes. First it is creation of detailed formal artifacts that could be used later on project start and later during project. This approach is quite costly and requires high level of standardization in sales process due to creation of formal artifacts. Second possible solution is participation of project manager during sales process. It is still costly activity and requires some additional skills to project manager and high level of mobility during sales process. Authors think that second scenario; participation of project manager in sales process significantly reduces information asymmetry and therefore leads to greater possibility of project success.

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SUCCESS AND FAILURE FACTORS IN GOVERNMENT TO GOVERNMENT ENVIRONMENT

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Keywords: G2G, Project management, e-governement

Abstract

With the development of the Internet and communication technologies, e-government has become an effective means of delivering government services. Due to that, government agencies and departments in same country or even from different countries interact with each other to provide services to one another, which form Government to Government (G2G) model. This collaboration among public organizations become more common and more complex than it was in the past. As a result to this complexity, many researches have been appeared to determine success and failure factors of G2G projects. This paper discover the project management challenges in e-environment and presents the success and failure factors of G2G depend upon G2G's case studies.

1. Introduction

Nowadays, information technologies are using in the public as well as private sectors. Governments and their agencies are starting to move from the traditional methods of services to electronic government services. Electronic government (E-government) is the using of information technologies by government departments and agencies to provide their information and services to citizens, businesses, government agencies, and other governments. Another definition defines the e-government as a technology to simplify and mechanize transactions between governments and constituents, businesses, or other governments [1]. Using the e-government increases the efficiency and effectiveness of government operations. In order to move to e-government, Governments modify their structures, architecture, and procedures of government agencies. For that, some developed countries proposed architecture for the e-government project. Standard and architecture for e-government applications (SAGA) published by Germany's Federal Government [2]. Federal Enterprise Architecture Framework (FEAF) issued by the Federal Chief Information Officers of the United States [3].

E-government mad several relationships between the government agencies and other entities. Figure 1 show the e-Government projects area [4].

There are three major types of e-government, Government to Citizen (G2C), Government to Business (G2B), and Government to Government (G2G) [5, 6].

a) G2C. In this type, the interaction is between government and citizens in order to provide services to the citizens such as social security administration and voting system [5].

b) G2B. In this type, the interaction is between government and the business community. G2B is essential for the economic development of the country. In this type, businesses deal with many online services from the government [5, 6].
c) G2G. In G2G, government agencies and departments from the same country or even from different countries interact with each other to provide services to one another. This kind of interaction allowed to utilization from the public resources by linking sites together, such that FirstGov.gov uses by U.S. to interlink government agencies [5, 6].

Many counters around the world have been move to e-Government. Table 1 shows the top 10 counters in terms of e-government [4].

Table 1

Top 10 countries in e-government development

Rank	Country	E-government development index value
1	Rep. of Korea	0.8785
2	US	0.8510
3	Canada	0.8448
4	UK	0.8147
5	Netherlands	0.8097
6	Norway	0.8020
7	Denmark	0.7872
8	Australia	0.7863
9	Spain	0.7516
10	France	0.7510

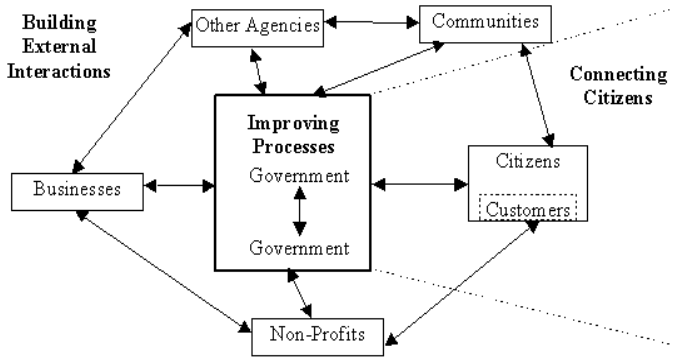

Figure 1. Areas of e-Government

This paper is organized as follows. In Section 2, we present G2G projects. Section 3, explains some case studies about the G2G. In section 4, we explain the project management in e-government environment. The relation between G2G and the project management is explained

in section 5. Section 5 explains challenges of G2G and the success and failure factors of G2G projects. Section 6 presents the conclusion.

2. Government to Government Projects

The globalization of the economy, and the development of the technology and of Unions, such as the European Union, the North American Free Trade Association (NAFTA), etc.), lead to collaboration among many public organizations from the same country or even from different countries [7]. In G2G model of e-government, government agencies from the same country or even from different countries interact with each other to provide services to one another. Each of these agencies has its own information and knowledge. This collaboration among public organizations become more common and much more complex than it was in the past. In many case, G2G can interact with citizens and businesses. In the next section, we are going to present several case studies for G2G projects.

3. Project Management in Government to Government Projects

We can realize that project management in the e-government (G2G, G2B, and G2C) has similarities with the private sector in many aspects like project management stages, processes, tools and technologies though; it has its own challenges [8]. These challenges led to failure of many e-government projects. Nevertheless, some past research argued that there are no real similarities between the e-government and private sector organizations in term of project management practices [8, 9]. Many project management models are suitable with G2G. The main purpose of project management body of knowledge (PMBOK) framework is to classify and define the best activities and practices to apply with any type of IT projects [8, 10].

Others research modified the project management frameworks and methodologies of the private sector to better manage the e-government environment [11, 12, 13]. Actually there are many differences between the public sector (e-government environment) and the private sectors, which effect the project management [8]:

a) Lack of adequate skills within the public sector;
b) Larger number of participants;
c) Routine processes of projects approval, reporting funds release, and monitoring;
d) More complex;
e) Goals not properly linked with organizational goals (i.e. national development).

Project management model, activities and tools of G2G has similarities with other e-government models G2B and G2C in many aspects, though; it has its own characteristics. In the next section, we are going to illustrate some of these characteristic through the different case studies.

4. Case Studies

In order to realize the main challenges, success and failure factor of G2G, we are going to investigate several real G2G projects and concentrate on the main challenges, success and failure factor.

1) A Management Information System and GIS to Support Local Government in Balochistan

   This project funded by United Nations Development Program (UNDP) and established to support decentralization in Balochistan region in Pakistan [15]. The aim of this project is to gather the data on distribution of public services with cities and village level, then process this data and used by government to make decision to help plan, manage and monitor public development activities. The main Stakeholders of this project are the project staff, the government decision makers who use the information from the system, community members, and UNDP. This project has been successful and the main successful factors ware:
   1) Funding of UNDP;
   2) Participation of the community;
   3) Use of GIS.

   The main Challenges of the system ware:
   1) Senior officials;
   2) Lack of infrastructure (IT skills and access in villages);
   3) Sustainability of the project in the Future.

2) E-Procurement by Mexico's Federal Government

   E-Procurement is a government procurement system, established by the Unit of Electronic Government Services within the Mexican Ministry of the Controllership and Administrative Development (MCAD) [15]. The main Stakeholders of this project are Federal Government agencies and organizations, MCAD, and the Ministry of Finance. E-Procurement has been successful and the main successful factors ware:
   1) Political support;
   2) The system introduced in a scaled manner, with continuous user training;
   3) Participation and negotiation of stakeholders.

   The main Challenges of the system ware:
   1) Cultural of using technology;
   2) Delay of Laws: need for new Laws and rules for the new forms of procurement;
   3) Shortages of resource.

3) Electronic Birth Registration Information System (BRIS)

   BRIS uses to register births electronically, providing a basic citizen identity, and building this with other data into a population database that can be shared with other public agencies [15]. The main Stakeholders of this project are government agencies for immigration, elections, education, statistics, and health services in Rajshahi City in Bengali. BRIS has been successful and the main successful factors ware:
   1) Involving and encouraging younger members;
   2) Motivate senior officials;
   3) Citizen participation.

   The main Challenges of the system ware:
   1) Corruption;
   2) Delays of the ordering the parts for the system;
   3) Lack of IT skills.

Table 2

Main success factors in G2G

Category	Factors
Project & Project Management	**Own a project management model** It is preferred that each government has its own project management model.
	Teams management issue Good team management lead to increase the success of the G2g projects, because the each team comes from different department or country, has its own function, and manager.
	Good management to the partnerships between public agencies.
	Good stakeholder relationship.
	Clear responsibilities must be defined.
	Good tracking, monitoring and control must use.
	Using an effective project management.
Government	**Motivate senior officials** Senior officials and the leaderships are the decision makers of any government, so they play important roles to establishing and success G2G projects [18].
	Funding Founding is the basis for establishing any projects.
	Political support Political support is an important issue in order to allocate resources for the G2G projects.
	Structure of the governmental agencies Agencies structure influences the success of G2G model, because it interactions among different levels within several public agencies.
	Participation of the stakeholders The participation of all stakeholders, departments, and agencies is one of the key success factors in G2G projects.
Technical	**Security** Security is the most important success factor, because the internet is a very important communication media between governmental departments and agencies [19].
	Software development methods To increase the percentage of success in IT project a good project management method should be conceder from the beginning [20].
	IT infrastructure The equipment, and people skills.
	IT Standard Each government must have its own standard.
People	**Training** G2G involves several public agencies, so continuous user training increase the Chance of G2G success.
	Skills.
	Cultural of using technology.

5. Success and Failure Factor of G2G

An extensive research have been done on e-government projects in developing/ transitional countries, and showed that 35% of e-government projects around the world can be categorized as total failures, 50% as partial failures, and only 15% as successful [16]. Failure means the project did not implement, meet its major goal, or neglected. Another study of a World Bank showed that the e-government projects in Least Developing Countries are either partial or total failures [17]. According to this study, the main factor of failures is the method of managing the project.

Many factors affect in the success or failure the G2G project. These factors relate to type of the project, project management activates, technical issue, people, or relate to government by itself. From the previous case studies, we can release several success and failure factors. Figure 2 illustrates the category of the success and failure factors.

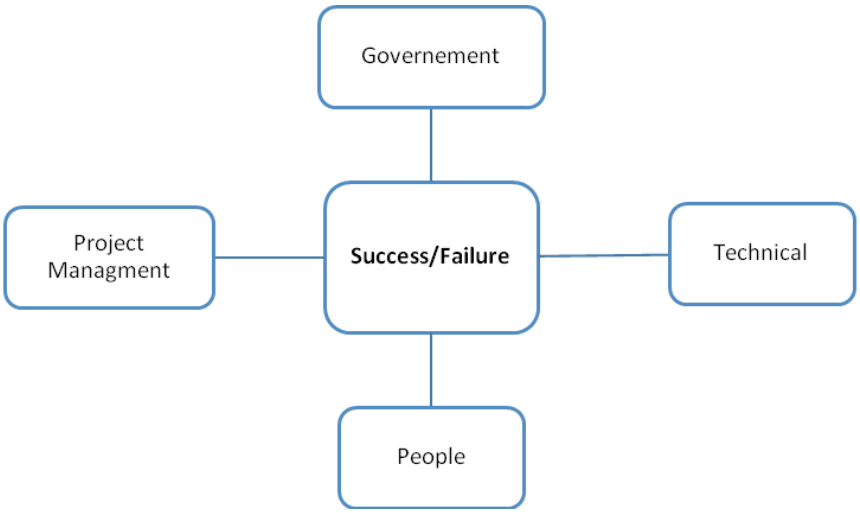

Figure 2. Category of the success and failure factors

Table 2 summarizes the main success factors in G2G projects. Table 3 summarizes the main failure factors in G2G projects.

Table 3

Main failure factors in G2G

Category	Factors
Project &Project Management	Lack of Project management model.
	Complexity of the projects.
	Shortages of resource.
	Shortage of communication.
	System integrity issues.
	Bad management to the partnerships between public agencies.
	Unclear responsibilities.
	Absent of monitoring and control.

Category	Factors
Government	Routine processes of projects approval, reporting funds release, and monitoring.
	Goals not properly linked with national development planning.
	Lake of Funding in the public sector.
	Structure of the governmental agencies is different from department to another.
	Larger number of participants.
	Corruption in the public sector.
	Delay of Laws: need for new Laws and rules for projects.
	Sustainability of the project in the Future.
Technical	Delays of the ordering the parts of the system.
	Lack of infrastructure in the public sector.
	Bad design for web page.
	Lack of IT skills.
People	Lack of Training within the public sector.
	Lack of adequate skills within the public sector
	Cultural of using technology

6. Conclusion

E-government generally becomes the appropriable means to delivering government services. G2G provides collaboration between agencies and countries. This collaboration of public organizations become more complex than it was in the past. Implementing and management such complex system is a big challenges.

Project management activities and tools of G2G have similarities with other e-government models G2B and G2C, but it has its own characteristics and challenges. Many factors affect in the success or failure the G2G project. The most effective factors relate to the project management and government by itself.

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EX ANTE EVALUATION OF EFFECTIVENESS IN IS/ICT PROJECT

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Keywords: IS/ICT project, economic evaluation, data warehouse, net present value, Technology Scorecards

Abstract

The paper deals with the basic methods of economic evaluation of information systems and information and communication technologies (IS/ICT). Although the standard project methodology doesn´t include an ex ante evaluation of effectiveness, there is considerable demand for it and this type of analysis is included in feasibility studies. The paper summarizes main methods of evaluation of IS/ICT effectiveness, especially focuses on the economic ones. Linking between standard project methodology and ex ante evaluation of effectiveness is made in the paper. The Technology Scorecards methodology is also discussed as one possible evaluation method. The application of ex ante evaluation on the real project of data warehouse is presented at the end of the paper.

Introduction

The purpose of this paper is to put forward concisely basic methods of economic evaluation of information systems and information and communication technologies (IS/ICT) and also to introduce Technology Scorecards methodology as one possibility of tuning of investment into IS/ICT and performance of the business. The real project of data warehouse will be presented.

List of the basic methods of evaluation of the impact of IS / ICT on business performance will be presented at first, than there is shortly defined data warehouse (for better understanding). The second part of the paper is commented case study of real data warehouse project ex ante evaluation of effectiveness.

Evaluation of the IS/ICT Impact on Business Performance

We can divide the evaluation methods of the IS/ICT impact on business performance (namely financial part of business performance) into:

- Financial methods;
- Measurable non-financial methods;
- Soft methods.[1]

[1] More detailed information can be found in : MOLNÁR, Z. *Efektivnost informačních systémů*. Praha: Grada 2001. ROULSTONE, D. B. – PHILLIPS, J.J. *ROI for Technology Projects*. Burlington: Butterworth-Heinemann 2008.

Most used financial methods are:

- Payback;
- Net present value;
- Cost-benefit ratio;
- Profitability index;
- Internal rate of return.

Most used measurable non-financial methods are:

- Reduction of development time and production time;
- Reduction of number of complains;
- Increase of number of customers;
- Increase in market share;
- Reduction of downtime of production equipment.

Soft methods of evaluations are:

- Improvement of business reputation;
- Improvement of customers satisfaction;
- Increase in customers loyalty.

Further in this paper we will focus on specific application of financial ex ante evaluation methods, namely net present value (NPV), internal rate of return (IRR) and payback. Because of case project of data warehouse we will define the data warehouse.

Data Warehouse and Its Benefits

W. H. Inmon in his well-known definition determines data warehouse as a subject oriented, nonvolatile, integrated, time variant collection of data designed to support management's decisions. Data warehouse can be seen also as a type of software architecture used for easier and faster data analysis, report production, deviation observation (sledování odchylek), historical analysis etc. All this is made with tools for data collection from heterogeneous sources. These tools further clean, integrate and consequently aggregate data into multidimensional structures.

Important data warehouse properties are:

- Subject orientation – data recording is made according to subject focus regardless source application;
- Integration – each entry is saved in the data warehouse only once so all users use same data;
- Time variant – differently form operational software application data warehouse involves also historical data so there is possibility to analyze also historical development;
- Non-volatility – data in data warehouse are not overwritten, only added.

The use of data warehouse helps to business analysis and is underlying tool for management decision making.

Ex Ante Evaluation of Effectiveness of Real Project

A few years ago a team form Collage of Polytechnics Jihlava worked on feasibility study for project of data warehouse for a higher territorial and administrative unit of the Czech Republic. The aim of the project was to expand informational tools of this territorial unit, namely to help to particular municipalities, organizations and citizens to get needed information. The budget of this project was 8 000 000 Czech crowns (approx. € 400 000).

Particular aim was also centralization of multidimensional database of all relevant data from public sector on territorial level. One part of project activities was training of the users of whole system.

Particular data warehouse contains these data marts: endowment fund, income and expenses, balance-sheet, communications, transport services, metadata system, statistics, school institutions, public contracts, tourism etc.

Feasibility study deals mainly with technical details of project and its budget. Special part was focused on future operation of data warehouse, its costs and benefits. Because of relatively high risk three possible scenarios of result benefits were considered: pessimist scenario = saving of one work position, middle scenario = saving of 3 work positions; optimistic scenario = saving of 5 work positions. Results of effectiveness evaluation are presented in this chart:

Index	Pessimistic scenario	Middle scenario	Optimistic scenario
Net present value	-1 065 810 CZK	2 480 141 CZK	6 026 091 CZK
Internal rate of return	0.79% p.a.	14.7% p.a.	28.8% p.a.
Payback	15.5 years	5.2 years	3.1 years

Ex ante analysis of effectiveness proofed positive effect for the investor in middle and optimistic scenario. There is need of fulfilling data warehouse analytical services' potential for direct financial positive effect, i.e. to achieve middle or optimistic scenario. So the impact of this data warehouse investment in mainly in managerial level of work place and work load optimization.

Technology Scorecards

From the presented case of the real project we can generalize requirement for need not only of evaluation (ex ante and also ex post) of the effectiveness of IS/ICT projects, but also of methodical management of the whole of the implementation process and subsequent operation. One of the useful methodologies for that is Sam Bansal's Technology Scorecards. This methodology is focused on tuning IS/ICT investment with business performance.
Particular parts of Technology Scorecards are:

Strategy

- Enterprise strategy;
- KPI – key performance indicators;
- Benchmarking;
- Value/Benefits estimating;
- Business process reengineering.

Realization phase
- Solution architecting;
- Gap analysis (gap between business requirements and IS/ICT functionality);
- Roll-Out Planning;
- Configuration planning.

Human factors
- Project management;
- Project champions (key personalities);
- Business case development.

Umbrella considerations
- Change management;
- Implementation time risk analysis and mitigation of risk in enterprise systems;
- Quality management;
- Communications management;
- Test plan and test procedures;
- Training.

Performance management

Technology Scorecards is built on other well-known methodologies (namely Balanced Scorecards), but its specification is the aiming to IS/ICT investment. Technology Scorecards is a suitable guide for managing of IS/ICT investment effectiveness.

Conclusion

The purpose of this paper was to put forward concisely basic methods of economic evaluation of information systems and information and communication technologies (IS/ICT) and to show results of real IS/ICT project evaluation. We can conclude that IS/ICT investment effectiveness is dependent mainly on users level (using or not using potential of IS/ICT) and on managerial tuning of whole organization. So there is direct linking with human capital. Suitable methodology can strengthen this linking. From this point of view The Technology Scorecards methodology is fully usable for IS/ICT projects.

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TAXES IN PROJECTS FOR THE CHOICE OF INDUSTRIAL LOCATION

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Keywords: project management, industrial location, income taxes, tax rate, site-related factors, net present value

Abstract

The decision for the location of an industrial investment is very important for a company as it cannot be corrected in short term. The economic evaluation of such a project or business case mostly is calculated by the net present value method. The net present value method in general compares the cash flows of the planned investment with the cash flows of a comparable financial investment. The method is explained and tax-effects are integrated in the calculation. It is shown that this method results in the same recommendation if the taxes paid on the growth-project and paid on the alternative financial investment do not differ. Afterwards it is investigated how to achieve tax-advantages by moving business to another location. Due to these tax advantages the profitability of the growth-project can be increased so that within the project management the tax-discussion has a main influence on the decision taking tools and the decision itself. Because of the financial impact it has to be included in the business case of the project. Alternatives have to be calculated from the point of view of headquarters with their shareholders and local taxes. The authors combine their expertise in project management and taxation in an effort to improve the analytical research frameworks for investment project management. The impact of the taxation is investigated and it is discussed to which extent companies can achieve a tax optimized project decision.

1. Introduction

Almost every company has the strategy to grow. Growth can be achieved in different ways: building up something new, buying an existing company or organic growth are just the most common ways to extend the business. As building up a new entity or business is unique and of high importance to each company the toolbox of project management is recommended to be used [1, p. 4].

Projects which deal with the build-up of a new factory, branch, subsidiary or sales department within the nation of the mother company or even abroad carefully have to take into consideration all site-related factors. In both cases (national or international growth) the project management has to consider various economic aspects like the labour market (quality, quantity and salary level), the infrastructure of traffic (highway, airport or harbour) or the nearness to natural resources or key markets [2, p. 2/11/80].

Beside these traditional site-related factors the taxes become more and more important for the final decision where to g(r)o(w). The taxes play a bigger and bigger role while the world

grows together. Logistics, IT- and Telecommunication-Technology allow spreading the locations of a company all around the world and they still can be reached and steered by headquarters. To pay attention to taxes brings competitive advantage.

2. Decision Taking – the Tool of Net Present Value

In huge and well-structured companies no project decision is done without taking various viewpoints with regards to the project. In the initiation phase of a growth-project there are various alternatives to be evaluated in a short time so they are done just roughly and quickly. But without carefully analysing legal aspects, the technical implications or the new market the phase of planning the project will not be finished and no step to the future will be done. The most important viewpoint where at the end all dimensions have to be merged is the economical evaluation. The companies use the technique of the Net Present Value Method (NPV) to take an economic picture of the project [3, p. 33] and they call it normally Business Case (BC) [1, p. 46]. All influences on the flow of cash will be analysed (How much we have to invest to grow? How huge will be the additional revenue of the project in every year from now on? What about inflation? How big are the running costs for every year in the future? Exchange rates?).

The core of the NPV method is that the cash flows at different times have different values [3, p. 9]. Cash flows at different times cannot be compared directly – with the help of the NPV method all cash flows of an investment can be converted to a set time "t" and then the values can be compared and even added. Normally, this specific time is "The Today" with t = 0 in order to provide the decision-makers an indicator for the decision as simple, current and realistic as possible. The formula for calculating the net present value (NPV) is generally as follows [3, p. 13]:

$$NPV = \sum_{t=0}^{N} \frac{C_t}{(1+r)^t}$$

The Cash of each period (C_t) is discounted with the interest rate "r" as an opportunity interest rate of the company. These values (all are now in the time "0") can be added.

The following figure illustrates this method.

Year	t=0	t=1	t=2	…	t=N-2	t=N-1	t=N
Discounting Factor	$\frac{1}{(1+r)^0}$	$\frac{1}{(1+r)^1}$	$\frac{1}{(1+r)^2}$	…	$\frac{1}{(1+r)^{N-2}}$	$\frac{1}{(1+r)^{N-1}}$	$\frac{1}{(1+r)^N}$
Cash	C_0	C_1	C_2	…	C_{N-2}	C_{N-1}	C_N
$NPV = \sum_{t=0}^{N} \frac{C_t}{(1+r)^t}$							

Figure 1. Discounting methodology. [4, p. 3]

If the NPV is greater than zero, the project is positive – it should be performed. The returns from this growth investment are higher than a comparable investment in the capital market. If the NPV = 0, the investment is as good as a comparable investment in the financial market. If the NPV is less than zero the investment should be discarded because they can better invest the money on the financial markets.

3. NPV and the Influence of Taxes

Chapter 2 describes the way how to take a project decision based on the NPV method in general. The taxes still have not been taken into consideration. If we assume in the first step, that the tax-rate "s" is constant, will be applied for both (Profits on the investment and profit from the financial market) and losses will cause a pay-back from the tax office we can distinguish two effects caused by the taxes within the model of NPV. In the described first phase to create a BC (calculating all cash flows of the project and allocate them to the years of the project duration) the taxes have to be calculated because they are cash flows as well (paid to the financial offices – in case of losses received). The profits have to be calculated and the taxes on these profits will be the results. The taxes normally reduce the volume of the cash flows of every year (volume-effect). Furthermore taxes have also an impact on "r" because if the company would invest not in the growth-project but on the financial market it would have to pay taxes on the interests gained there. So "r" should be reduced as well by the tax influence. This interest-effect can be calculated as $r_s = r\ (1\text{-}s)$ [5, p. 28]. The result of introducing taxes into the NPV-method is a reduced volume (negative influence on the NPV) and a reduced "r_s" (positive influence on the NPV). The formula then looks like this [5, p. 32]:

$$NPV_s = \sum_{t=0}^{N} \frac{(C-S)_t}{(1+r_s)^t}$$

If the taxes reduce the Cash flow in every period in the same way or relation like the taxes reduce "r" in every period the taxes can be ignored in the decision making process [5, p. 26]. This is valid, if investments are not depreciated but immediately incorporated in the tax calculation (immediate write-off). The more realistic assumption is to include depreciation for investments – for example for 10 years (the duration of the usage of the investment). Then the decision based on NPV might differ [5, p. 25] but the changes in the BC are small. The author accompanied various BCs and even if the depreciation differed from the immediate write-off (more realistic!) the recommendation for a decision based on a NPV calculation with or without taxes was in all observed cases the same. So in general it can be said that the effect of taxes on the NPV-method is visible but if the taxes paid based on the growth-project and the alternative investment in the financial market are on the same level, the recommendation for this or that alternative does not differ [6, p. 131].

This looks different, if we take different tax rates for the volume-effect and the interest-effect into consideration. Financing the company seat means normally paying taxes in the country of headquarters. If we invest/grow in our country normally we have to pay the same tax rate. Even this can differ, if – like in Germany – local taxes are collected on different levels. If we can reduce the taxes in the cash flow view (volume-effect) by moving business to

countries with lower tax rates, we can achieve advantages in relation to tax-payments in our country [7, p. 206].

How to achieve these advantages in the site- related factors is the subject of the next chapters. Besides achieving lower tax-payments it is important to analyse how to achieve the approval of the lower tax-payments in the moment of sending dividends to headquarters.

4. National and International Differences in the Kind and Level of Taxes

As described in chapter 3 the taxes on the interest are paid in the country of headquarters and stay unchanged in a NPV calculation (interest-effect). Against it the investment in a new factory or subsidiary can be more profitable if the company reduces the taxes in the cash flow by choosing a location (municipality or country) that charges lower income taxes than the location of headquarters (volume-effect). The authors investigate an investment project in a new 100% owned subsidiary of a parent company (headquarters) that is seated in Germany. As usual in multinational companies the legal form of both the investing parent company and the new subsidiary is a corporation.

The research of the authors firstly compares national investments in German subsidiaries in the cities Heidelberg and Schönefeld. These two locations are chosen as the municipal rate of Heidelberg at 400% is a German average rate whereas the municipal rate of Schönefeld at 200% is the lowest rate in Germany. The municipal rate is part of the local business tax rate. Secondly, international investments in Germany and Latvia are compared. The following figure illustrates the research.

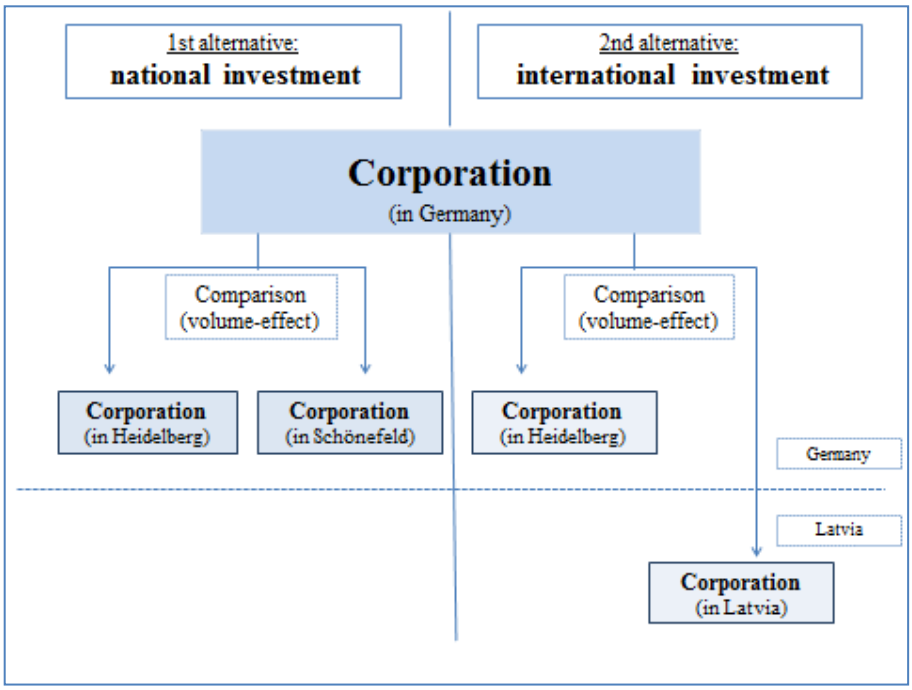

Figure 2. Description of the research

Even in the case of building up a new corporation **within Germany** there can be huge differences in taxes because of the described deviating municipal rate and therefore deviating local business taxes. In Germany corporations have to pay corporate income tax (15% of the taxable income according to § 23 Corporate Income Tax Act), solidarity surcharge (5.5% of corporate income tax according to § 4 Solidarity Surcharge Act) and local business tax (7% – approx. 17.5% of trading profit). The latter tax-rate depends on the municipal rate of the municipality, e.g. 400% in Heidelberg so that the tax burden of local business tax is 14% (= 3.5% x 400%) [8, p. 316, 349]. The foundation of a new subsidiary in Heidelberg is compared with a subsidiary in Schönefeld. Assuming a taxable profit of 1 million Euro in each case the following figures are calculated.

Table 1

Taxation of German subsidiaries in Heidelberg and Schönefeld

Subsidiary in	Heidelberg	Schönefeld
Levy rate	400%	200%
Profit before tax	1,000,000 €	1,000,000 €
– 15% corporate income tax	150,000 €	150,000 €
– 5.5% surplus tax	8,250 €	8,250 €
– trade income tax (levy rate x 3.5%)	140,000 €	70,000 €
Profit after tax	**701,750 €**	**771,750** €

Because of the deviating local trade tax the investment in Schönefeld is taxed lower than an investment in Heidelberg. This tax advantage increases in every observed and relevant year of the Business Case the cash and consequently the NPV (positive volume effect) and makes it more likely to go for this investment in a lower-tax-region.

In the case of an **investment abroad** different national tax rates can be used to reduce the income taxes of the project (ceteris paribus). A multinational company has to deal with national differences regarding the tax base and the tax-rate. "Business goes global, taxes stay local" [9, p. 9]. Based on the sovereignty principle each country is allowed to levy taxes autonomously [10, p. 3, 8]. Because of the globalization of markets the European Union tries to harmonize the taxation of income. However, such a harmonization would lead to an abandonment of the sovereignty principle so that a successful realization is not probable [11, p. 2581]. At the moment the income tax rates on taxable corporate profits (including corporate income tax and local income taxes) in the European Union and other selected industrial countries (USA, Canada, Japan, Switzerland and Norway) vary between 10% (Bulgaria and Cyprus) and 39.62% (USA, State New York) [12, p. 20].

Consequently, the income tax rates in Germany and Latvia – our chosen example – can differ. As a new subsidiary is a separate legal entity with management or place of residency in Germany or Latvia it has to pay taxes on its worldwide taxable income in the country concerned ("resident taxation"). Again the authors assume a profit before taxes of 1 million Euros. Assuming a local levy rate of 400% – as in Heidelberg – the average tax rate on the profit of corporations in Germany is 29.83% whereas the corresponding tax rate in Latvia is almost 15%

[12, p. 20]. The calculation of the tax burden and the resulting profit after taxes is compiled in the following table.

Table 2

Taxation of subsidiaries in Germany and Latvia

Subsidiary in	Germany	Latvia
Income tax rate for corporations	**29.89%**	**15%**
Profit before tax	1,000,000 €	1,000,000 €
– income taxes	298,300 €	150,000 €
Profit after tax	**701,700 €**	**850,000** €

Because of the deviating income tax rates of both countries the investment in Latvia is taxed lower than an investment in Germany. This tax advantage again increases in every observed and relevant year of the Business Case the cash and consequently the NPV (positive volume effect) and makes it more likely to go for this investment in a lower-tax-region.

5. How to use local Tax Differences in the Headquarters/Site of a Company

In chapter 4 the authors explain the tax advantages of investment projects in different industrial locations with respect to the taxes levied on the profit of the new subsidiary ("resident taxation" in the country concerned). In the next step the calculated profit after tax of the subsidiary should be distributed to headquarters (parent company). This dividend again can cause taxes both at the level of the subsidiary (withholding tax) and at the level of the headquarters [10, p. 8]. Calculating the tax burden of a group means to calculate the sum of taxes at headquarters (shareholder) and the subsidiary.

Concerning the investment in a **subsidiary in Germany** (Heidelberg or Schönefeld) there are no differences regarding the taxation. According to § 8b German Corporate Income Tax Act the dividend received by the parent company is tax-free in Germany (only 5% of the dividend are treated as non-deductible expenses and therefore lead to taxable income). The subsidiary has to retain 25% German withholding tax that can be charged by the parent company completely [20, p. 244] so that finally it does not influence the tax burden of the group. Moreover, headquarters have to pay local business tax on the dividend. In all, the consideration of the whole tax-effects on the dividends strengthens the observed and described tax advantage of the investment and the increase of the NPV (positive volume effect) in the lower-taxed municipality Schönefeld.

Concerning the **investment in a Latvian subsidiary** German and Latvian tax rules have to be observed. As in general both countries are allowed to tax the dividend, on April 6th, 1998 Germany and Latvia concluded a Double Taxation Agreement (DTA) in order to avoid a double taxation. According to this DTA (Article 10 and Article 23) [14, p. 336, 342-343] and according to German tax law the dividend is treated as tax-free (exempt the described 5% non-deductible expenses of the dividend) [13, p. 244].

Additionally, the DTA allows Latvia to impose a withholding tax on the dividends at the maximum amount of 5% of the gross amount of the dividend [14, p. 336]. In order to avoid a

multiple taxation of dividends within groups in the European Union the "Parent Subsidiary Directive" abolishes withholding taxes on dividend payments between group companies residing in different EU member states if the parent company holds 10% or more of the shares of the subsidiary [15, p. 345/10]. As in our case the headquarters hold 100% of the shares no withholding tax has to be paid in Latvia.

Consequently, only headquarters have to pay taxes on the dividend. Again the tax-effect on the dividend strengthens the observed and described tax advantage of the investment and the increase of the NPV (positive volume effect) in the lower-taxed country Latvia.

Conclusions

The combination of the theory of project management (decision taking) and the theory of taxes (locally differentiated tax burden) shows, how taxes can influence site-related project decisions. It was shown that within a country (the example Germany was used) a right chosen site can increase the profits after tax ceteris paribus by +10% in this example. As an international example Germany and Latvia were compared and an investment in Latvia brings ceteris paribus 21% more profit after tax than in Germany. The use of large differences regarding the tax-rates in different regions will increase the cash and consequently the NPV of the project (positive volume effect).

Project decisions are based on various factors like the individual interests of stakeholders but the financial aspect is always leading. In a time of better understanding each other internationally via the English language, IT and telecommunication and easier traveling, nonfinancial arguments of stakeholders against a foreign investment become less relevant. Finally, the existing tax differences between countries become more and more important in the allocation of capital to invest.

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IT SOFTWARE PROJECT IMPLEMENTATION FROM SUPPLIER AND CLIENT PERSPECTIVE

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Keywords: IT project implementation; Agile; Sure Step; Dynamics Ax project; Stevedore business

Abstract

Increased globalization, innovative new technologies and changing economy increased competition among the Stevedore companies in Baltic region, resulted in looking at opportunities to reduce operational costs and increase business efficiency. As organizations seek to improve their internal business processes, many of them have learned that process improvement is most efficiently done through the use of modern Enterprise Resource Planning system along with project management techniques. Business process improvements and company-wide business process integration efforts are effective ways to make a company more efficient by removing ineffective processes and eliminating redundancy.

Paper presents and analyzes a case study – ERP software project implementation at Riga Free port leading Stevedore Company from supplier and client perspective. Successfully implemented software would allow Company to eliminate redundancy and increase efficiency in real time planning, thus reducing time consumption in number of business process. Authors analyze and discuss project implementation process problems – supplier selection, project management, planning, monitoring and control – from client and supplier point of view Microsoft Dynamics Sure Step methodology was used for project implementation, what combines project management disciplines and real-world-tested best practice. Agile development life cycle was considered as the most appropriate because of frequent changes in requirements after project start and dispersed end-users involved.

Conclusions are based on the analysis results, which indicate that for more effective project implementation following problems were necessary to solve: week problem cause analysis, incomplete project risk analysis, number of various end-users – stakeholders involved, role definition for project team and project planning (use of network techniques). Additionally

authors provide suggestions to improve similar IT project management. The methods of the research are logical and comparative analysis, case study and expert method.

Introduction

In the current conditions of competition, the main success factors for small Stevedore companies are flexibility and real time planning. Increased globalization, innovative new technologies and changing economy increased competition among the Stevedore companies in the Baltic region, resulted in looking at opportunities to reduce operational costs and increase business efficiency. To provide competitive stevedore services Company should ensure management for different resources – railway infrastructure, port facilities, employees, auto-transport, and machinery.

ERP is a system for the seamless integration of all the information flowing through the company such as finances, accounting, human resources, supply chain, customer information and production. The implementation of an ERP system provides immediate and precise information for the managers and reduces costs in many areas within the corporation. ERP system can maximize business management by substantially shortening time and distance. Business process improvements and company-wide business process integration efforts are effective ways to make a company more efficient by removing ineffective processes and eliminating redundancy [1].

There is number of factors that affect successful IT project implementation. There are many cases of successful and unsuccessful implementations. The main reason for failure is associated with a management of the implementation process. Paper presents case study – ERP software project implementation at Riga Free port leading Stevedore Company. Company had already implemented ERP system – Dynamics Ax for finances, accounting, payroll and accounts payable/receivable. Given project aim was to implement a Company production process on existing ERP system. Company used several systems before the project was started; some of them were developed internally by the Company. These systems were difficult to maintain and develop, and they didn't provide consistent and accessible data that was required for online decision-making and management. Some of the business processes were implemented only on paper. Work in Company was functionally oriented, and each department worked separately from each other. Production business process implementation in ERP should allow controlling all resources in one system, monitoring current situation and provide necessary data for decision-making.

Project Initiation and Planning

Project supplier selection

The first project phase consisted of project supplier selection. There are several Microsoft Certified partners in the market which can provide Dynamics Ax project implementation. To find out the best supplier for the given project implementation Company created checklist to evaluate the supplier's suitability.

The main aspects that were considered for supplier selection:

1) Supplier's employee count and qualification;

2) Project realization terms;
3) Project implementation methodology;
4) Totals costs;
5) Project documentation quality;
6) Other customer references;
7) Corporation with the supplier so far.

Requests for quotation were sent to 3 different suppliers, onsite interviews were conducted and client references gathered. Onsite meetings with all suppliers' clients were performed and evaluated. All received data were grouped; see Table 1, Supplier checklist.

Table 1

Supplier checklist

Criteria\Company	A	B	C
Employee count, qualification for the project	8	7	4
Implementation time (months)	9	11-12	10
Analysis	500	400	250
Design	360	450	300
Development	450	500	600
Deployment	260	200	200
Operation	160	250	200
User manuals	180	250	130
Total hours	**1 910**	**2 050**	**1 680**
Implementation methodology	**MS Dynamics Sure Step**		
Total costs	**133 700**	**153 750**	**117 600**

Source: Stevedore Company unpublished data, compiled by authors

Based on Suppliers checklist data and supplier clients' references Table of scores was created in order to evaluate every supplier. Scale from 0 to 5 was chosen, were 0 stands for minimal score and 5 for maximal, see Table 2, Table of scores.

Table 2

Table of scores

Score (0-5) \ Company	A	B	C
Project costs	5	3	4
Implementation time	4	4	3
Customer references	5	4	4
Company competence (qualified employee count)	3	5	3
Cooperation with supplier so far	3	0	4
Implementation methodology (Waterfall (3), Agile(5))	4	3	3
Total score:	**24**	**19**	**21**

Source: Stevedore Company unpublished data, compiled by authors

The board of Stevedore Company made an evaluation and based on Table of scores winner company was selected. Company A was chosen.

Project management methodology and techniques

Microsoft Dynamics Sure Step methodology was used for project implementation – it combines project management disciplines and real-world-tested best practice. Microsoft Dynamics Sure Step is a comprehensive implementation methodology [2]. It provides prescriptive guidance, project management strategies, tools, and templates that Microsoft partners can use to implement Microsoft Dynamics products for their customers [2]. Microsoft Dynamics Sure Step offers five project types – Standard, Enterprise, Rapid, Agile and Upgrade [2]. For the given Project, Agile development life cycle was considered as the most appropriate because of frequent changes in requirements after project start and dispersed end-users involved [3].

Given project had fixed price budget that made it risky from supplier point of view. The main problem in this project type is constrained by the iron triangle, where are three critical factors: schedule, budget and scope, see Figure 1, The Iron Triangle. For successful project management supplier should be able to manage the project so that the expected results are produced while managing time and cost.

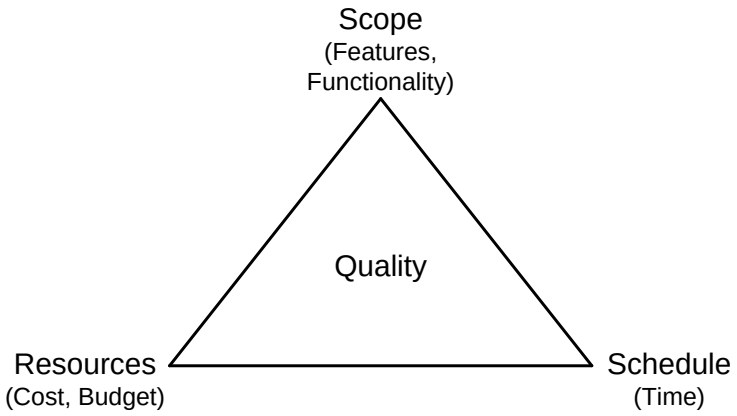

Figure 1. The Iron Triangle

Source: Scott W. Ambler, Mark Lines: *Disciplined Agile Delivery (DAD): A Practitioner's Guide to Agile Software Delivery in the Enterprise*, IBM Press, ISBN: 0132810131)

To reduce the risk to fail fixed price agile project type supplier intended to make more precise documentation in the Analysis phase that Sure Step Agile methodology provides. Instead of Solution Backlog Functional Requirement Document was made, where project scope was defined and conceptual model described. Detail requirement list was left to Analysis phase.

Project planning

Project was divided into 6 project phases and 4 stages by business functionality. Project phases were: Analysis, Design, Development, Deployment, Operation and User manuals. As the project was implemented with agile methodology, then Design, Development and Deployment phases were implemented together on each sprint cycle. Three project plans were created before project start – by costs (hours), resources and time.

Project cost plan was created for project budget control, where work hours necessary at each stage on each phase were specified, what helped to define project scope in Analysis phase, see Table 3, Project plan – costs.

Table 3

Project plan – costs

Stage/ phase	Analysis	Design	Development	Deployment	Operation	User manuals
1. Resource planning	180	100	150	80	40	60
2. Calendar info	160	80	100	60	40	40
3. Services management	160	80	100	60	40	40
4. Inflow information management	160	100	100	60	40	40
Total (hours)	**500**	**360**	**450**	**260**	**160**	**180**
Total (EUR)	**35 000**	**25 200**	**31 500**	**18 200**	**11 200**	**12 600**
					Total(EUR)	**133 700**

Source: Supplier Company unpublished data, compiled by authors

In the project resource plan the number and type of people needed to carry out the project was specified. Supplier identified resources by the name and the role. It allowed identifying the amount of resource required per project activity. Resource plan summarizes the level of resources needed to complete a project and allows ensuring that all needed resources are identified and provided by the supplier, see Table 4, Project plan – resources.

Table 4

Project plan – resources

Stage/ phase	Analysis	Design	Development	Deployment	Operation	User manuals
Project manager	150	40	40	40	40	20
Project architect		200	100	40		
Senior programmer		60	110	60	20	
Consultant	175	60		40	20	80
Consultant	175				40	80
Programmer			100	40	20	
Programmer			100	40	20	
Total (hours)	**500**	**360**	**450**	**260**	**160**	**180**

Source: Supplier Company unpublished data, compiled by authors

Finally project timeline graph was created. Project timeline consists of stages and phases by months. Project timeline allowed ensuring that project is running according to schedule; see Table 5, Project timeline.

Table 5

Project timeline

Stage/Phase	January	February	March	April	May	June	July	August	September
1. Resource planning	Analysis	Analysis	Analysis	Design	Design	Develop	Develop	User manuals	Deploy
2. Calendar info	Analysis	Analysis	Design	Design	Develop	Develop	User manuals	Deploy	Deploy
3. Services management			Analysis	Analysis	Design	Design	Develop	User manuals	Deploy
4. Inflow information management		Analysis	Analysis	Analysis	Design	Design	Develop	User manuals	Deploy

Source: Supplier Company unpublished data, compiled by authors

Project organization and Steering Committee

Given project had functional organizational structure with weak matrix elements. On the top of the structure were clients' Board and several key users – clients' department managers and key executives. Client and supplier project managers had limited authority, see Figure 1, Project organizational structure.

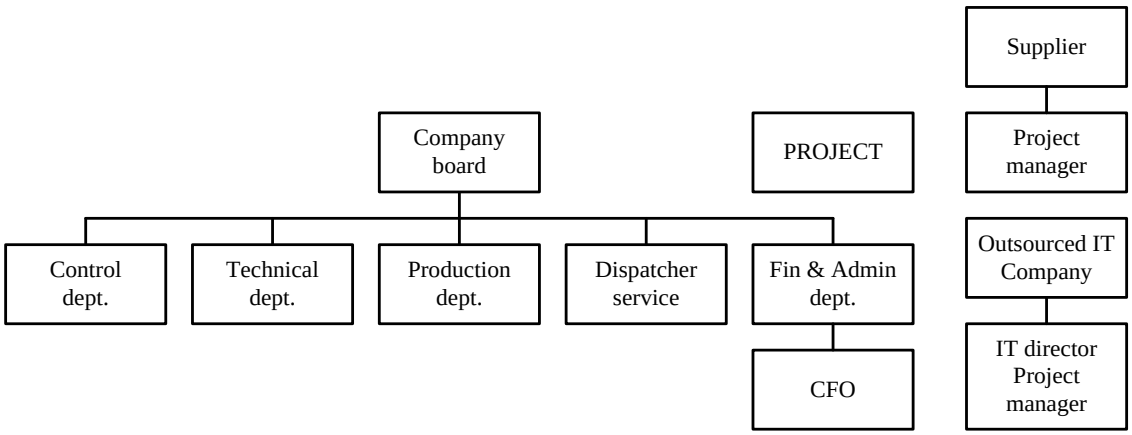

Figure 2. Project organizational structure

Source: compiled by authors

Steering committee was formed to administer and control the project. For the given project, Steering committee consisted of client Chairman of the Board, Board member, Chief Financial Officer and supplier Chief Executive Officer. Steering Committee meetings were scheduled once a month. Steering Committee meeting agenda included:

- Review the status of action items from the previous meeting;
- Activities done in the period;
- Fact vs. plan;
- Delays;
- Issues;
- Risks identified.

Supplier project manager created Project Status Reports every second week and informed Steering Committee about the current situation in the project.

Project implementation covered many different departments and types of users, which all had associated risks. All risks identified were described in weekly status reports, and Steering Committee was informed about them monthly.

Project Management and Execution during the Analysis Phase

Project was started with Kick Of meeting to define an overview of the project vision, scope, objectives, and benefits. Analysis phase existing and planned business processes and procedures of the client were thoroughly analyzed.

During Analysis phase, activities were done to gather and document customer's business requirements. For each project stage, customer defined several key users responsible for certain business process. There were 14 interviews with the key users to define a list of requirements for particular business process. On each interview supplier consulting team met clients' department managers and key executives one by one in separate sessions to create detailed information about current processes and their future expectations.

After each interview, a meeting protocol was created and sent to employees involved. In the last section of the interview protocol was used to record most important needs and problems covered in the interview. [5] Requirements were documented in the Functional Requirements Document (called Solution Backlog in Sure Step methodology). This document reflected the information gained in the Analysis phase and stated the detailed requirements. On the Analysis Phase several documents were created – Solution Overview, Functional Requirement Document and interview protocols.

During Analysis Phase, several problems and risks were identified. At the beginning of the project, there was identified a weak project manager work on the customer site. Supplier had to analyze and discover all processes by itself with key users. From another side – as users don't have an experience in IT projects and also in creating a requirement lists they were capable of telling only a part of all necessary business requirements without specifying details. Users also didn't take seriously first phases – they didn't make any comments on meeting protocols sent after interviews. Even when Requirement Document was created only few of the clients' department managers made comments and asked for modifications in the requirement list.

Project Monitoring during the Design, Development, and Deployment Phases

On the Design Phase, supplier made initial definition how to implement the business requirements. The phase included configuration of the overall Microsoft Dynamics solution and the design of specific customizations that were necessary to satisfy business requirements identified during the Analysis phase. Since the project was implemented with Agile approach there was no Solution Design Document. When initial project design was made supplier built system components that were defined and approved in the design specifications, including developing the customizations, integrations and interfaces, and data migration processes.

The Agile approach executed the project through a series of sprint cycles. After initial project design and development was done series of sprint cycles were started. During each sprint cycle, a smaller subset of the requirements was taken from the Solution Backlog into the Sprint Backlog. Each requirement was broken down into smaller manageable tasks [5]. Each Sprint cycle had to encompass the Analysis, Design and Development phases. It included requirements and design modeling, programming work. In addition to development, with feedback from the growing system, there were a series of requirement workshops to refine most of the requirements [6].

Deployment Phase included end user training, performance testing and the actual move to the new production environment. There were several problems during design and development phase. Many users couldn't define new requirements after a sprint cycle. Users didn't use system developed – they could specify only on the next – deployment Phase – when they were forced to use the system with real data. From other side – some users generated a very large count of cycles. On each cycle, they made a list of new requirements that weren't mentioned before. Cycle count could reach more than a 10. Requirements on each stage were not significant – most of them were improvements for user interface. Such approach leads to delayed project stage closing and increased project costs for the supplier. Deeper problem analysis in the first project phase would allow supplier provide more functionality on early cycles, that would reduce total cycle count.

Another problem during this phase was a very long decision making process. As this project implementation involved several company departments, then for given problems or questions, there was not a single opinion. Also there was a problem with clear role definition on customer site. Such issues were taken into Steering Committee meeting, which was called once a month where a head of the Chairman of the Board made a decision. Furthermore, client wasn't prepared enough for this stage. Clients' IT department and key managers didn't have enough time to test, approve or decline developed business requirements. Clients' IT department had several parallel projects inside that disturbed to complete given project phases. Weak risk analysis from customer before the project beginning lead to delayed project closing.

Project Closing during the Operation Phase

After solution going live, project moved to the Operation phase. The key activities during this phase included transition solution to support to transfer the solution from the delivery team to the support team and project closure to finalize and wrap-up the project. [7] The Operation phase involved the final activities that were required to close out the project and transition the solution and knowledge to the customer. Key objectives of this phase

include providing post go-live support, transitioning the solution to support, performing a final quality audit, and providing project closure. On the Operation specific business requirements were summarized that was defined as out of scope in development phase.

Conclusions

There were number of risks in the fixed price agile project implementation. In this paper case study – ERP system project implementation was discovered. Given project implementation covered many departments. This has caused administrative difficulties.

The main problems that authors identified during project implementation were:

1) Weak problem cause analysis;
2) Weak risk analysis;
3) Unclear role definition;
4) Long decision making on the client site;
5) Large number of stakeholders - users involved;
6) Testing on the customer site – not enough resources to test cycles, customer IT department has several parallel projects;
7) Users don't have enough experience to define business requirements;
8) In the development phase users make a large count of iterations.

Recommendations

1) More detailed analysis from the supplier site is necessary. Give details in the document;
2) Define decision making terms on the contract for each phase and deliverable;
3) Motivate employees on the client side, let them understand how important it is to describe details in the beginning of the project;
4) Role definition – more detail responsibility definition, make sure that user specified for the role can make a decision;
5) Give homework to employees before interview to write current business process and identify how it should be – let them start to think earlier;
6) Make at least 2 interviews with each user and force them to read and analyze Functional Requirements Document;
7) Specify a maximum sprint cycle count in the project contract;
8) Client should force supplier to use project planning techniques (like network diagrams);
9) Make sure that users are ready to implement agile project type;
10) Client should train people to accept change, and getting them to do business in a totally new way.

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LEARNING PROJECT MANAGEMENT USING BUSINESS GAME

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Keywords: project management, business game, simulation, learning, education

Abstract

Understanding basic theoretical knowledge of project management it is not enough for today's business administration specialist working in the field of business or public sector. It is very important to use project management in practice. World universities' practice shows that using simulations and games could allow to achieve the best results in education subjects related with learning complicated topics [1].

Experience of using computer business game in study process of program of Business administration at Kaunas University of Technology shows not only improving knowledge of students, but satisfaction of learner too [2].

The first module in the Faculty of Social Sciences of Kaunas University of Technology where business game is used is "Introduction to Business". The main goal of this module is

teaching the students to make managerial decisions and analyze financial reports. However, it has been found that one of the main parts of the game that is hard for students to understand includes buying pieces of equipment that are only available during the next period. Thus it has been decided to teach project management by preparing a project, describing it using MS Project, and executing in WEB based Computer Business Game "Hard Nut".

Introduction

Analysis popular publications related with professional requirements for managers and other peoples from organizations which are responsible for projects show increasing demand for project management competencies as for individual and organizational level. Demand of Project managers is high as in Business as in Public sectors. Research of Zaneta Ilmete, Silvija Bruna [3] showed that the top level managers of organizations do not have the basic knowledge of project management, so they are incapable of assessing the significance and benefits of project management that the organization would obtain thanks to applying project management methods in the organization.

The number of failed projects in Lithuania and other countries is not very small. Most often reasons are:

- Miss the deadline;
- Mistakes in planning financial resources;
- Low levels of clients' expectations are exceeded.

Usually organizations try to find at least one competent person who could organize running of the project. Experience of famous organizations shows difficulties working in the team that is professionally incapable of understanding project manager [3]. Authors made very important conclusion that the total level of an organization's competences is affected by that of all the people involved in the project in the organization. It could be explained why it is important to develop the competence in project management in all levels of managers during performance of their tasks [3].

The discomfort is often caused by bad practices on both sides; developers often hide bad news, and project managers often pester developers with too many project management overhead tasks [4].

It is necessary that education system need to pay more attention in these requirements. There are two ways to improve the situation:

- To prepare new qualified specialists in the Universities;
- To retrain the existing workers.

The purpose of this paper is to study situation in needs of skills and knowledge in Project management for students studying business administration study program and suggest the way helping students to seek best results.

The way for Students to Seek Competence in Project Management

Level of competition among similar study programs in universities is increasing every year. Study committees of popular study programs should be very sensitive to demands of

employees. Analysis needs of administration of Lithuanian small and medium enterprises show high requirements to workers in the field of project management [5].

According heads to Lithuanian Project managers association (*http://www.lpva.lt*) the workforce doesn't have enough good project managers.

Kaunas University of Technology prepares specialists of Business administration as in bachelor as in master level. Graduates this study program should have competencies in the field of project management.

Quality learning in Project management is related with knowledge and skills in the field of information communication technology (ICT). The study committee, adapting to the challenges of the real life, has recently decided to modify the study program to have at least one module ICT-related in each year. Common scheme of sequence of implemented IT subjects in bachelor study program of Business administration is showed in Figure 1.

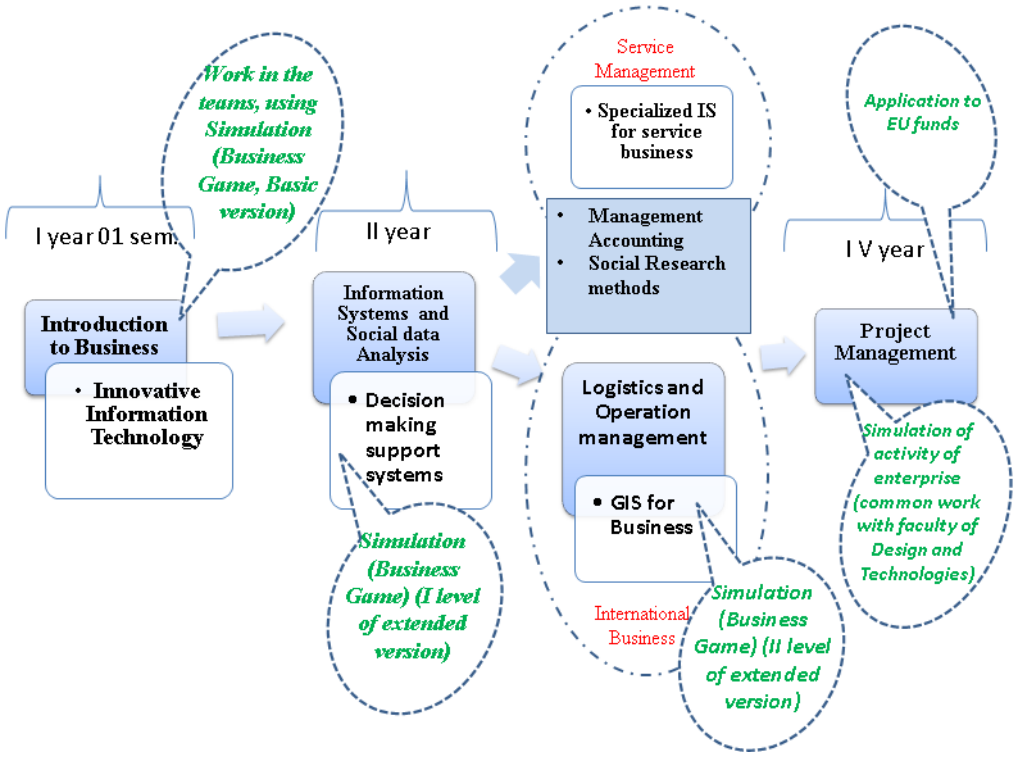

Figure 1. Using Simulation & Gaming in subjects of bachelor study program of Business administration in Kaunas University of Technology

During first year students studying Business Administration at Kaunas University of Technology have 2 subjects related with using IT: Innovative Information Technology and Introduction to Business. The main aim of Innovative Information Technology is to gain knowledge about main MS packages, cloud technology etc. For first panoramic understanding about Business we suggest students to play WEB based Business Game "Hard Nut" which helps students better to gain skills in administration of business organization, financial reports and

dependencies of different characteristics. The business game also gives the students some teamwork experience.

During second year students need to study information system and Social data analysis. Using MS Access allows students to understand background of information system (IS) and Databases (user level). Decision making support systems [6] related with different methods of mathematics. So usually it is difficult for our students to understand usefulness of specialized software. So, students are asked to play extended version of Business Game "Hard Nut'. The DB of BG is designed in My SQL and is open for students to analyze structure of DB. Figure 2 show possibility of architecture of BG to allow students to extend simulation to different directions. It is mean to have possibility to change level of deeply and level of widely understanding enterprise managerial skills (Figure 2).

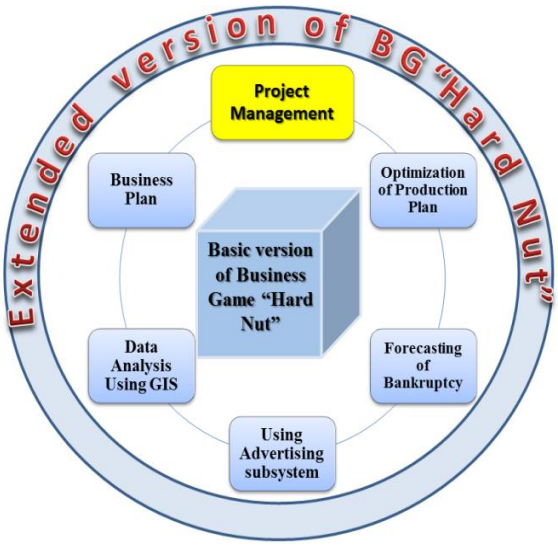

Figure 2. Types of extensions of Business game *"Hard Nut"*

Figure 2 show types of possible extensions of Business Game: Optimization of Production Plan, Forecasting of Bankruptcy, Using Advertising subsystem, Data analysis using Geographical Information system, designing Business Plan, using Project Management. The main requirement for all IT tools used in study process is possibility to use part calculation. It is mean that learner should do needed calculations, queries visualizations and decision making by himself [7].

Data analysis using Geographical Information system is used in module Business Geographical information systems [8]. Optimization of Production Plan, Forecasting of Bankruptcy is used in subject "Decisions making Business support systems".

Figure 3 show possibility accessing data from DB of Business Game via ODBC (Open Database connectivity) for Project management. Students asked to design project of organization Advertising. They need to analyze activity of real existing firms, check real prices, and plan types of advertising. Students asked to choose type of management (classical, Agile, Scrum or other) [9, 10, 11].

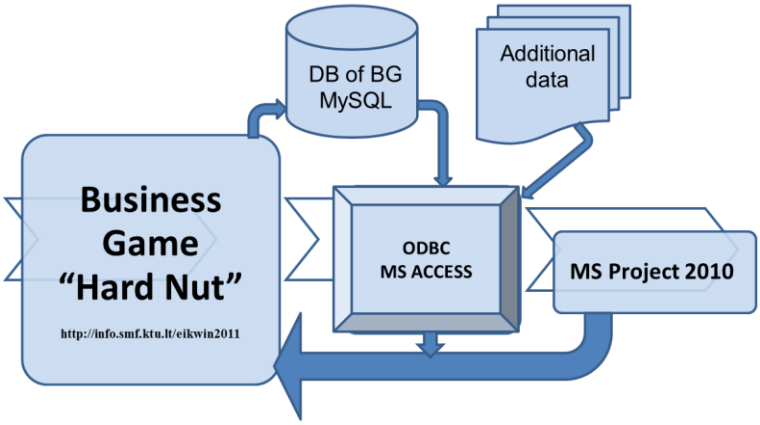

Figure 3. The schema of extension Business Game "*Hard Nut*" in using *MS Project*

Similar schemas to Figure 3 are used in all extensions of Business Game. Block MS Project 2010 should be changed to needed software.

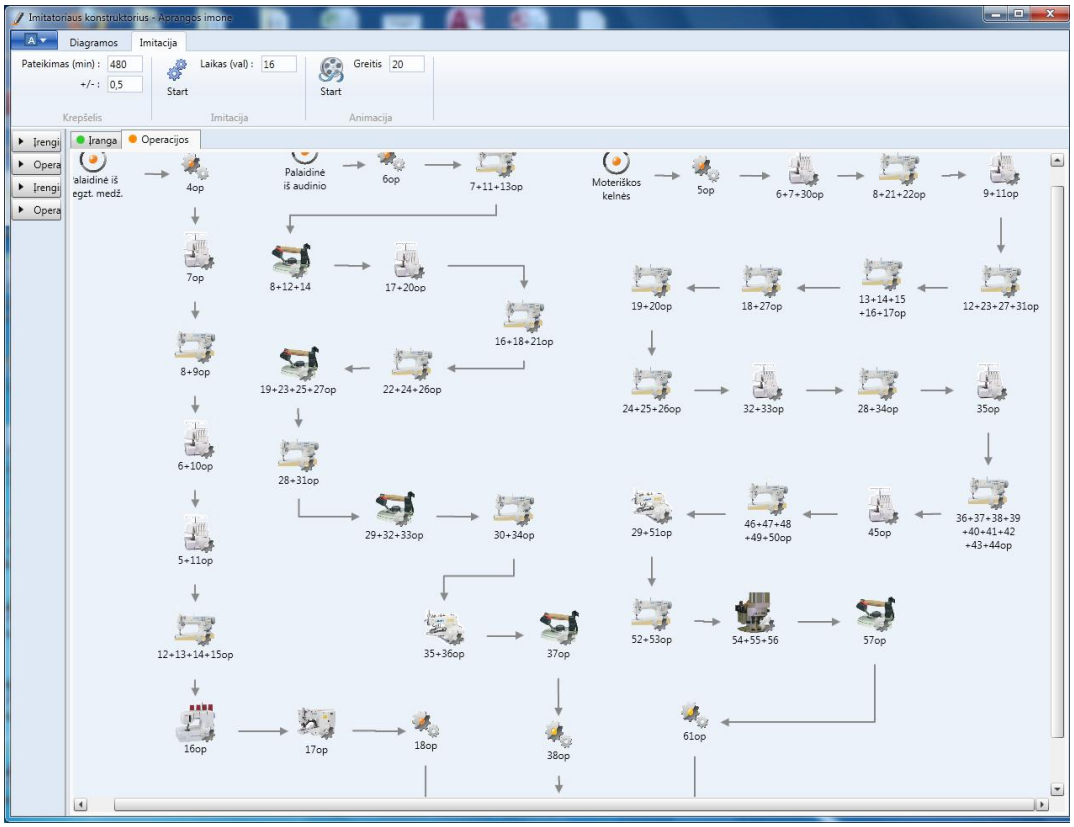

Figure 4. An example of simulated dress producing enterprise technological processes in *ManSimSys* environment

Young people after graduating university it is not easy to understand technological processes in dress producing, furniture producing or other enterprise. The best way for training students is using computer based technological simulation tool [12]. Faculty of Design and technologies of Kaunas University of Technology decided to use software *ManSimSys* for training students of technological specialties. Administration of enterprise usually work people which graduated business administration or management study programs. They need to have technological process at least panoramic understanding too, as they plan manage projects. An example of simulated dress producing enterprise technological processes is shown in figure 4.

There are three subsystems of Simulation tool *ManSimSys:*

- Graphical editor;
- Simulation Animator;
- *Simulation console 2011* – tool of management of simulations and integrated software for statistical analysis.

After the details of the technological processes are worked out, *MS Dynamic AX* can be used to analyze the economic processes.

After designing simulation of technological processes and analysis data manager could make decision to buy new technological tools. Usually administrations of enterprises try to get financial support from EU structure funds. Students are asked to simulate filling all documents needed for getting support. Usually it is done in MS Excel file. Financial part is especially emphasized, since the financial situation of the enterprise depends on the adequate planning of the tasks.

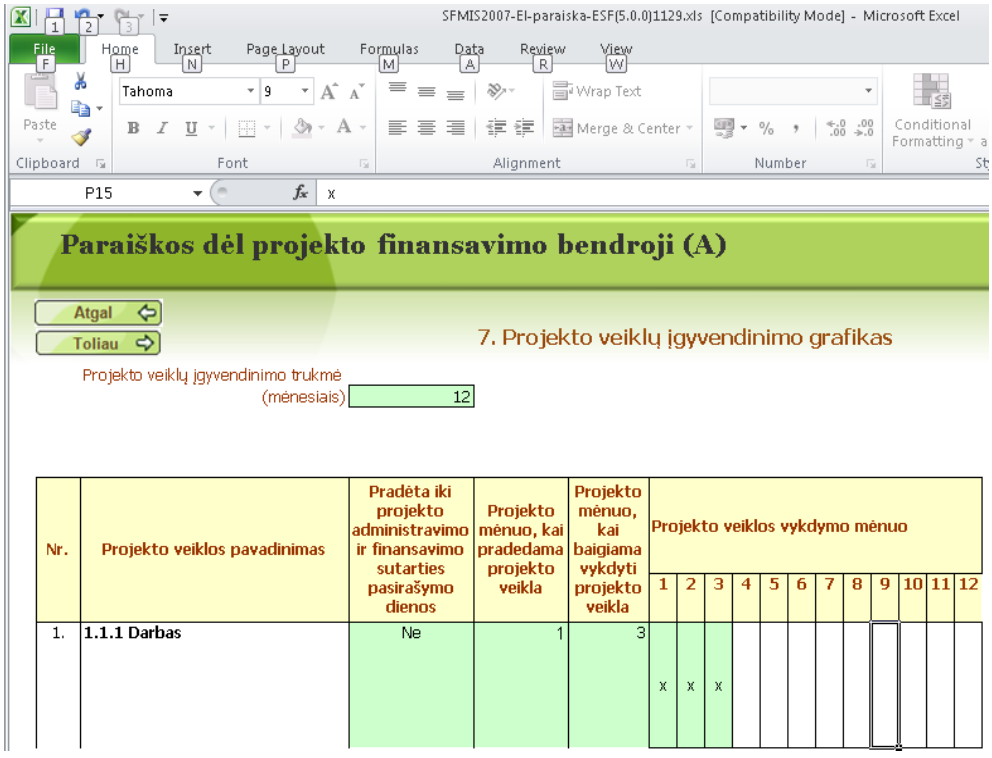

Figure 5. Fragment of the form for EU structural funds

An example of a form for request for EU structural funds is given in figure 5. It shows the work schedule of the project. In general, the representatives of the enterprises have to plan the works, distribute the resources, control the works analyze the data etc. Special software, for example, MS Project 2010, is used in the enterprises for that.

The students are asked to choose the methodology of the project, model the workflow and prepare the report. They are advised to use MS Project.

Results

There are some ways to summarize usefulness to education of using simulation in teaching business project management:

- To organize survey;
- To organize qualitative research;
- To analyze data collected in databases.

First two topics of analysis belong to classical research methods. The main aim of paper was to show usefulness of using extended version of Business Game "Hard Nut". The architecture of designed Business game allows us to save all entered and simulated data in unique DB. So, the best choice in our case was to use third topic. The final wishes of each business enterprise are to seek maximum profit and fighting against bankruptcy.

Altman model of bankruptcy it was used for analysis usefulness of using extension BG in task of project management.

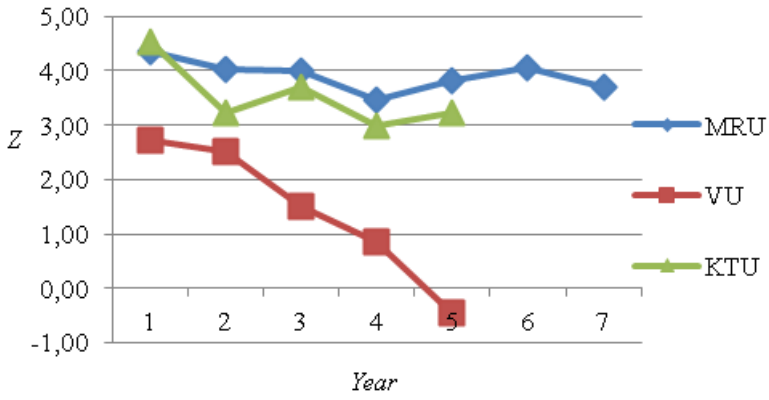

Figure 6. The comparison of generalized Altman bankruptcy coefficients for virtual enterprised in different universities

Figure 6 show comparing Altman indicator results of players of students of three Lithuanian universities (Vilnius University (VU), University of Mykolas Romeris (MRU) and Kaunas University of Technology (KTU)). Calculations were provided for students studying business administration study program. Probability of bankruptcy is inversely proportional to the value of Altman indicator.

Extended version of BG was used only by students of Kaunas University of Technology. The best results belong to University of Mykolas Romeris, but Business Game was used only in

forth study year and continued till 7th financial year. Students from Kaunas University of technology start to play in the first year and finish in 4th study year. More stable results belong to students from Kaunas University of Technology.

Conclusions

Multifunctional and multidisciplinary using (step by step) of Business Game is useful for students.

Possibility to simulate real situations in virtual environment allows the students to understand technological processes of enterprise better.

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EVENT AND PROJECT MANAGEMENT

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Keywords: Event Management, Project Management, Stakeholder Management, Risk Management, Project Organisation, System Theory, Constructivism, Holistic project management

Abstract

Our live is shaped by events, from private birthdays to the funerals, from the local sport events to the Olympic Games, from simple festivals to the bundle of events celebrated a whole year in the European Capitals of Culture like in RUHR2010 or in the future in Riga 2014.

Each event is a project – unique regarding concept, scope, time, organization, budget, etc. For events special kinds of project management were developed, like conference management standardized for example by IEEE [1].

Events mostly have a clear focus – like marketing events presenting new products – and event management in such cases is well developed [2]. For so called mega events like those clustered in a European Capital of Culture there is an open scenario. The article will discuss and show suitable theories, techniques and tools from different areas combined with the latest findings in project management.

1. Introduction

Events have a long history, different purposes and therefore different scopes. Events in ancient times are often celebrations: midsummer, New Year, Christmas, new chiefs, new kings, new popes, and shape the life of a community. In addition in the last years events has become more and more an business instrument (marketing instrument).

In literature are several definitions mentioned. But referring to the business and project topic a more suitable one is provided: Every event is unique, temporarily, stemming from the blend of management, program, setting, and people [2].

Events can be categorized based on the regional focus [2, p. 19]:

- Local events;
- Major events;
- Hallmark events;
- Mega events.

They can be categorized based on their purpose and therefore of their content [2, p. 22]:

- Cultural events;
- Business events;
- Sport events.

You can combine different types of categories and can structure events based on the complexity [3, p. 6]:

- Individual (dinner parties, weddings, birthday parties, etc.);
- Group (village festival, street or neighbourhood parties, etc.);
- Organizational;
- Multi organizational;
- National;
- International.

The Characteristics for event, particularly for of special event are [3, p. 16]:

- Uniqueness;
- Perishability;
- Ambience and Service;
- Labour intensive;
- Fixed Timescale;
- Intangibly;
- Ritual or Ceremony;
- Personal interaction.

If you summarize these characteristics under the view of the management of an event, there are three major characteristics to be important:

1. To be accomplished at one moment / "One Shoot".
   Most importantly the delivery of the `product/service´ has to be accomplished at one defined moment. The planning process and some parts of the execution are carried out before to achieve the result but the actual event is happening at one moment.
2. High amount of stakeholders.
   Many stakeholders are involved in managing an event. Not only the team members, who are carrying out the event, but mainly the customers/clients have an important role in the whole event.
3. Temporary organisation.
   Due to the high organisational complexity of events an own temporary structure should be set up. For mega events an own temporary legal entity (company) will be founded.

In order to support the challenging activities of an event the theories, techniques and tools from other disciplines might help to overcome the challenge.

Based on a survey from 1996 in Australia with 105 managers the most important discipline of an event manager is project management [2, p. 36]. These results were confirmed by other survey years later [2, p. 35].

The next chapter gives an overview of different views on a project and therefore helps to get the right view on events.

2. Projects and Project Management – Different Views and Latest Developments

The most common view on projects is defined in most of the standards for example from the Project Management Institute (PMI), ISO 20500, International Project Management Association (IPMA), etc.

The project is a unique endeavour with a start and an end in order to develop a product [4]:

This view describes a project as a complex endeavour that has to be structured and where a solid planning is required. Therefore the project management approach is a well-structured approach with different elements (e.g. so called Knowledge Areas in the PMBOK [4]):

- Integration Management;
- Scope Management;
- Time Management;
- Cost Management;
- Risk Management;
- Quality Management;
- HR Management;
- Communication Management;
- Procurement Management;
- Stakeholder Management.

Some of these Knowledge Areas are very important for event management, e.g. Stakeholder Management, Risk Management, and Time Management [2, p. 38]. Some of these topics will be described in more detailed in the chapters below.

Furthermore you can see a project based on different perspectives, e.g.:

- Process view.
  Most projects are structured by project phase (e.g. feasibility, preparation, development / construction, implementation and testing).This is the standard and most common view.
- Optimization view.
  In the last years some optimisation techniques and tools were developed and were derived from other disciplines in order to improve the planning and controlling phases of project management. Particularly noteworthy are here earned value management, critical chain approach, Lean Management and Six Sigma methods [5].
- Modelling view.
  In past there are attempts to model a project and therefore manage it with appropriate techniques and tools [5].
- HR view / Social systems.
  Project consists of people and their interactions, Therefore a project can be seen as a social system. Three fundamental properties of social systems are that they are self-organizing, self-regulating and have an environment [5].
- Temporary organisation.
  Due to the high organisational complexity of project an own temporary structure should be set up.

3. Event and Project Management

An event has to be managed as a project [2, p. 257]:

If you follow the above listed different views on projects and the latest developments of project management the soft facts or human factors become more and more important. For

example the GesellschaftfürProjektmanagement, the German body of Project Management (the local association of the International Project Management Association) stated that 54 % of success of a project based on the soft skills.

If you combine the requirements on events and the theories, techniques and tools of project management, these theories, techniques and tools can support the successful planning and conduction of an event.

Table 1

Requirements of Events Management and Corresponding Project Management Topics

Require-ments	Critical Success Factors for event	Project Management Topic	Supportive Theories, Techniques and Tools
One Shoot (Deliverable = Service)	Solid planning	Risk Management	Application of integrative Risk Management
	Solid planning	Cost Management	Budgeting, Earned Value Management
	Solid planning	Scoping (HR focus)	Scope Statement, Boundaries and Context Analysis of Systems Theory
	Solid planning	Time Management	Schedule, Critical Path, Network Diagram, Critical Chain
	Product = Service	Focus on Quality Management (Process Quality)	Tools of quality process review
	Product = Service	Integration Management	Project Charter, Project Management Plan
Many stake-holders	Integration of different views and requirements of people	Stakeholder Management	Stakeholder register, force-field analysis, communication methods
	Integration of different views and requirements of people	Project Organisation and Communication	• Role description • Ground rules • Communication plan • Social controlling
Temporary organization	Performing Culture	Project Culture	Change Management Aspects
	Integration of different views and requirements of people	Project Organisation and Communication	• Role description • Ground rules • Communication plan

The following chapters will highlight some new developments and combine these findings, techniques and tools with the requirements of event management.

All these elements will lead to a holistic project management, where people, the system, communication, change and learning are the key of success. But as some parts have a stronger connection to project management this paper focuses on Risk Management, Stakeholder Management, Project Organisation and the System Theory.

The following chapter show main project management topics based on the table 1 above.

4. Risk Management

In general the Risk Management includes the planning, identification, analysis, response planning, and monitoring and controlling on a project to secure an efficient and solid planning. Therefore different constraints like budget, time, the overall scope, and environment are implicated.

First of all it is crucial to set-up a project specific risk management approach based on best practices and / or standards (e.g. PMBOK or EMBOK [4] [6]). The project team has to define the processes, decide concerning qualitative vs. quantitative evaluation, identification methods (workshops, Delphi methods, questionnaires, etc.) etc.

Within the identification phase the risk are determined and structured with different the a.m. methods.

Then the risk will be evaluated with certain criteria depending on the evaluation methods (e.g. qualitative and / or quantitative by time and costs). Counter measures will be developed and a risk owner has to be identified.

A crucial aspect of risk management is the monitoring and controlling of the risks.

5. Stakeholder Management

In the 5th edition of PMBOK there is a new knowledge area on project stakeholder management with the following processes [4, pp. 391-415].

- Identify stakeholders;
- Plan stakeholder management;
- Manage stakeholder engagement;
- Control stakeholder engagement.

This new knowledge area is very useful for successful application of stakeholders in event preparation and conduction. Again in this knowledge area we need processes to harmonize, balance, and prioritize requirements.

A classification of stakeholders supports an effective and efficient communication towards the single stakeholder and stakeholder groups. There are several ways to classify stakeholders. In the 5th edition of PMBOK, there is the following proposal [4, p. 402]:

- Unaware stakeholders: Unaware of project and potential impact;
- Resistant stakeholders: Aware of project and impacts and resistant to change;
- Neutral stakeholders: Aware of project yet neither supportive nor resistant;
- Supportive stakeholders: Aware of project and potential impacts and supportive to change;
- Leading stakeholders: Aware of project and potential impacts and actively engaged in ensuring the project is a success.

The ISO 20121 [7] list the main stakeholders in event management, e.g. top management, event organizer, event owner, event manager, partner and sponsor, founder and investor, workforce body, employee person, staff person, volunteer person, supplier, emergency services, participants, attendee, regulatory body, central government, local authority, local community, industry etc.

In [8] stakeholders are classified the following way:

- Power and Interest: In this classification, stakeholders are grouped as per their power and interest towards the project and its outcome.
- Power and Influence: Here, stakeholders are grouped according to their power and level of influence on the project and its outcome.
- Influence and Impact: This classification is based on influence and impact of the stakeholders on the project.
- Power, Urgency and Legitimacy: Here, stakeholders are classified as per their power, urgency and legitimacy.

6. Project Organisation and Communication

Projects and therefore events are driven by the people that participate. "Teamwork" is the term that is always used. But: have responsibilities, interfaces and role identifications been clearly defined? Participants must be identified. Expectations must be made clear [9].

- Rough classification of organizational structure of the project;
- Precise role distribution in the responsibility assignment matrix;
- If applicable: role definition of particular responsibilities;
- If applicable: definition of required qualifications of participants.

Particularly for mega events with hundreds of team members (internal and externally) an appropriate role definition have to be defined. In order to emphasis the relationships and the different sub systems / sub-teams an alternative way of representing the project organisation can be developed. One approach is the illustration from system theory [9, p. 151], shown as example in the following figure.

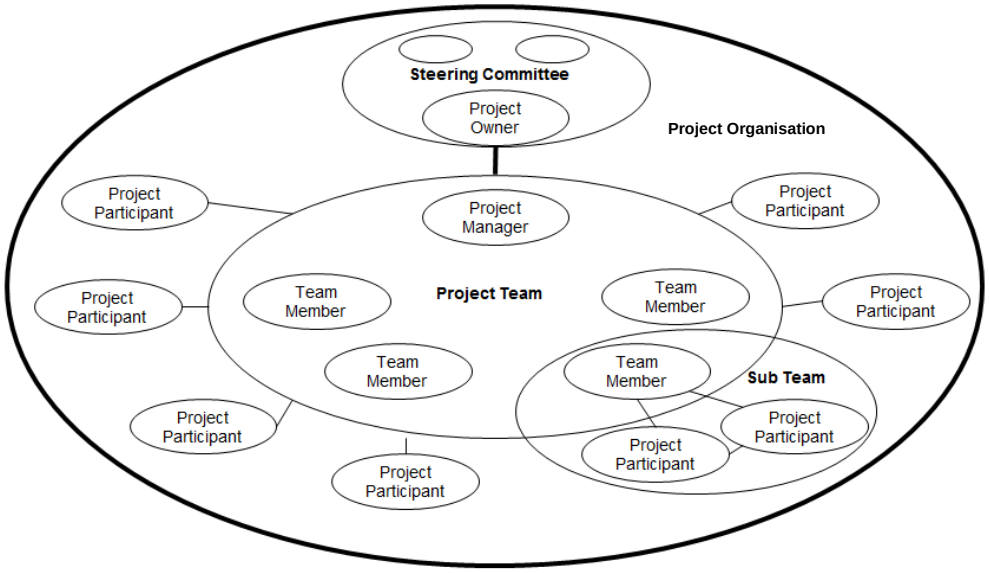

Figure 1. Project organisation

Important elements for a project organization are [9]:

- Clear Project organisational structure;
- Role description;
- Responsibility Chart (e.g. Responsibility and assignment matrix);
- Ground rules;
- Communication structure.

7. System Theory

The main characteristics of a social system are [9, p. 237]:

- Consists of elements with internal structures bounded by the context (environment);
- Not predictable;
- Depending on the context;
- Not possible to be influence directly;
- Results of influence unclear;
- Allowance of contradictions.

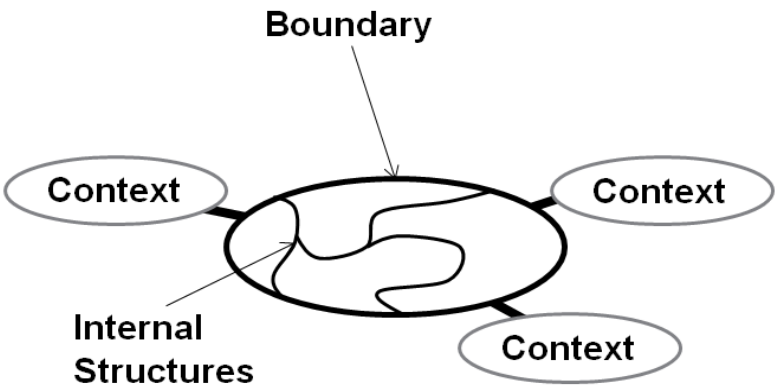

Figure 2. Project as a social system

Based on this view the following questions have to be answered:

- Boundaries: What makes sense for the project in terms of schedule, scope and social structures?
- Internal structures: What organisational structure, roles, communication structures should be applied for this system?
- Context: What elements (e.g. stakeholders, rules, and strategies) have an impact on the project and therefore have to be managed?

Based on the system theory and the view of a project as a social system, there are derived some efficient and valuable tools for project management [9]. This topic can be elaborate especially for event management.

8. Conclusion

Based on the characteristics of events, the different views on projects and the latest developments in the area of project management, there is an average quantity of these elements (e.g. risk management, stakeholder management, project organisation, social system approach) that can be elaborated specially for event management.

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LEAN PROJECT MANAGEMENT

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Keywords: Lean Project Management, Project Management, Lean Management, Quality Management, Standardization

Abstract

The evolution of project management will lead to Lean Project Management. Along this path concepts, methods, and tools of project management, quality management, lean management and further disciplines will be combined and enhanced.

1. Introduction

Concepts of lean management were initiated on the manufacturing side. "Lean" is a production practice that considers the expenditure of resources for any goal other than the creation of value for the end customer to be wasteful, and thus a target for elimination. Working from the perspective of the customer who consumes a product or service, "value" is defined as any action or process that a customer would be willing to pay for.

So lean management is a management of values – as developed by OGC for example and applied to improve project management [1].

On the other side lean management and quality management are overlapping. Stephan Wood says "Quality Management means Lean Management" [2]. The principles of quality management as fixed in ISO 9000 are really core elements of lean management, such as customer focus, continual improvement, process approaches, etc.. And quality management is a well-established knowledge area of project management according to PMBOK© [3] for example.

So the question is what is lean project management? Is it a new name for classical standards? What can lean management with the first focus on manufacturing contribute to project management? This paper will discuss the context of lean project management and perspectives for lean project management.

There are already proposals for lean project management like [4], [5], [6] and others. Here also agile project management is included.

Well established knowledge areas on quality management in projects are extended to strengthen or implement the principles of lean management [7].

Classical and new standards on quality management and project management like ISO 10006 [8] and ISO 21500 [9] are analyzed and proposals for the improvement of lean principles considered.

There is also a link to maturity models. [10]

Lean project management has an impact on project management standards – prior research on project management standards [11], [12] will be extended here.

2. Management of Values

Lean management is based upon values. The management of values is a rather new field in project management – but a field with a long tradition for example in industrial engineering – with pioneers like Lawrence D. Miles who introduced Value Analysis at General Electric in the 40th [17], [18].

Value analysis uncovers costs and values of processes and products. Value analysis asks for alternatives that are less expensive and add more value to the customer. The management of values has an additional strategic focus to align an organization to shape processes and to optimize customer value.

According to OGC the Management of Values is based upon seven principles [13]:

1. Align processes and applications with the organization's strategic objectives.
2. Focus on functions that are necessary and sufficient in order to deliver the required outcomes.
3. Balance processes and applications with all key stakeholders, reconciling their objectives to balance benefits and their delivery against the total use of resources, thereby maximizing value.
4. Apply optimization of processes and applications through all stages of the total lifecycle of the project – throughout the investment decision.
5. Tailor the project's environment, size, complexity, criticality and risk.
6. Learn from experience and improve.
7. Assign clear roles and responsibilities and build a supportive culture.

Values are the keys to balance between expenditures and benefits, and to balance between stakeholders.

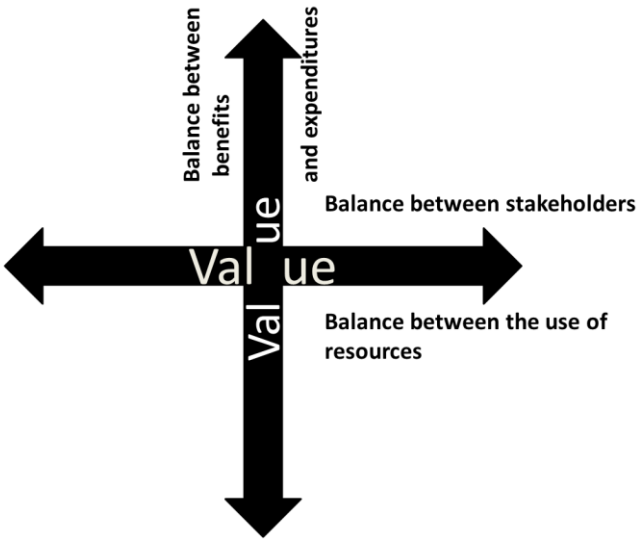

Figure 1. Balances based on Values – adapted from [13]

In the architecture of portfolio, program, and project management according to OGC we have the module "Management of Values" and other modules like "Management of Risks" that support portfolio, program, and project management. These modules are embedded in models like the P3M3 Model of OGC.

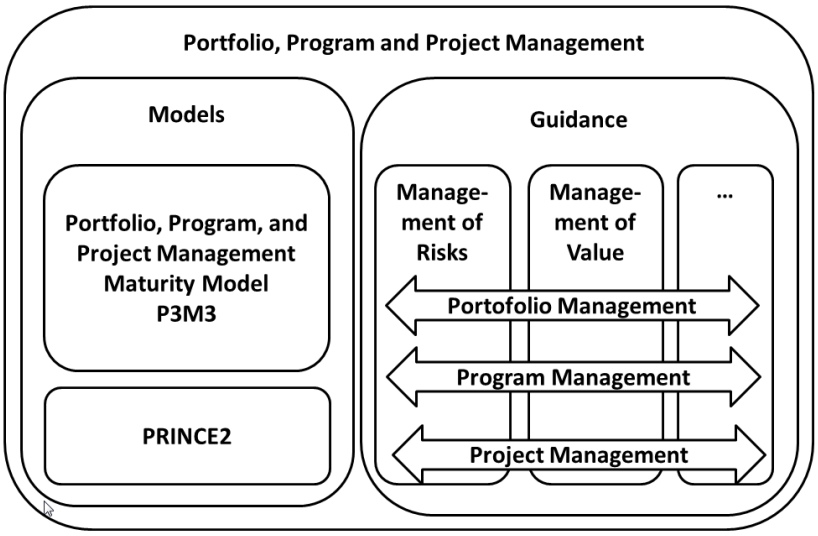

Figure 2. Management of Values – Roles in Project Management [13]

3. Quality Management

Lean management is strongly linked with quality management. That is just visible when we compare the principles quality management and the principles of lean project management.

According to ISO 9000 the following principles of quality management are defined:
Principle 1 – Customer focus;
Principle 2 – Leadership;
Principle 3 – Involvement of people;
Principle 4 – Process approach;
Principle 5 – System approach to management;
Principle 6 – Continual improvement;
Principle 7 – Factual approach to decision making;
Principle 8 – Mutually beneficial supplier relationships.

Lean project management is based upon the following principles [14]:

- Specify what creates value from the customer's perspective;
- Identify all the steps along the process chain;
- Make those processes flow;
- Identify waste – based upon needs and expectations of customers;
- Eliminate waste – based upon needs and expectations of customers;
- Make only what is pulled by the customer;

- Strive for perfection by continually removing wastes;
- Amplify learning;
- Make decisions at the right time;
- Empower the team, build integrity;
- See the whole.

The customer focus is the main common issue – but there are many matchings. Quality management and value management are also overlapping. [19]

4. Project Management Standards and Lean Project Management

Project management according to PMBOK for example is shaped by processes assigned to knowledge areas and process groups. On the way to lean project management these processes should redesigned and extended.

In the 4th edition of PMBOK in project scope management the following processes are defined:

- Collect requirements;
- Define scope;
- Create work breakdown structure;
- Verify scope;
- Control scope.

In the recently published 5th edition of PMBOK in project scope management the following processes are defined:

- Plan scope management;
- Collect requirements;
- Define scope;
- Create work breakdown structure;
- Validate scope;
- Control scope.

In both versions there is a lack in processes dealing harmonizing and balancing requirements. In the 5th edition of PMBOK a "requirements prioritization process" is mentioned on page 110, but this process is not defined. Such processes must be introduced and existing processes must be extended to support lean management and avoid waste.

Processes in all other knowledge area must also be redesigned to support lean project management. In some knowledge areas this redesign can be organized like in corresponding areas of lean management. Lean project procurement or lean project human resource management for example can follow the paths of lean management.

In the 5th edition of PMBOK there is a new knowledge area on project stakeholder management with the following processes:

- Identify stakeholders;
- Plan stakeholder management;
- Manage stakeholder engagement;
- Control stakeholder engagement.

This new knowledge area is very useful for the development of lean project management, the stakeholders have their values, and they define requirements. Again in this knowledge area we need processes to harmonize, balance, and prioritize requirements.

A classification of stakeholders can help to develop lean project management. There are several ways to classify stakeholders in the 5th edition of PMBOK, there is the following proposal [15 – page 402]:

- Unaware stakeholders: Unaware of project and potential impact;
- Resistant stakeholders: Aware of project and impacts and resistant to change;
- Neutral stakeholders: Aware of project yet neither supportive nor resistant;
- Supportive stakeholders: Aware of project and potential impacts and supportive to change;
- Leading stakeholders: Aware of project and potential impacts and actively engaged in ensuring the project is a success.

In [16] stakeholders are classified the following way:

- Power and Interest: In this classification, stakeholders are grouped as per their power and interest towards the project and its outcome;
- Power and Influence: Here, stakeholders are grouped according to their power and level of influence on the project and its outcome;
- Influence and Impact: This classification is based on influence and impact of the stakeholders on the project;
- Power, Urgency and Legitimacy: Here, stakeholders are classified as per their power, urgency and legitimacy.

Such approaches can be used to develop lean project management.
Further developed in [14], [20].

5. Maturity Models

Lean project management is related to the maturity of project management. A high level of maturity corresponds to a high level of lean management in projects. Optimized processes according to a maturity model should have a minimal level on waste considered from the lean management perspective. The P3M3 model of OGC [10], [13] considers 5 maturity levels:

- Level 1 – awareness of process;
- Level 2 – repeatable process;
- Level 3 – defined process;
- Level 4 – managed process;
- Level 5 – optimized process.

Level 1: Awareness of process. The organization of processes is not well developed and they are not documented.

Level 2: Repeatable Process. Procedures of successfully achieved processes are recorded, in order to be able to repeat them in the future.

Level 3: Defined process: Processes are documented, standardized and integrated.

Level 4: Managed process. At this level, standardized processes are more mature, due to some quantitative metrics and techniques that are implemented in the management.

Level 5: Optimized process: Processes are optimized and prepared for changes.

6. Conclusion

The development of Lean Project Management will strength project management in many aspects. Beyond those mentioned above and advanced knowledge management for example will improve the management of values – also many other disciplines will contribute [20].

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THE FINANCIAL APPROACH TO INFRASTRUCTURE PROJECTS IN DEVELOPING COUNTRIES

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Keywords: public-private partnerships, project finance, project finance model, financing mechanisms, infrastructure projects

Abstract

In latest years suggestions for reforming the provision and financing of infrastructure services in developing countries have focused on private participation. This alternative to public financing is seen as a way both to minimize the inefficiencies of public administration and to avoid the need for external borrowing. In fact, for much of the nineteenth century, infrastructure projects were privately financed and built. This approach, however, did not obviate the need for government intervention and foreign capital. Because of the difficulties of assessing projects, investors were reluctant to commit their funds, and governments turned to subsidies and loan guarantees to encourage investment. Often, however, government intervention only replaced one set of problems with another. Investors with government-guaranteed loans had no incentive to monitor the firm's performance-a limitation that led to the diversion of funds and frustrated the public interest.

Research

Since the beginning of the 1990's, the principle of public-private partnership (PPP) has spread considerably in developing countries (Figure 1 shows this), as element in the broader process of privatization. Many formerly state-owned enterprises perform ordinary activities that have been routinely undertaken by the private sector. It is quite widely accepted that such enterprises probably should not have been run by the state in the first place. Therefore, the involvement of the state in these enterprises should, and hopefully does, end upon their privatization. This is not, however, the case with the activities relegated to PPP's [1]. These activities have some public good features.

The high-speed rail, the wind turbine, air and sea ports - all this infrastructure projects are made possible by a mechanism that engages a multitude of participants including multilateral organizations, governments, regional banks, and private entities. Therefore, they are not privatized once and for all; rather, the state continues to be involved in some way or another and one option is to set up PPPs.

Yet one may argue that PPPs are not genuine partnerships that properly or efficiently share risks and liabilities (and profits). Rather, they are a means to disguise conventional

contracting undertakings that are subject to standard budgeting processes as some new undertakings that are carried out off budget.

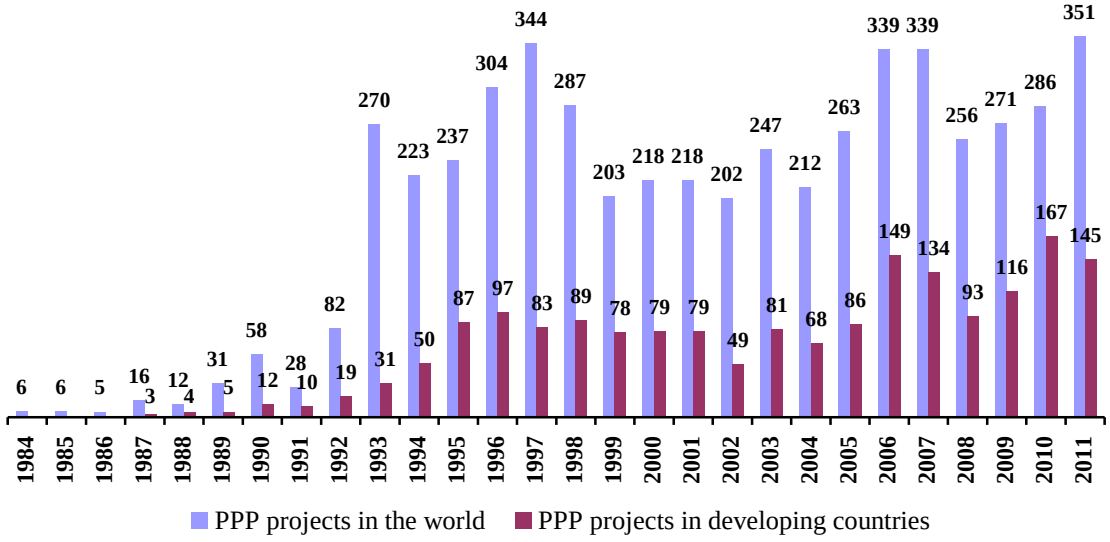

Figure 1. Infrastructure projects with private participation in developing countries, 1984-2011

Source: World Bank and PPIAF, PPI Project Database *(http://ppi.worldbank.org)*

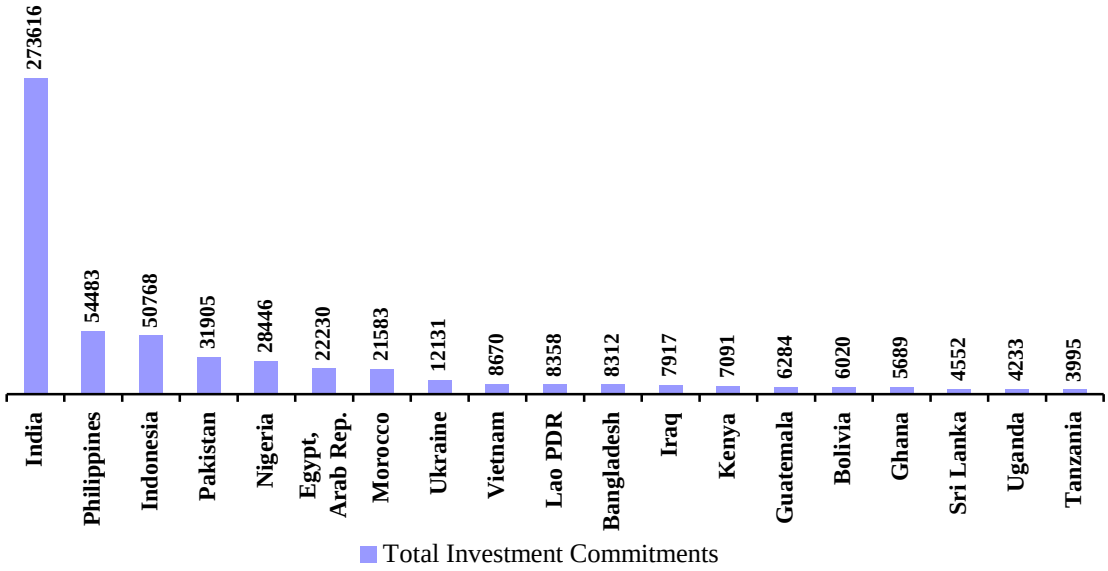

Figure 2. Top Twenty by Investment in new private infrastructure projects in development countries, 1984-2011 in US$ millions

Source: World Bank and PPIAF, PPI Project Database *(http://ppi.worldbank.org)*

This claim might have been particularly valid at the beginning, when most PPPs took the form of private-finance initiatives (PFIs), in which the private contribution was primarily to provide financing. Put differently, the private involvement amounts to little more than providing the government with a channel through which it can finance infrastructure investment by implicit (or hidden) budget deficits and debts. The most common method of financing PPPs is "project finance" [2].

Project finance is an important tool for financing projects in developing and emerging economies, yet developed countries employ the mechanisms as actively as less developed countries. Top Twenty by Investment in new private infrastructure projects in developing countries over the 1984–2011 is presented in Figure 2.

For private finance to be an option one needs to evaluate the robustness and sustainability of the different financing options throughout the asset life. It is also necessary to consider what sort of failure might occur – whether it be a gradual erosion of service, the financial collapse of the private-sector party, or the sudden and complete shutdown of the asset – and how to mitigate the impact of such a failure. The tradeoff between the level of fees or charges for the infrastructure and the robustness of financing should be analyzed explicitly.

Given the long life of many infrastructure assets, parties must explicitly address all the tradeoffs within different commercial, contractual, and financing approaches [3].

It is often very difficult for both the private and public parties to forecast costs and revenues over the long term, particularly when those costs and revenues depend on public usage. But the consequences of getting this wrong may be considerable. Governments risk incurring the public's wrath if the concessionaire makes too big a profit, while the concessionaire risks going bankrupt if it loses too much money.

Three key factors should be considered when setting contract or concession policy. First, if the infrastructure is monopolistic, how should the protection of consumers be balanced with maintenance of any necessary capital investment? While a monopoly might lead to a shorter contract, the protection of consumers might lead to a longer one. Second, if debt is being raised to fund infrastructure development, over what period will it be repaid? Forcing repayment over a short period could result in higher, potentially unaffordable, fees or user charges. Third, how long will investors need to achieve an "acceptable" level of return – and what is "acceptable" [3]?

The basic unit in any project financing set-up throughout the world consists of an SPC (Special Purpose Company), which carries: the project assets, the equity injected by the project's sponsors and the debt [2]. Certain legal issues must be addressed with respect to this entity, such as its place of incorporation (local vs. offshore) and its corporate structure (public limited company vs. joint venture). In most instances however, the concession-granting authority imposes its own agenda in order to narrow the potential outcome of these issues.

Moreover, it is possible to envisage the financing of small-scale projects within the scope of extensions to existing projects or various special cases.

Conventional financing is poorly suited to handling this level of risk (few assets, cash flow-based income streams), but also the amounts and duration involved. The continual development of new tools should give rise to more advanced types of financing and thereby expand the market for public – private partnership projects.

There are several possible explanations for the continued growth and success of the project finance model. First, developing and emerging economies are making significant strides to develop their economy, which often requires building infrastructure to effectively utilize available natural resources for domestic growth.

Telecom, Land Transport, Water and Electricity- overall estimated that the global annual investment for these sectors will average 2.5 percent of global GDP [4]. Figure shows current infrastructure spending levels in emerging countries. The area that seems to be growing most rapidly is power project financing for both power generation and transmission. There are several reasons that electricity projects dominate project finance. The primary reason is that governments are looking to build infrastructure that does not rely on oil. Additionally, many countries have other natural resources that can be converted into energy, and power project finance allows nations to build new massive infrastructures cost-effectively.

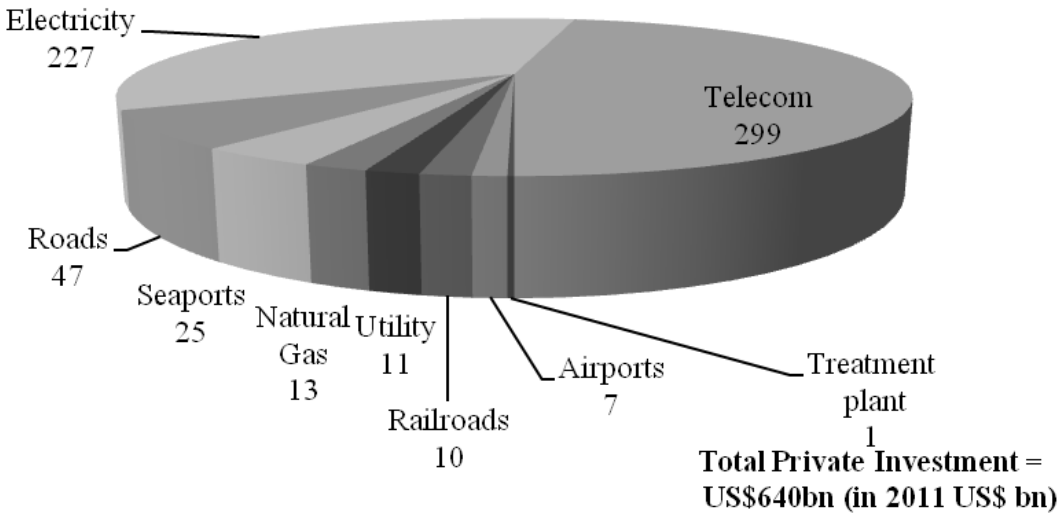

Figure 3. Investment in Infrastructure projects with private Participation in developing countries, 1984-2011 in US$ millions

Source: World Bank and PPIAF, PPI Project Database *(http://ppi.worldbank.org)*

Traditionally, governments initiated infrastructure projects to develop or build essential facilities so that citizens and businesses could conduct various operations and experience economic growth. In project finance, participants negotiate amongst themselves to spread risks associated with an undertaking, thereby increasing the chances for success in developing vital infrastructure projects. Without project finance, many essential and life-enhancing projects may have never been constructed. Project finance allows countries to build the infrastructure necessary to increase growth and development. It draws a greater volume of financing than under traditional schemes because risks are often spread among the various participants, and development organizations mitigate risks by providing political and commercial guarantees. Consequently, the financial approach is based upon the project's risk analysis, with the financing package serving to optimize the use of the various tools available to best meet project

needs. Primarily, the project's financing entities will pay great attention to the intrinsic quality of the project (profitability, quality of the partners, assurance of income and the socioeconomic environment).

The configuration of financial approach exerts a large influence on the project's overall success. The characteristics of public-private partnership – type project (especially their life, total financing amounts, reimbursements backed up by the cash flows generated) and all associated risks, in essence tend requires a qualified decision on financing. It is important to emphasize, that financial community focuses heavily on the parties involved, the contract, the environment (both institutional and economic), quality and role of the construction companies, legal and technical capacities of the concession-granting authority, and the contract's economic parameters.

In traditional or corporate financing, the sponsoring company (the company building the project) typically procures capital by demonstrating to lenders that it has sufficient assets on its balance sheets. That is, in the case of default, the lender will be able to foreclose on the sponsor company's assets, sell them, and use the proceeds to recover its investment. In project finance, the repayment of debt is not based on the assets reflected on the sponsoring company's balance sheet, but on the revenues that the project will generate once it is completed.

The sponsoring company must consider several factors when determining whether to use a corporate or project finance structure. Such considerations include the amount of capital needed, the risks involved (political risks, currency risks, access to materials, environmental risks, etc.) and the identity of the participants (whether a government, multilateral institution, regional bank, bilateral institution, etc. will be involved). Corporate finance most often involves private investors who provide financing in return for ownership (equity) in a project company. The focus in project finance, however, is mostly on loans to the project company, with project revenues as the source of the return on the investment to lenders [3].

Project finance greatly minimizes risk to the sponsoring company, as compared to traditional corporate finance, because the lender relies only on the project revenue to repay the loan and cannot pursue the sponsoring company's assets in the case of a default. However, a sponsoring company can only use project finance where it can demonstrate that revenue streams from the completed project will be sufficient to repay the loan. In fact, lenders will often require that the sponsoring company demonstrate that it has agreements in place that will generate the required revenue (called "off-take agreements") [3]. For example, in the case of power projects, the sponsoring company often signs contracts with distributors where the distributors agree to purchase electricity generated by the project. Therefore, project finance is most suitable for a project where there is a predictable revenue stream to support debt repayment.

Similar to the traditional finance model, a project finance model allows an entity to use equity or debt financing. Most entities in search of investment funds prefer debt financing to equity financing because they retain full control over the project and earn a greater return through the use of debt financing. Debt financing refers to funding a project with a loan, where the SPV (special purpose vehicle) takes out a loan and no other investors are involved. In contrast, equity financing requires the project sponsors of the SPV to either contribute cash needed for the project or sell ownership in the SPV to raise capital. In addition to maintaining

full control, debt financing is attractive because project sponsors do not have to contribute extra capital to the project.

Moreover, it is possible to envisage the financing of small-scale projects within the scope of extensions to existing projects or various special cases. Project finance provides access to more capital than would be available to a private company or government on their own because governments would typically be limited to their internal financing and private companies usually cannot attract enough capital necessary for large infrastructure projects without additional guarantees.

Conventional financing is poorly suited to handling this level of risk (few assets, cash flow-based income streams), but also the amounts and duration involved. The continual development of new tools should give rise to more advanced types of financing and thereby expand the market for public – private partnership projects.

Besides the potential social and economic impact of infrastructure that fails or collapses, governments have to factor in several considerations when deciding how to finance an asset. Whether the infrastructure is to be publicly or privately financed, four main factors are [4]:

- the robustness of the financing structure,
- the sustainability of the financing,
- the regulatory regime of the industry,
- the bankruptcy regime – what happens when either the owner or the asset goes bankrupt.

Public-sector parties concerned about continuity of service delivery may want to have the ability to maintain the contracts and arrangements the private-sector party has established with some project parties should the private-sector entity fail for some reason.

General inferences which can be drawn from experience with project finance in developing countries over the past twenty years encompass: heightened pressures to justify increased reliance on public-private partnerships; the growing emphasis placed on pragmatic approaches as opposed to public-private partnership "models"; the importance of an *ad hoc* approach to public-private partnership able to respond to narrowly-defined problems; the institutional environment's fundamental role; the life cycle of public-private partnerships projects; the necessity of a contract regulator; and the need to take contractual procedures through to the stage of implementation quickly.

Conclusion

In conclusion, in order to achieve the objectives of a public-private partnership, it is necessary to pay close and prolonged attention to the legal system being applied. Keep in mind that no ideal blueprint for a national or contractual system exists. Beyond the necessary precautions taken by investors, assurance must be provided that the project's ultimate set-up is sufficiently compatible with the host country's legal culture. Herein lies another guarantee of the public-private partnership's durability, which is just as important as that resulting from the negotiation of the contract's sensitive clauses.

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PUBLIC SECTOR PROJECT INITIALIZATION AND PLANNING PRACTICE IN LATVIA

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Abstract

The application of Project Management (PM) tools and techniques in public sector is gradually becoming an important issue in developing economies, especially in a new development country like Latvia where projects of different size and structures are undertaken. The paper examined the application of the project management practice in public sector in Latvia. Public sector project management in Latvia become popular in recent years as there is different type of public funding sources available. The paper describes the public sector project management practice in Latvia. Study shows that public sector project maturity level is low and should be improved. Research period covers the time from January 2013 – March 2013.

Introduction

Government and organizations usually embark on different projects with the aim of creating new service or improving the functional efficiency of the existing ones. All these projects require appropriate skills and techniques that go beyond technical expertise only, but encompass good and sound skills to manage limited budgets, and monitor shrinking schedules and unpredicted outcomes, while at the same time dealing with people and organizational issues [1]. The application of project management practice in public sector has been identified as an efficient approach which would help in upgrading management capabilities and enable public sector to efficiently complete projects and attain developmental objectives [2].

Recipients of funding – both public authorities, public institutions and businesses, is a major challenge for financial gain and to promote public welfare. However, the benefits bring with them the responsibility for waste and financial records and reports on practical goals. Funding Administration requires thorough knowledge and understanding of the law. A growing number of mass media and the administration of financial instruments institutional statements we hear that a large number of project applications, which is a low quality place. Now that the errors and weaknesses in project development and administration are unacceptable, more and more to think of an effective system that would be according to the conventional project management theory. Such a system would be built at local level, ensuring appropriate project specialist, but the program level, i.e. need to improve the administration of financial instruments including methodical and regulatory documents update and synchronize project management

theory to improve the project initiation process and ensure the quality of project applications development, thus resulting in an effective and rational use of taxpayers' money [3].

The typical steps of project planning are:

1. Development by, or on behalf of, the project sponsor of a project concept plan to explore the possibilities and clarify the broad nature of the project;
2. Development by, or on behalf of, the project sponsor of a more comprehensive project business case with details of the proposed outcomes, product requirements and firm costing; and
3. Consideration and approval by the decision-maker of the project business case.

In many cases, there will be subsequent consideration and approval of a more detailed implementation plan, and further approvals at key points during the project. Effective project planning and approval will also be assisted by having effective support arrangements at the entity level – such as promoting strategic alignment, having the right people and culture, and having effective governance arrangements. This is the responsibility of the chief executive, normally assisted by the Senior Executive team [4].

Viewed in a broader sense, it can be concluded that the planning process phenomenon consists of three connected plans: the strategic plan, functional plans and project plans. Project plans are a reflection of the strategic plan, while functional plans represent a detailed guide to using resources to achieve a set purpose. Project realization planning represents a rational determination of how to initiate, sustain and complete a project [5].

The **object** of the research is public sector project management.

The **aim** of the article is to evaluate project planning and initialization practice in public sector in Latvia.

The **objectives** of the article are as follows:

- assess the public sector project initialization practice in Latvia,
- identify the problem areas of public sector project management,
- provide proposals for public sector project management process improvement.

The research methods used in the article include the project and program empirical data analysis and literature review as well as survey based on questionnaire.

Research

There is little evaluation done so far for the period 2007-2013. There are two studies commissioned by managing authority concerned with management and control procedures that have been finished: "An assessment of effectiveness of EU funds financial management and control system"10 that resulted in 39 recommendations on potential efficiency improvements (method – quantitative data analysis and interview in focus groups) and "Preliminary study on the possibilities of EU funds management system simplification [6] put forward 71 recommendations (method – quantitative and qualitative data analysis and interviews). The later study concluded that the fund management system advances towards simplification, nevertheless many aspects can be improved. The 3 main recommendation blocks of the report were the following: the EU structural fund programming is isolated from long-term state development planning, from industry focus or prioritization and from financial planning that municipalities and businesses carry out. Final beneficiaries have trouble

planning their development in the context of Structural Funds available and delays in program introduction creates substantial losses to the final beneficiaries in form of cancelled orders or cost increases.

The second recommendation group stated that fund management institutions should harmonize their procedures and cooperate better to avoid situations when the final beneficiaries face large amount of different requirements, to reduce the amount of required documentation that the institutions can easily obtain themselves from each other or public registers and to disseminate best practice among intermediate bodies. The third finding was that administrative culture of fund management institutions is at times unacceptable when the institutions see the support applicant as an unreliable suppliant rather than as a valuable partner whose activates actually contribute to the country development. Such attitude is demonstrated by formal, at times excessive requirements regarding quantity and designs of documents for submission. It also shows in lack of enthusiasm to reconcile Project amendments quickly, even if those amendments do not materially affect the project substance and do not impede achieving project goals.

Authors has elaborated survey questionnaire for local municipality project management specialists.

Questionnaire has been sent to all Latvian municipalities (in total 119), in the frame of study 97 responses has been collected (research sample is 97 out of 119, n=97). Research period is January 2013 – March 2013.

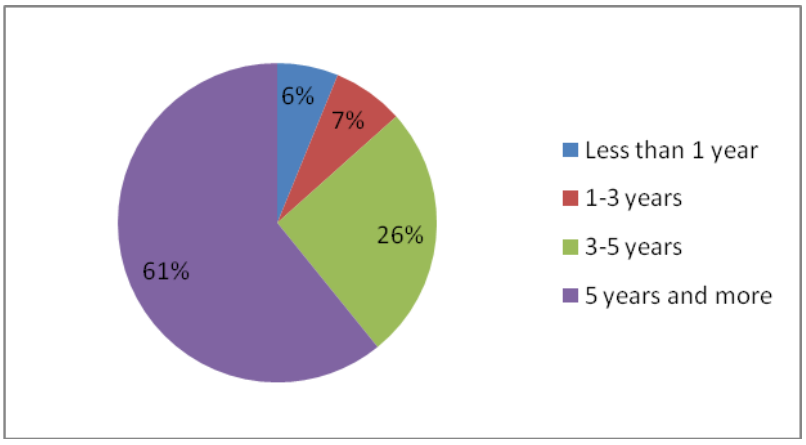

Figure 1. Specialists experience in project management field (n=97)

Source: author's empirical research

Research shows that staff involved in project management processes in public sector in Latvia is well experienced as 61% of respondents has project management experience five and more years. 26% of respondents have been involved in project management for three till five years, which is explained by the available different public funds (such as European Union structural funds, European Economic Zone and Norwegian cooperation programs, Latvian – Swiss cooperation program etc.).

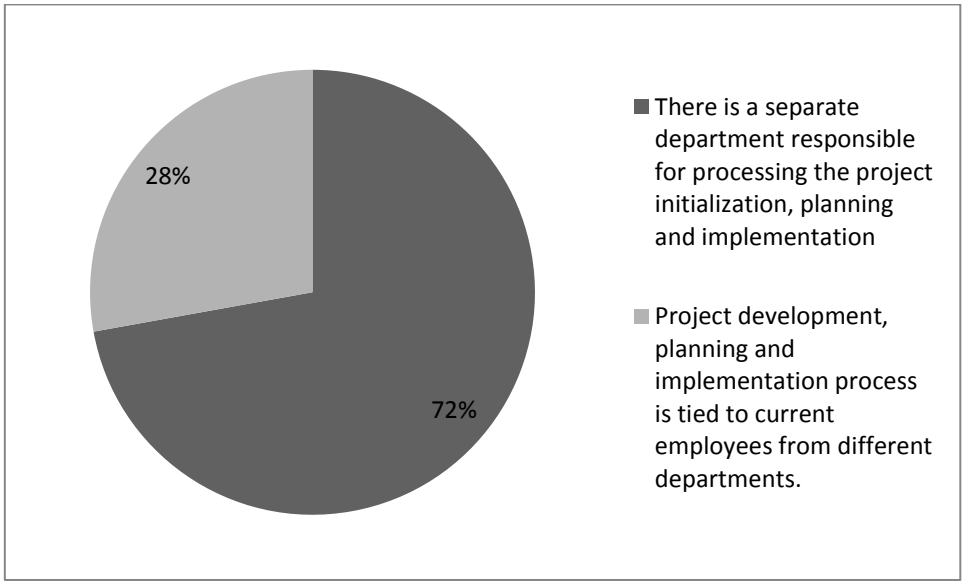

Figure 2. Organizational structures of project management in public sector (n=97)
Source: author's empirical research

In project management practice there can be identified different types of project organizational structures. Research shows that 72% of responds has pure organizational project management structure or signs of it. Meanwhile 28% of respondents has matrix or mixed project management organizational structure.

Ultimately, project management directors seek organizational methods that facilitate teamwork, can maximize the use of limited resources, efficiency and quality in the way a project is completed and how goals and objectives are achieved. Public sector organizations are often complex with internal and external relationship intertwine with each other and difficult to apprehend.

The rational of organizational management is to facilitate the application of knowledge, skills, tools and techniques to project activities to meet project requirements in terms of Scope, Cost, Time, Quality, Participant satisfaction.

Organizational strategy is the way in which resources are used in the achievement of a purpose. Strategies are at the same time action plans for laying down instructions for the coordination of resource use through an employment program, projects, policies, procedures and organizational design, as well as the definition of execution standards. Organizational structure is the placing of human resources in the function of the organization. When speaking about project planning, it can be said that plans represent merely good intentions, until they degenerate at the moment they are transformed into hard work [7].

The author evaluated the public sector practice in project development and initialization process. In the frame of research evaluation of project problem and goal definition has been done.

Study shows that in public sector project management there is lack of deep problem and situation analysis. 45.78% of respondents elaborated project proposals based on local municipal development programs and policy planning documents and don't provide deep analysis of

problems. 26.05% of respondents accepted that they don't use situation analysis methods but project proposals are elaborated based on desired situation. Still 28.17% of respondents showed that they used project management methods such as current situation analysis and research, case study methods by clarifying the factual situation and the desired situation.

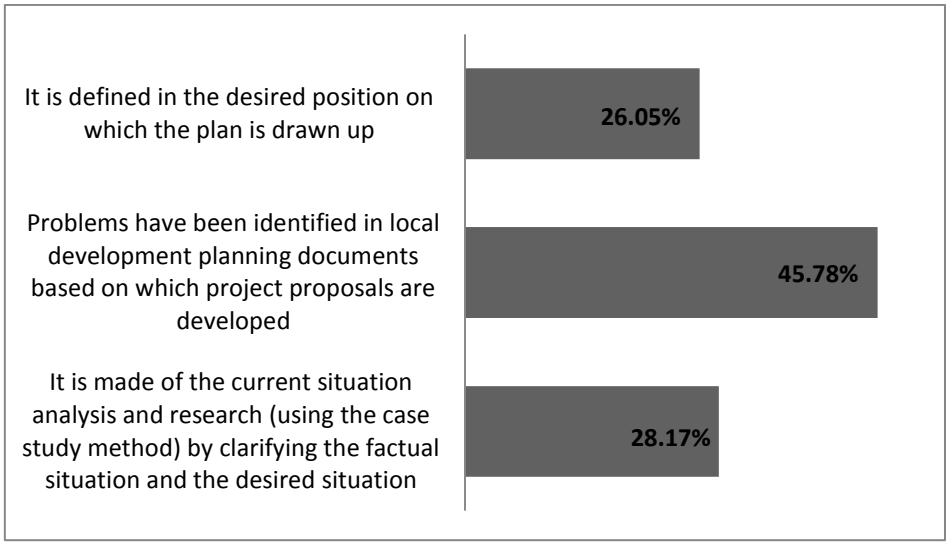

Figure 3. Problem definition practice in public sector in Latvia (n=97)

Source: author empirical research

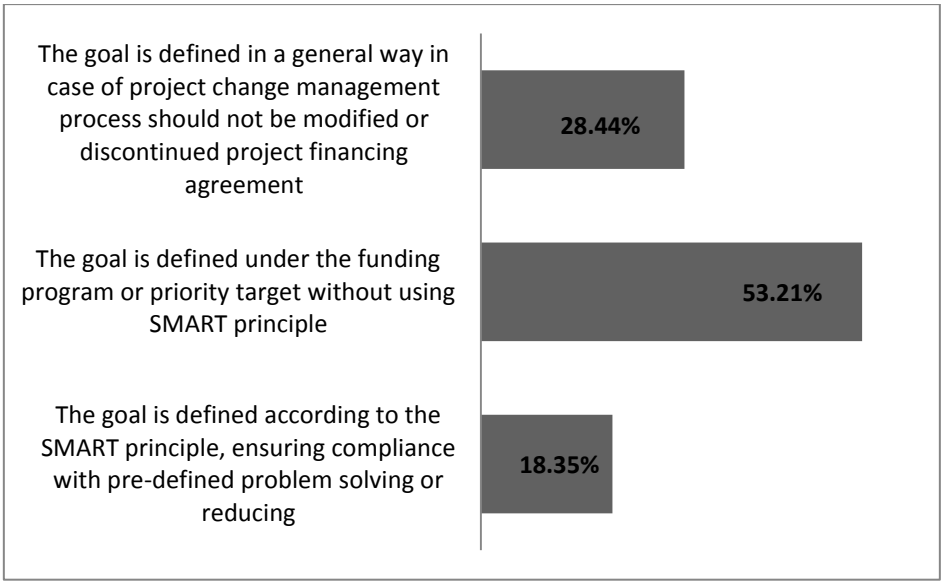

Figure 4. Project goal definition in public sector (n=97)

Source: author's empirical research

Goals and objectives are statements that describe what the project will accomplish, or the business value the project will achieve. The study shows that public sectors not using appropriate goal definition methods and don't use a SMART principles in definition of project goals (only 18.35% of respondents use SMART method to define their project goal). 53.21% of respondents define their project goals under the funding program or priority target without using SMART principle. Also the 28.44% of respondents define their project goals in a general way to avoid of further changes in project submission or project financing agreement.

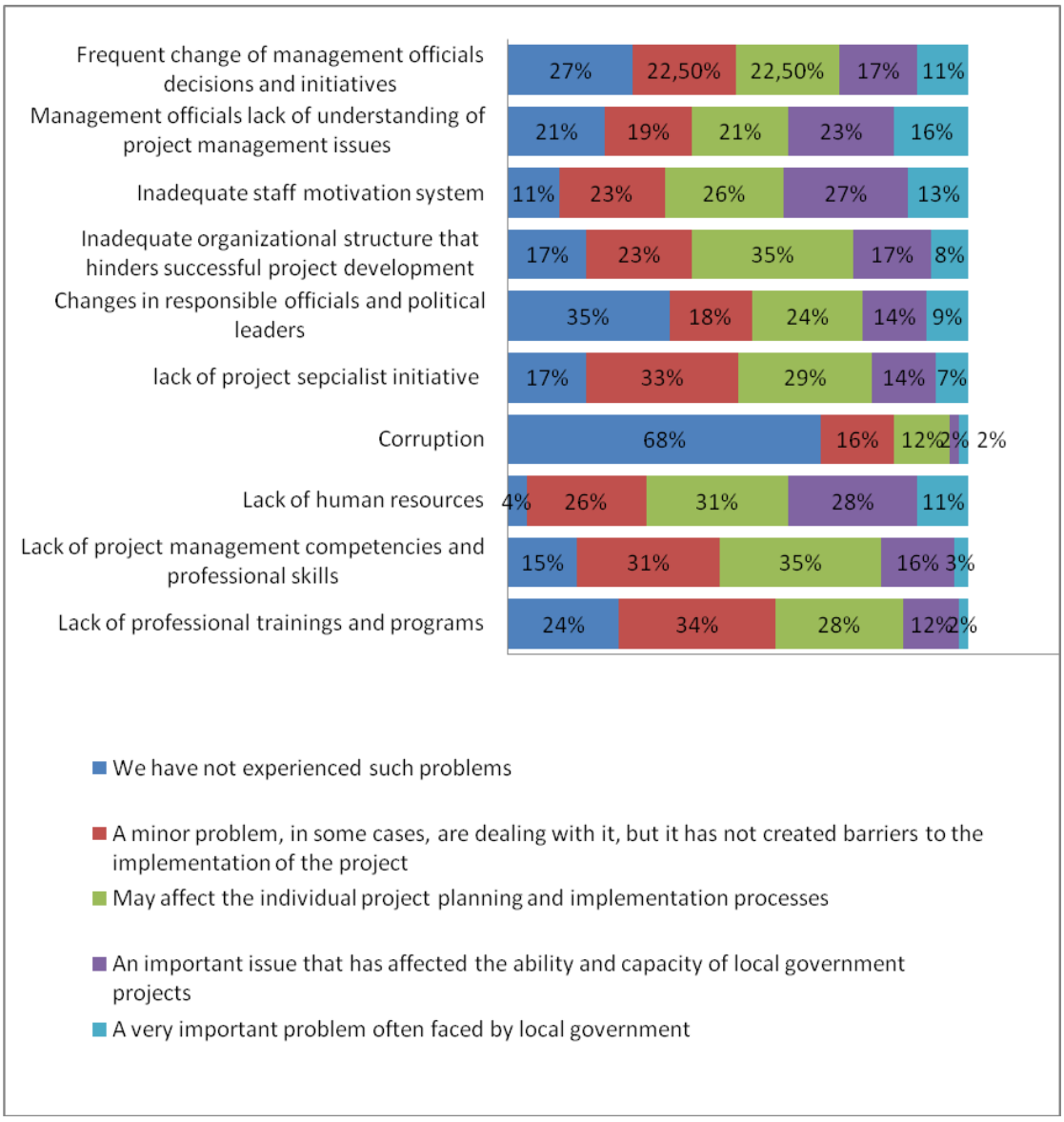

Figure 5. Problem aspects of project definition and initialization in public sector (n= 97)

Source: author's empirical research

Many traditional definitions of projects assume that the objectives of a project, and the methods of achieving them, are well understood throughout the project. For instance, in its body of knowledge, the UK Association of Project Managers defines a project as 'an undertaking to achieve a defined objective [8], and goes on to state that 'generally all projects evolve through a similar "lifecycle" sequence during which there should be recognised start and finish points'.

Other definitions similarly imply clearly defined objectives and methods: 'an activity defined by a clear aim, appropriate objectives and supporting activities, undertaken to define start and completion criteria [9], and 'a human activity that achieves a clear objective against a time-scale [10].

The author research has identified the problem aspects of project initialization and planning process in public sector in Latvia (Figure 5). As the minor problems respondents identified: frequent change of management official's decisions and initiatives, corruption, changes in responsible officials and political leaders. As the important or very important problem factors which could affect the ability and capacity of local government projects respondents defined: management official's lack of understanding of project management issues, inadequate staff motivation system, lack of human resources and lack of project management competencies and professional skills.

To evaluate public sector project management capacity and maturity author asks for respondents to undertake self-assessment and evaluate their organization capacity in project management. The study shows that public sector organization maturity is on middle/low level (Figure 6).

Project Management Maturity refers to processes, documentation, management and metrics. There are five levels of project maturity management as follows:

Table 1

Project management maturity levels

Maturity Level 5 (Highest)	Optimised processes (All project management processes are in place, measured and continually improved upon)
Maturity Level 4	Managed processes (All project management processes are in place and these are regularly measured)
Maturity Level 3	Organisational standards and institutionalised processes (majority of project management processes are in place and are used by the majority of people)
Maturity Level 2	Structured processes and standards (basic processes are in place and used most of the time)
Maturity Level 1 (Lowest)	Initial process (no or little formal and/or documented processes being used)

Source: author's questionnaire maturity description

Research concludes that public sector bodies assessed their maturity as maturity level 3 – Organisational standards and institutionalised processes (majority of project management processes are in place and are used by the majority of people), quite big part of public sector organizations has identified their organizations in the second level of maturity – Structured processes and standards (basic processes are in place and used most of the time).

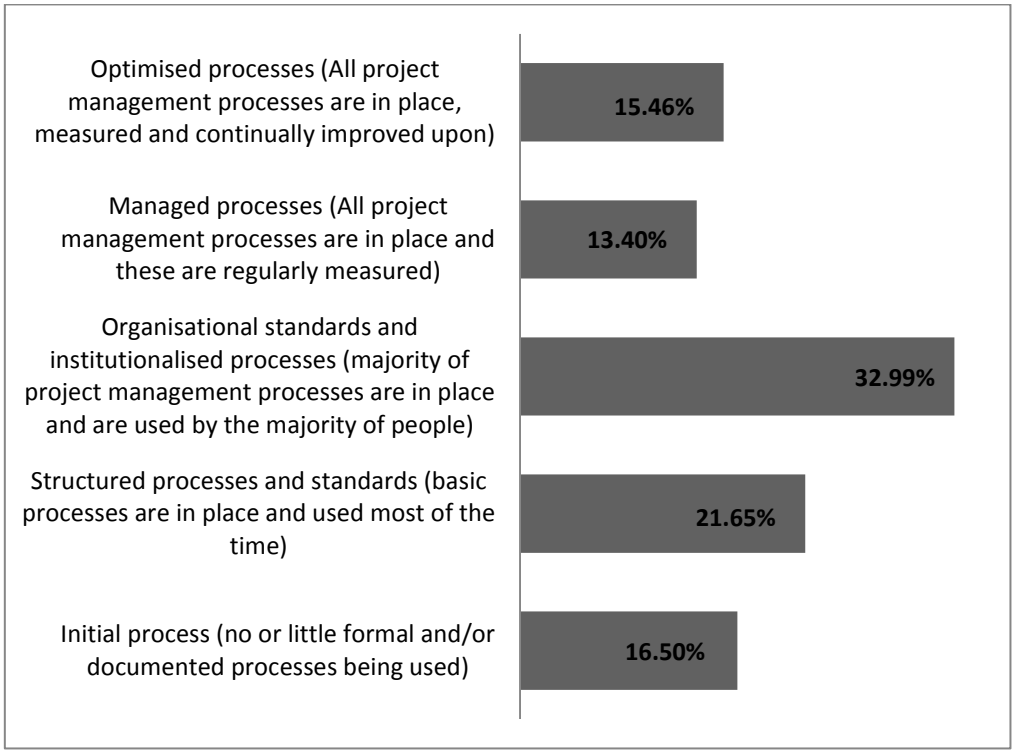

Figure 6. Public sector project management maturity self-assessment (n=97)

Source: author's empirical research

Conclusions

Public sector project realization planning represents a project management phase that encompasses goal definition and the determination of ways and measures for achieving the set goals, i.e., that the project is realized in the planned time, at the planned cost.

Study shows that self-assessment of public sector organizations in Latvia is quite high. Project management specialists define them self as very experienced in Project management, but meanwhile the self-assessment of organization Project maturity levels shows that organizations is only at the beginning of setting up the appropriate Project management system. The public sectors project management usually is described as different kind of foreign financial instrument and program implementation.

To improve project management practice in public sector in Latvia, author can recommend:

1. To increase the capacity and professional skills level for local municipal project management staff (training programs, supervisions etc.);
2. Define the appropriate organizational structure for project elaboration and implementation (matrix or pure project organization structures);
3. Project management tools and techniques should be applied gradually (should be as an obligatory requirement in big scale public sector projects).

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MANAGEMENT OF INNOVATIVE PROJECTS FROM THE HUMAN CAPITAL OPERATIONAL PROGRAM

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Abstract

Poland is in the group of countries with a low level of innovativity in the economy. Therefore, most of the available EU programs are focused on its improvement in the long term. They encourage innovative development in various sectors, either directly or indirectly. An example of the former is the IE OP program, while the latter HC OP. Management of projects formed in the framework of these programs is an extremely difficult process and requires a lot of experience. This due to the very complex nature of the evaluation and implementation of these projects. This paper presents the procedure of execution of innovative testing projects basing on the example of HC OP. The main goal was to show the mechanism of innovative implementations including various phases and steps involved in the dissemination of the final product. To prepare this article, the data of the European Union and analysis of literature and own conclusions about the discussed issues were used.

1. Introduction

The level of innovativeness of the Polish economy, including Polish companies is relatively weak, although the Summary Innovation Index in 2009 shows a significant change – a transition from the "catching up countries" group to "moderate innovators" (change of the fourth group of the third group). It is to some extent quite a success, reaching of which without the aid of the European Union and its resources would be quite impossible. Importance of EU funds in this area is important because it results from two elements. Firstly the amount of funds allocated to Poland in the years 2007-2013 (more than 85 billion euros including own contributions) and the number of programs designed to develop the knowledge-based economy and the related to it broadly understood innovativity. The largest programs funding innovation activities are: OP IE (8.3 billion EUR), OP HC (9.7 billion EUR) or the regional operational programs (15.9 billion EUR). Preparation and management of projects in the framework of these mentioned above programs is a very difficult task and takes place in stages. This study focuses its attention on managing the implementation of innovative actions basing on the project testing the OP HC.

This work consists of three basic parts. The first one presents the level of innovativity of Polish economy compared to other European countries (for comparison also the global leaders were included, which undoubtedly are USA, Japan and Korea). In the second part the EU programs used for the improvement of innovativity in Poland were analyzed, taking into account the role that they play. The third part is devoted to issues related to the management of innovative projects under OP HC. This section analyzes the assumptions related to the assessment of the project and its implementation. A detailed description of all the stages and phases of the project were described, taking into account the nature and size of the project.

The main primary objective of this short paper is to show the mechanism of preparation and implementation of innovative projects in the framework of structural programs on the example of OP HC. Attention focused on the stage of the evaluation and implementation of projects, diverting away from the stage of problem (issues) identification and project preparation.

2. Level of Innovation in the European Countries versus the World's Countries – General Characteristics

The European Union (EU) is among the world top regions in terms of the innovativeness of its economy. It does not mean, however, that it is the main innovation leader. According to the Innovation Union Scoreboard report, the EU ranks fourth after such economic powers as the USA, Japan and Korea. The analysed data clearly indicate that the EU has not closed the existing development gap, particularly to Japan and Korea, in the last two years (Figure 1)

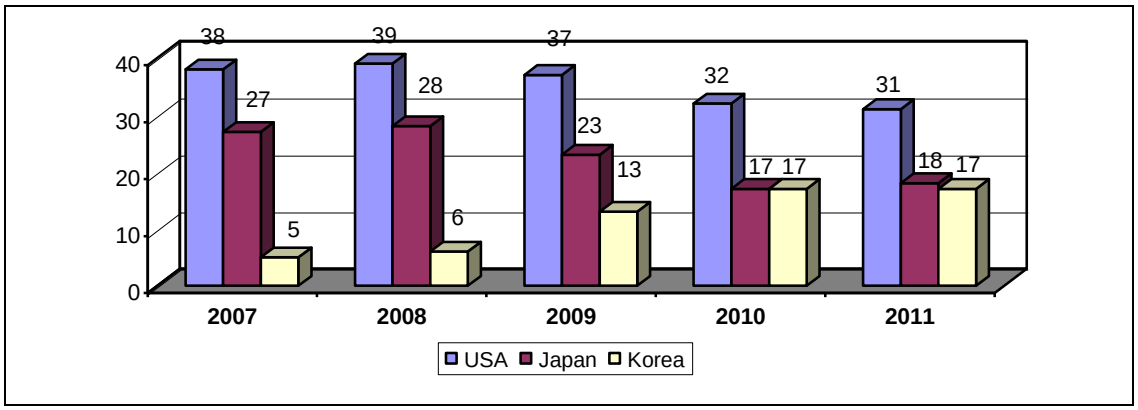

Figure 1. Differences in the innovation development of the main EU competitors (innovativness index)

Source: compilation based on: *Innovation Union Scoreboard 2011*, The Innovation Union's performance scoreboard for Research and Innovation, European Commission, UNU-MERIT, 7 February 2012.

The developed innovativeness indexes ($100*C_I/C_{EU}$ – where C_I is the absolute index of the given country and C_{EU} for the whole Union) indicate that there is a particularly huge difference in relation to the USA. The two remaining countries also retain their advantage at the sustained level. The difficulties of the EU in increasing its innovativeness level result mostly from significant internal disparity (Figure 2).

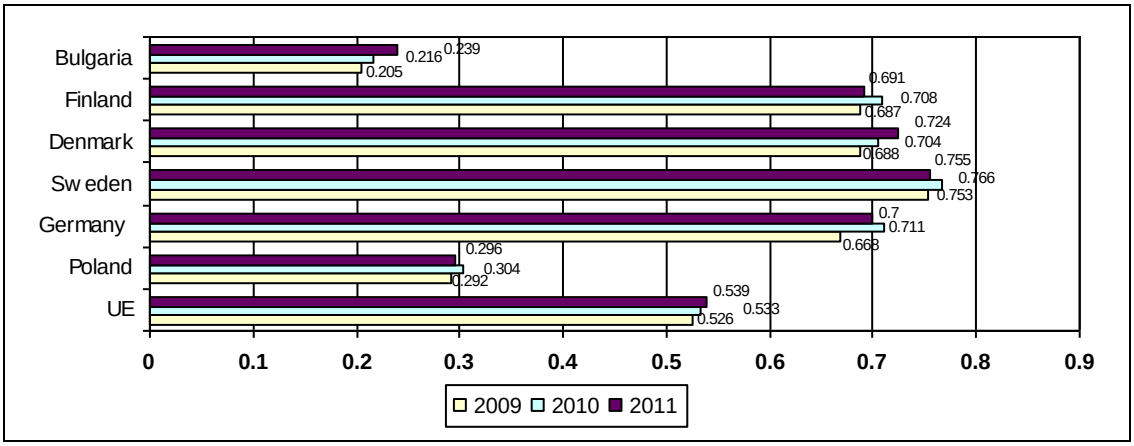

Figure 2. Dynamics of the innovativeness level in the selected EU countries ("leaders" and "strugglers")

Source: compilation based on: *Innovation Union Scoreboard* ..., op. cit.

The diagram presented above indicates another important regularity concerning this dynamics in the last 3 years. The declines in the innovativeness level of the former "leaders" of innovativeness in the EU are clearly visible, which does not mean that they lose their "strong" position. However, the index presented in this diagram (SII – Summary Innovation Index) reveals this trend also in relation to Poland. In 2011 our country was at the level recorded before the year 2009. It should be hoped that the position achieved at the turn of 2008 and 2009, when we progressed from the group of "catching up countries" to the group C of "moderate innovators" will not be lost (Poland moved from the last group 4 to group 3) [4].

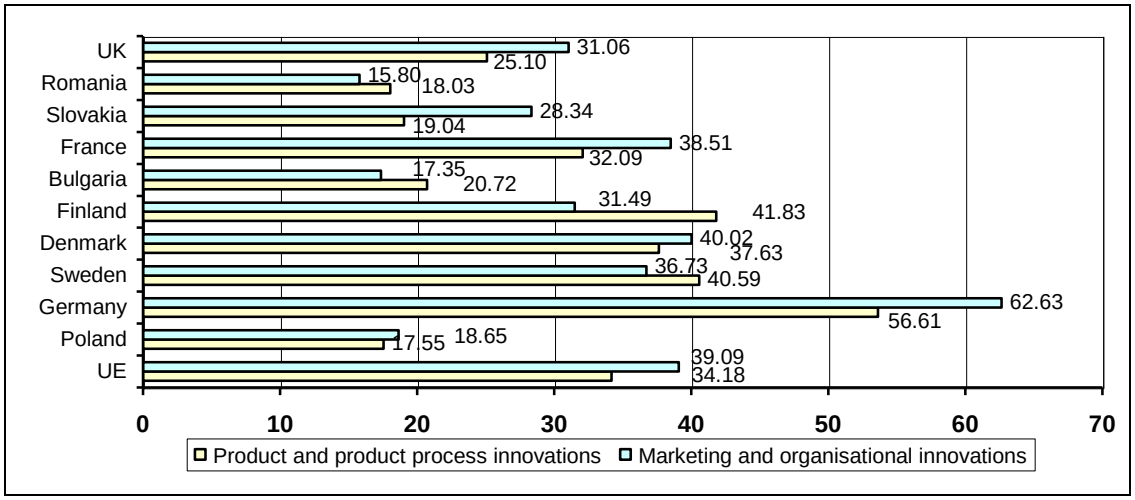

Figure 3. Share of innovative entities in the whole SME sector (in the selected EU countries) breakdown into two groups (%)

Source: compilation based on: *Innovation Union Scoreboard* …, op. cit.

The level of innovation development of the whole economy depends on the development of its components of which the most important is undoubtedly the SME sector due to the volume of the generated GDP (approx. 50% of the total GDP) and the number of employed people (approx. 60% of the workforce) [2]. As EU statistics show, the proportion of innovative enterprises in the total number of entities in this sector in Poland is still very small hence Poland rates low compared to the other countries (Figure 3).

In Poland this share is lower than 20% (in relation to product and process innovations as well as marketing and organisational innovations). In the latter area, Poland ranks even lower than Slovakia but higher than Bulgaria and Romania (17.35% and 15.8% respectively). It indicates the necessity to change the priorities of the Polish economic policy and to further develop innovations in this sector despite the existence of specific features of the Polish market (reluctant to purchase highly innovative products due to their higher price). Unfortunately, EU statistics indicate a significant reduction in the number of innovative entities in the total number of SMEs in the last year by approx. 5% (product innovations) and approx. 7% (marketing).

2. Programs and Projects Aimed at Improving the Polish Innovation

In the years 2007-2013, in Poland function five EU operational programs. These include [2]:

- OP Innovative Economy – designed to improve the competitiveness of the Polish economy through the development of innovative enterprises (greater use of information technologies, cooperation with business institutions and R & D units, formation of cooperation networks, support for SMEs),
- OP Infrastructure and Environment – serving the increasing of investment attractiveness and socioeconomic cohesion of Poland through the development in areas such as: transportation network transposition, environmental protection, energy infrastructure, cultural potential, higher education and health care,
- OP Human Capital – aiming to increase employment (combatting unemployment) and improve social cohesion (increase in professional activity, spread of education, adaptation of society to the new requirements of the labor market by raising the qualifications and education level, reducing areas of social exclusion, fight against discrimination in the labor market),
- OP Eastern Poland Development – covering five regions: Warmia and Mazury, Podlaskie, Lublin, Subcarpathian, Świętokrzyskie. The main objective is to accelerate the pace of socio-economic development in line with the principle of sustainable development (development of transport infrastructure, supporting research activities, development of tourism, access to the Internet, the development of metropolitan cities, raising the importance of a knowledge-based economy),
- 16 Regional Operational Programs – which are implemented on the regional (voivodeship) level, and the most frequently mentioned objectives include: support for entrepreneurship, environmental protection, providing greater economic and social cohesion, development of transport, social and tourism infrastructure and to improve the quality of life of the inhabitants.

The sum of 45.1 billion Euros is prepared for the implementation of the principles contained in these programs, and an additional 22.2 billion for the Cohesion Fund (giving the total

amount of 67.3 billion EUR). Allocation between the different programs is presented in the table below (Table 1).

Table 1

Size and division of funds from the EU Structural Funds and the Cohesion Fund allocated for innovative economy in Poland in the years 2007-2013

OP	Amount of funds (in billions of euros)	Share in the total allocation (%)
Infrastructure and environment (I&E)	27.8	41.3
Regional Operational Programs (ROP)	15.9	23.8
Human Capital (HC)	9.7	14.4
Innovative Economy (IE)	8.3	12.3
Eastern Poland Development (EPD)	2.3	3.4
Technical Aid	0.5	0.8

Source: Own elaboration based on: *National Strategic Reference Framework 2007-2013 supporting economic growth and employment*, National Cohesion Strategy, Document approved by the decision of EC on the 7th of May 2007, Ministry of Regional Development, Warszawa 2007.

All of these programs are directly or indirectly increasing the innovativeness of the Polish economy. The most subordinated to this purpose are OP IE and Regional Programmes. Among the other programs, for the broadly understood innovation, projects can be submitted as part of the OP Human Capital (Development of modern economy staff, Support for the staff adaptation system and Development of personnel qualifications of R & D system and increase of the awareness of the role of science in economic development) and OP Development of Eastern Poland (Modern Economy). The full list of options for the submission of projects under existing programs (direct and indirect support) is shown in Table 2.

At the moment, a change in the management of these programs takes place. A shift away from the central management of them for the benefit of public management occurs. Manifestation of such activities include establishment of new institutions that are associated with the handling of European funds which are funding research and development. The example is the establishment of PARP (Polish Agency for Regional Development) in 2001, or a change in recent years as a result of which, The National Research and Development Centre (NRDC) was formed, which is responsible for the area of applied and implementation research. Supporting role in this respect goes to the National Center for Science and the Polish Academy of Sciences (responsible for basic research). Decentralisation of management is also apparent in that there are new functions performed by the public sector in the area of setting new directions of innovation policy, creating activities to stimulate the development of innovation policy, providing financial support and the promotion of innovation in the context of tasks connected with competitiveness. Important in this respect are the local authorities (e.g. in the area of effective support of SMEs), the characteristic thing being that there is a diversification in the created projects (and used funds) in the individual programs resulting from different resources and different needs of particular regions. A sign of the growing importance of public management is the creation of

local (regional) advisory (or initiating) bodies composed of representatives of entrepreneurs, researchers and universities and industry associations [5].

Table 2

Opportunities to promote innovative development of the Polish economy in the framework of direct and indirect support of EU

Type of support	Type of activity (project)				
	Basic research	**Applied research**	**Development works**	**Demonstration**	**Diffusion**
Grants	NCS calls OP IE 1.1 OP IE 1.3 7 FP Cooperation 7 FP Industries	NRDC calls OP IE 1.4 OP IE 4.1 OP IE 4.2 ITI InnoTech ROP Bon na innowacje 7FP Possibilities CIP ERA-NET EUREKA			Technological loan OP IE 4.3 OP IE 4.4 OP IE 4.5 ROP
Loans		CIP	OP EPD 1.2		OP EPD 1.2
VC/PE			OP IE 3.2 National Capital Fund CIP		
Taxes		Innovativity fund			Tax reduction on new technologies

Indirect support			
Human capital development	Research infrastructure	Intermediary institutions	Cooperation and organization
OP IE 1.2 OP HC 2.1 OP HC 4.2 7 FP Ludzie European education and training programs	OP IE 2.1-2.3 OP EPD 1.1 OP EPD 1.3 Regional OP 7 FP Possibilities	OP HC 2.2 OP IE 3.1 OP IE 3.3 OP IE 5.2-5.3 OP EPD 1.3 Regional OP 7 FP Possibilities	OP IE 5.1, 5.4 OP EPD 1.4 ROP 7 FP Possibilities 5.1, 5.4 OP EPD 1.4 ROP 7 FP Possibilities

Source: Own elaboration based on M. Bukowski, A. Szpor, A, Śniegocki, *Potencjał i bariery polskiej innowacyjności*, Instytut Badań Strukturalnych, Warsaw 2012.

Very important for the development of innovativity in Poland are direct aid programs (54% of total aid). Indirect support is about 46% of the total funds allocated to innovations. The EU programs with the highest importance are OP IE (Operational Programme Innovative Economy) and the OP HC (Operational Programme Human Capital). The first is an example of direct support for innovative solutions and the second is an example of indirect support. This is due to the amounts of funds allocated under these programs for 2007-2013 (Table 1).

3. Evaluation of Feasibility of Innovative Activities within the OP HC

As previously mentioned, in the EU programs for the 2007-2013 period much of the funding is devoted to innovative activities. HC OP also includes supporting the development of innovation in several areas (see the previous section). Types of basic guidelines for the assessment of projects in the field of implementation of innovative implementations were elaborated in a separate document. In it one may find the definitions, the thematic scope of innovative projects and the methodology of selection of innovative projects. According to this document, innovation means seeking for better, more efficient ways of solving problems found within the area of ESF support.

Management of innovative projects under OP HC involves several steps. They may include:

- identification of innovative problems / issues included in the innovation topics of HC OP,
- preparation of the project for the HC OP,
- evaluation of the project (the competent intermediate authority),
- execution of the project.

Due to the limited scope of this paper, attention is given only to issues found in the last two stages.

Management of the process of evaluating projects in terms of their degree of innovation involves several important steps. First is the formal assessment, which aims at verification of the validity of submitted documents in terms of content, compliance with certain procedures, deadlines, etc. The second step is the evaluation of substantive content including research on the type of project, concept, size and accuracy of the idea with regard to the practical use of the final product (result) (Figure 4).

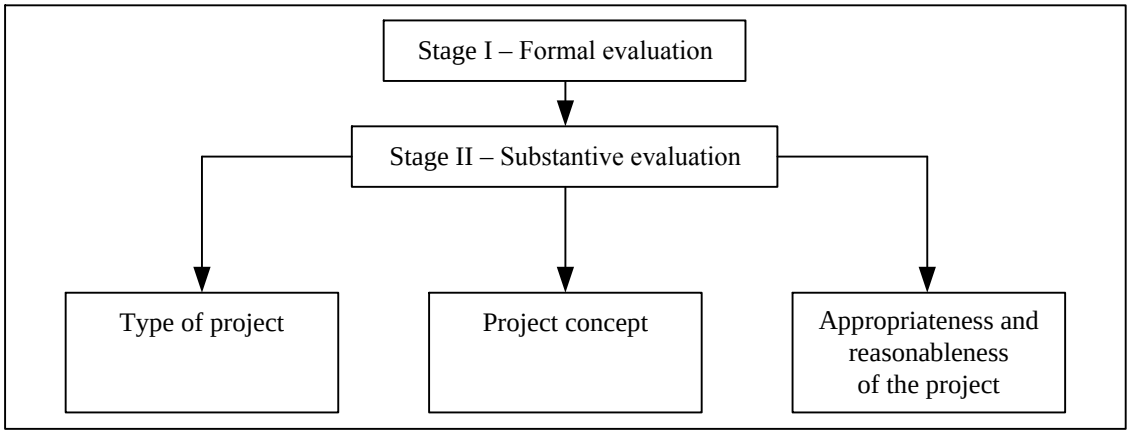

Figure 4. Stages of Project Management

Source: own elaboration

When specifying the nature of the project the typology proposed by the European Commission is taken into account. It includes the following types of projects: **test** projects based on

completely new solutions (aiming at the spreading of them) and **dissemination** projects aimed at introduction of good solutions (outcomes / end products) into use. The evaluation of the concept is on the other hand performed from the point of view of its innovative character in terms of the suggested topic. Below we present a list of examples of innovative topics in the framework of the OP HC (Table 3).

Table 3

Sample Innovative Topics within the OP HC

Scope of topics				
Search for new, effective methods of professional activation	Creation and development of cooperation of entities working in the area of employment, and social aid	Good governance	Linking the economy and higher education with the needs of the labor market	Adaptability
Topics				
Actions to extend professional activity	Innovations in the field of social support system and education of social workers	Increasing the civil activity (local and regional)	The modernization of provisional educational offer (customization to meet the market needs)	Testing of new methods of management in the enterprise
Instruments supporting the interest in new professions (niche professions)	Implementation of IT solutions aimed at improving the communication between social workers and institutions	Creation of instruments of effective communication and information flow in public institutions	Raising of professional qualifications of higher education students	Consistent training system in the enterprise
Prevention of social exclusion of children and adolescents	Creation of instruments in the area of coordination of activities in the field of social policy	Evaluation of administration based on the satisfaction of customers	Stimulating Stimulation of entrepreneurship among children and adolescents	Analysis, testing and implementation of the idea of flexicurity
Activation of unemployed in the economy or entrepreneurship	Recognition of trends and social problems ommited in official statistics	Professionalization of the sector of non-government organizations and social partners	Solutions in the area of commercialization of research	The use of knowledge management and change management in Polish companies
Reducing employment migration and attracting migrants to the Polish labor market	Search for efficient methods of ensuring the lasting of social economy institutions functioning	Supporting development of representativeness of citizen dialogue partners on a local and regional level. receivables equal	New models of lifelong learning (continuous learning models)	Methods of professional activation in the group of 50 + age
Search for new, effective methods of professional and social activation of groups	Tools for addressing the actions and the evaluation of their effectiveness (in the labor market and in social policy)	Social supervision over administration	Supporting students with individual educational needs	Creation and implementation of innovative solutions (adaptability of employees) in the regional market

Source: Stańczak M., *Projekty innowacyjne testujące w praktyce*, Fundusze Europejskie, Perspektywy Europejskie nr 6/7/ 4.

The size of the project means the scope of its "novelty" in terms of the recipient, the problem proposed for solving and / or means of support. In practice, this "novelty" becomes the end product (result) arising as a result of the execution of a specific project. In the first case (the recipient) novelty of the project is that it is directed to new, unusual audience, namely those who have not yet benefited from similar forms of aid (or did not receive support from other sources). However currently it is difficult to select such a group, because, in fact, almost all of the population groups have already used this kind (or similar) of aid. In the latter case, the novelty is the problem itself found in the project. This means that it was not previously included in the policy of the state and for the solution of this problem any tools have not been developed yet.

This dimension of novelty is most often used in emerging and brought for evaluation projects. In the third case (forms of support) the novelty is creation (implementation) of not yet used instruments for solving of already well known problems. It is important for this instrument to be as novel (not popular popular) for it to break conventions and stereotypes in the given area [Stanczak]. The source of these solutions does not have to be a new "discovery" but it may be the implementation of solutions (instruments) used in other countries and having a status of "checked and reliable instrument", but so far unused in our country. Between these dimensions relationships occur, what in practice may mean that there are no "pure" projects in one of these dimensions, but most are made with a mixed nature, where, for example the problem is mixed with the form of aid. The three-dimensional nature is shown in the following figure (Figure 5).

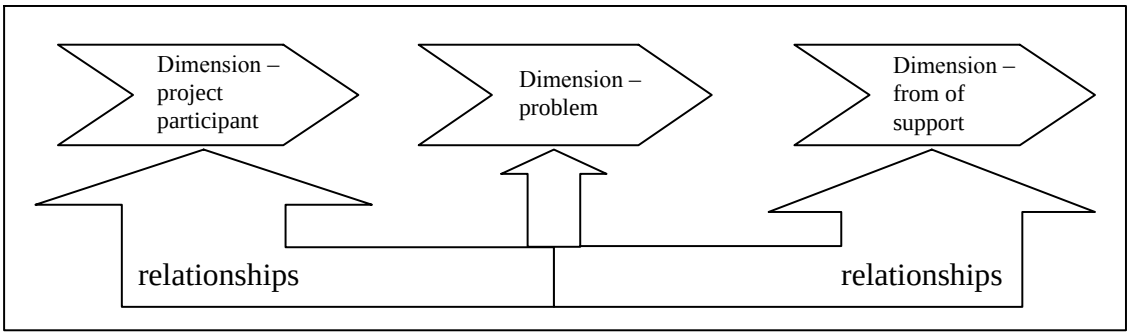

Figure 5. Three-dimensional nature of projects

Source: elaboration based on: Stańczak M., *Projekty innowacyjne testujące w praktyce*, Fundusze Europejskie, Perspektywy Europejskie nr 6/7/ 2012.

The next step is the implementation of the project which was positively evaluated and was recommended for funding. This is a crucial step for the project contractor (former applicant, and now the beneficiary of the project). As part of this step it is necessary to specify two main phases: the preparation for the implementation phase and deployment phase. In each of these phases one will find a number of components, arranged in chronological sequence. During the first phase we find, among others, diagnosis of the problem, creation of partnerships and development of a preliminary version of the final product (including the development of strategies for the implementation of this product). The second phase, which is much more complex

includes product testing, an analysis of the actual results, the development of the final product and its spread to practice (Figure 6).

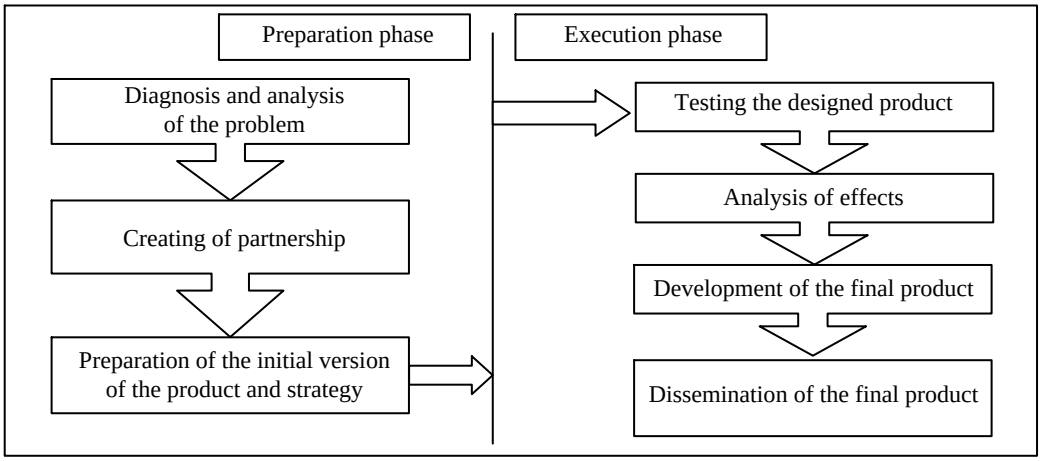

Figure 6. Phases of the testing project

Source: Stańczak M., *Projekty innowacyjne testujące* …, op. cit.

The first of these elements (in the preparation stage) is to confirm the existence of the problem described in the project. One may also order to carry out studies whose job it will be (in the future) to develop the most desirable end product. **Another element** in the course of preparations (creation of the partnership) can be brought down to building of networks defined earlier in the project. This is not a required condition for the future execution of the project, but experience from practice shows that the more actors, the more likely it is to end the project with a great success. However, it is necessary to define the principles and tasks during such cooperation. The final element of this phase is to develop a strategy for the implementation of the project. This is one of the more important activities, since it describes how to implement the project and achieve the final product. It is prepared in the form of a document that formed on the basis of the guidelines of the National Support Institution (NSI) [6]. This document is then verified by the thematic network (working as a forum for the exchange of experience) and on the basis of drawn up recommendations the intermediary institution makes a decision whether to adopt a particular strategy or reject it. In the case of a negative assessment, this institution has the right to terminate the agreement for funding the project. The spendings up to the date are reimbursed.

The second phase of the project begins with **the testing** of the developed product. The target in the end of this element is to **determine** the **effects** that the product causes in reality. They are compared with the assumptions included in the project and the strategy presented in the earlier phase. In case of too high deviations a modification of the product is made. Based on the achieved (by testing) results the effectiveness of the developed tool and effective implementation of the final product are rated. The last step is to work out the final result in the form of a product and implement it into practice.

Undeniable in this whole process of project management is the role of indirect beneficiaries (other entities participating in the execution of the project in general) as the mutual exchange

of experience between the main beneficiary and the cooperators can improve both the strategies and the final product. Such cooperation should develop in both the first and second phase of the project execution [6].

4. Conclusion

Poland is not one of the leaders of innovation in Europe. Therefore, most of the current EU programs for years 2007 -2013 are devoted to improving innovation across the economy, including. companies. In fact, all of the available programs in their content include activities for innovation. One of the most "innovative" programs is the OP IE being a form of direct support for the development of innovation. Great importance in this respect is given to the OP HC, which through indirect support implements innovative actions.

Management of projects under EU programs is not an easy task. It includes a number of steps, starting with the presentation of the project, through its evaluation up to the obtaining of the final product. Basing on the example of OP HC it can be concluded that innovation projects can have a multi-dimensional character which greatly expands them, creating a number of phases of their execution, achieving and implementation (spreading) of the final effect. The complex nature of projects requires the involvement of many entities. This is to ensure the development of a better strategy for the implementation of the final product and to develop a more useful form of it in practice. It is believed that in the new programming period (between 2014-2020) the mechanism (and thus the management of projects) will be subject to a radical change. It will be forced by the change of the form of state aid (a departure from grants in favor of loans).

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FROM TAYLOR TO TAILORING – IN PURSUIT OF THE ORGANIZATIONAL FIT

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Abstract

The Principles of Scientific Management designed by Frederick Taylor [1] advocated a unique and optimal manner of work which was for decades considered the best approach. Yet, things have changed since Taylor and nowadays that approach seems decoupled from the dynamic changes in markets, technology, or the business environment. Furthermore, at a time when projects are becoming more unpredictable, complex and changeable, the existence of a pattern can reveal itself to be an obstacle to the success of the organization as it constrains its flexibility.

Although evidence on Project Management research corroborates its advantages to any kind of organization, it is now widely accepted that "one size does not fit all" and an effort should be made to suit the Project Management approach to the organization's maturity, capacity and type or scale of the projects concerned.

Thus, combining the interplay between project's type and Project Management, the present paper aims to answer the following question: should the organization be changed to adapt itself to the project or on the other hand should the project adapt itself to the organization? Through an empirical case-study examination complemented by literature review, this paper outlines the importance of a proper and appropriate tailoring to foster an effective balance between administrative effort and project effort in the organization in order to achieve the most suitable organizational fit and avoid methodological myopia.

Based on but not limited to the diamond approach defined by Shenhar and Dvir [2], this paper also proposes a simple approach to tailor the Project Management methodology to business projects based on their specific needs, environment and context and is intended to provide real examples to help project managers deal with this matter.

Introduction

In the current environment of unpredictability, high volatility and instability that characterizes the dynamics where organizations operate, it is nowadays undeniable that to survive they must go beyond business-as-usual and differentiate themselves in their ability to sustainably transform their business.

Indeed, if operations are key to ensure the organization's day-to-day is however by change that it can continually reinvent and strengthen itself, (re) creating products and services, defining new methods of work and/or changing production or organizational processes. Thus arises then the concept of project as the vehicle of change by which organization's strategies are implemented and Project Management as a set of knowledge, skills, techniques and tools that enable the management of projects in a professional way.

However, although evidence in this discipline corroborates the broad benefits it brings to management, it should not be presumed a Project Management approach equal for all. No two projects are the same and the level of control required for a multi-million dollar project is much greater than that required for a project only costing a few thousand dollars. Therefore, a tailoring effort should be made to Project Management processes so they can fit the type or scale of the projects concerned as well as the organization's maturity.

Therefore, this paper starts by reviewing and defining the concept of fit as it is central to the tailoring model. Then, literature review is conducted on the tailoring theme, mentioning perspectives on Project Management standardization versus tailoring and pointing out the risks of Project Management methodological myopia as well as drawing attention to the need for a more appropriate and tailored application of project management processes and techniques across the spectrum of project environments. Afterward, the diamond approach is presented as defined by Shenhar and Dvir [2].

Following the theoretical background, the Data Analysis and Discussion illustrate literature with findings from an empirical case-study conducted and suggests a conceptual model for project classification and methodology tailoring.

Finally, the Conclusions section exposes implications for management and recommendations for further research.

Literature Review

The "Fit" Challenge

The concept of "fit" seems simple but is actually a complex construct that relies on the assumption that its meaning is well-known and consensual among Project Management academics and practitioners. Hence, the starting point for this paper is to challenge the "fit" concept assumption by reviewing existing literature on the subject.

This concept is not new and roots in the organizational strategy area of knowledge, namely, in contingency theories of strategy [3]. Those theories assert that different external conditions might require different organizational characteristics and highlight that the most appropriate strategy is a combination of the context of an organization (environmental factors, structure) and its implementation (the actual practice and activities undertaken to realize strategy) which both influence its performance.

While correlates of structural and environmental attributes have been well studied for the organizational perspective, the Project Management literature have for long ignored the importance of project contingencies and just recently this topic has gained interest among the research community, where a major investigation focusing on the "fit" concept and its implications for Project Management was conducted [4]. Nowadays, several authors [2] [5] [6] [7] [8] have stressed the fundamental idea that there is no single or best way of organizing projects, this is, one size does not fit all organizations.

In fact, different organizations have different strategies, operate in different environments and therefore require different approaches when it comes to Project Management. Then, as put it by Thomas&Mullaly [4], fit represents the particular practices, structures and approaches that are most appropriate – that fit – a particular organization, in a particular environment, trying to reach a particular strategy.

The value of Project Management implementation is therefore fundamentally determined by its fit as the measure that states to what extent did the implementation met the needs of the organization or enables its success in delivering projects and do not get the proper fit of the methodology can be an obstacle to the success of the organization's projects.

From Taylor to Tailoring

The Principles of Scientific Management designed by Frederick Taylor [1] advocated a unique and optimal manner of work which was for decades considered the best approach. Yet, a lot of factors has changed since Taylor's "one best way" approach, such as the dominance of customer's role, the dynamic and unpredictable environment or the nature of tasks which are now mental, unique and complex, just to name a few.

Effectively, the standardization of processes, procedures and tools is based on a critical need – prevent reinventing the wheel every time a project initiates and thus save time and energy, reduce rework and increase quality, among others. Moreover, the existence of a standard removes ambiguity and constitutes itself as a factor of internal stability capable of providing the main conduct guidelines or modus operandi in the context of a project.

However, some authors [2] [5] [6] [7] [8] have recently alert that Project Management standardization may obstruct the success of the project since its few elasticity peril an effective response to the dynamics and uncertainty surrounding projects, which are not so standard or stable.

In fact, any Project Management methodology implicitly presumes a single approach based in best practices which can led to a tendency to presume that everything must be done exactly as prescribed, referred as "project is a project is a project syndrome" by Shenhar&Dvir [2].Also Crawford[8] mentions the same problematic for maturity models, affirming that *"maturity models typically suggest that all firms must strive to progressively achieve prescribed levels of practice across the same range of "best" practices. But what constitutes best practice for whom and under what circumstances?"*

Likewise, Milosevic and Patanakul [9], who studied the influence of standardized project management (SPM) in projects success, concluded that: "*deploying a standardized PM process from the OPM level may increase project success but only to a certain point. Increasing standardization further beyond this point – which we referred to as an inflection point – may actually stifle project success."*

Often Project Management processes are followed literally and blindly, which ultimately lead to a robotic Project Management, inflexible to accommodate the usual dynamics of a

project and which may result in resistance towards a structure tended to be excessively bureaucratic. It should be noted that the processes set by a methodology are not an end in themselves, but rather are intended to facilitate the delivery of the nuclear project, under prejudice to achieve such an administrative workload that hinders project success. Consequent to this panorama, agile methodologies are becoming increasingly popular and seen as light or just-enough Project Management.

This methodological myopia allows us to observe a spectrum of adoption which has its extremes in the "Heroic Project Manager" and "Robotic Project Manager", described below.

Table 1

Spectrum of methodology adoption

Heroic	Robotic
Doesn't follow any methodology	Follows the methodology blindly
Few documentation and control	Excess of documentation and control
Agile and flexible	Slow and inflexible
Management by exception	Management by the book
Thinks outside-the-box	Stuck in-the-box
Project Management as an art	Project Management as a science
Accidental Project Manager	Professional Project Manager

Source: Adapted from Managing Successful Projects with PRINCE2® and complemented by the authors

In order to arrange for the right balance between those two opposites and preventing the inflection point as referred by Milosevic and Patanakul [9], the concept of tailoring has grown in importance over the years and even institutional methodologies like PRINCE2® [10] have made it a foundational principle.

Effectively, examples like the demand to fill the same sized documents regardless of the complexity of the project, the presence of irrelevant checkpoint meetings, the slow pace noticed in the delivery process across departments or in decision making, resistance in methodology implementation or, in the other hand, methodology being adapted or modified in an ad hoc manner, clearly represent syndromes of an inadequate fit between project management processes and project environment and illustrate the need for a tailored solution.

Tailoring can then be described as the ability to adapt or tailor the Project Management processes to the characteristics of the project and its context and ensure that projects are managed with the proper amount of documentation and control and related to the project environment and product design. For an effective tailor approach, the organization must be then acquainted about project environment factors and subsequent classification according to those. One of the most renowned frameworks for project classification is the Diamond framework, described below.

The Diamond Approach

A common approach for project classification is that of UCP model (uncertainty, complexity, and pace), later adapted and theorized by Shenhar and Dvir [2], in an approach they titled Diamond Model. According to these authors, projects can be categorized based upon four criteria or dimensions where each dimension results into four different project types:

- **Novelty** – represents how new is the product to the market and users (Derivative, Platform, New-to-the-Market, New-to-the-World);

- **Technology** – states how much new technology is used (Low-tech, Medium-tech, High-tech, Super High-tech);
- **Complexity** – measures the complexity of the product or project organization (Material/Component, Assembly/Subsystem, System, Array/System of Systems);
- **Pace**– reflects how critical is the project time frame (Regular, Fast/Competitive, Time-Critical, Blitz).

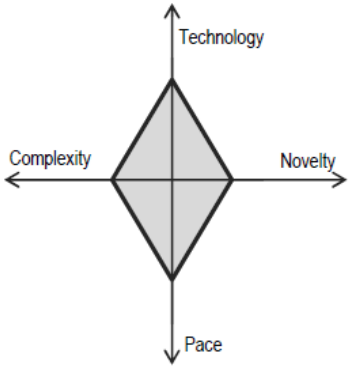

Figure 1. Diamond Model Dimensions

A unique Project Diamond describes each project context, and the specific project diamond determines what the appropriate management style for a particular project is. This model is based on the premise that a proper project classification prior to project initiation and a carefully selected management style may lead to better implementation and to an increased chance of project success.

While the Diamond Model is considered to be a suitable framework for project classification, it is vague about its implication for Project Management methodology in different project types. Therefore, using it as a starting point for project classification, we propose in this paper a method for tailoring project management methodology according to project types.

Research Methodology

Our research objective was to answer the following question: should be the organization to adapt itself to the project or in the other hand should be the project to adapt to the organization? To accomplish this objective, and considering the limited knowledge and perspective in Project Management methodology tailoring, case-study research was used in this study.

This study was conducted in the IT Business Unit of one of the largest retail companies in Portugal which comprises more than 150 people and a portfolio of110simultaneous projects by the end of 2012. For the purpose of this research, a sample of 44 projects was considered and during 6 months, a researcher spent approximately 2 days a week at the company. Several sources of data were used, e.g., observations, interviews, and studies of written material, such as project documentation, technical documents, minutes, company instructions and records.

For this purpose, as-is status was analyzed, a method was proposed for intervention and conclusions were gathered based on interviews, observation and a satisfaction survey.

Data Analysis and Discussion

As-Is State

Based in 32 interviews conducted at the Project Management team, when asked about major difficulties in project management, a common complaint was that Project Managers were struggling with the extensive duration of projects perceived as a result of the amount of paperwork they need to comply with.

Having this issue as a starting point, analysis carried out has shown that the business unit applies the same Project Management artifacts regardless of project size or complexity, making projects indistinguishable and resulting in around 20% of project total duration being concerned to project management work even for projects considered simple. Moreover, we found that projects were prioritized based only on its duration and budget, leaving behind crucial criteria such as complexity or level of innovation involved.

Proposed Method

In view of the as-is state described, our method was built upon the Diamond approach but extends it by addressing some issues of concern specific to the business unit referred needs. As a result, the following steps were implemented in order to tailor the methodology used:

1. The researcher analyzed a sample of the department's project portfolio and through interviews gauge a set of dimensions considered insightful to the organization and which typically were used to characterize the projects undertaken although not in a standardized way; this characterization was based in four main dimensions – complexity, innovation, criticality and client – which in turn were breakdown in a subset of criteria such as planned duration (complexity), type of innovation (innovation), impact on failure (criticality) or business unit priority (client), among others related to the business unit and organization environment; as some criteria were more valued by the company than others, different weights were defined for each criteria.
2. After validate with the five main stakeholders the dimensions and set of criteria to be considered, a set of configurations were outlined for each criteria, representing the parameters in which projects are classified and prioritized; those dimensions, their significance and configurations defined are represented below.

Table 2

Project Dimensions and Configurations

	Dimensions	Dictionary	Configurations
Complexity	*Planned Duration*	Timeframe, within a defined start and end dates, to execute the project	<= 4 months / 4 months > <= 8 months / > 8 months
	External Investment	Level of investment in the project by external entities	<=10K / 10K > <=40K / > 40K
	Number of Impacted Applications	Number of current functional applications that will be impacted by the project	<=3 / 3> <6 / >6
	Number of Functional and Non-Functional Requirements	Number of functional and non-functional requirements identified for the project	<=3 / 3> <6 / >6
	Number of Teams Involved	Number of internal teams required to execute the project	<=3 / 3> <7 / >7

	Dimensions	Dictionary	Configurations
Innovation	*Type of Innovation*	Type of innovation of the final product of the project	Evolution / Change / Study
	Changes in Users Work Procedures	Level of extend in which the current users work procedures will be impacted after project implementation	Don't change / Changes partially / Changes totally
	Changes in Support Work Procedures	Level of extend in which the current support work procedures will be impacted after project implementation	Don't change / Changes partially / Changes totally
	Need of New Suppliers	Describe the need for new suppliers external to the organization	Yes / No
Criticality	*Deadline*	Imposed constraint regarding delivery date	Yes / No
	Legal Constraint	Informs if the project results from a legal constraint	Yes / No
	Impact on Failure	Presents the level of impact in current applications if the project fails	Loss in productivity or efficiency / Loss in results or brand image / Legal non-compliance
	Visibility	Level of visibility of the project in the organization	Employees / Executive Management / Customers
Client	*Sponsor*	Identifies the position of the project sponsor within the organization structure	Director / Administrator / CEO
	Business Unit Priority	Importance of the project for the Business Unit	Could / Should / Must

3. Projects are then characterized for each criteria and, in view of the spectrum of configurations drawn and as a result of the combination of weights for each criteria, they will fit in a pre-defined project type; three project types were delineated – Light, Medium, Advanced – representing the project profile in which any project undertaken by the business unit could fit in accordance to its assessment of project criteria:

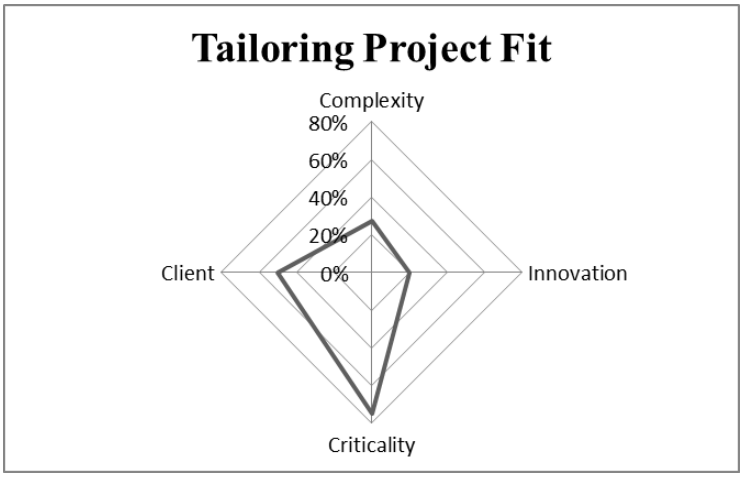

Figure 2. Level of Project Fit

4. Finally, tailoring was made to the current business unit's Project Management methodology by defining the processes and deliverables applicable to the three different project types; the project type obtained from project characterization will then determine which methodological deliverables are required from the Project Manager. The methodology proposal followed the PMBOK® [11] framework, presenting deliverables distributed through the project lifecycle and according to the project type, exhibited below. Five versions of the tailoring proposal have been presented till a final version reached a consensual approval by the five main stakeholders in the Business Unit.

Table 3

Project Management methodology tailoring according to project lifecycle and type

Project Lifecycle / Project Type	Light	Standard	Advanced
Initiation	• Project Charter	• Project Charter	• Business Case • Project Charter
Planning	• Product Breakdown Structure • Project Plan • Kick-off meeting	• Stakeholders Management Matrix • Product Breakdown Structure • Risk Register • Project Plan • Kick-off meeting	• Stakeholders Management Matrix • Risk Register • RACI Matrix • Communication Management Plan • Procurement Management Plan • Project Plan • Kick-off meeting • Capacity Planning
Execution	• Change Request	• Change Request • Intermediate Deliverables Acceptance	• Change Request • Intermediate Deliverables Acceptance • Team Performance Appraisal
Monitoring and Control	• Status Report • Change Request	• Status Report • Change Request	• Status Report • Change Request • Steering Committee
Closing	• Final Acceptance • Internal Report • Lessons Learned Report	• Final Acceptance • Internal Report • Lessons Learned Report	• Final Acceptance • Internal Report • Lessons Learned Report

The tailoring method proposed has by foundation the fact that the work for Project Management activities should planned according to the technical work involved, typically ranging from 5% to 25% of the effort considered, and thus enabling an effective balance between the administrative effort and Project Management effort.

It should be stressed however that the proposed tailored approach to project management methodology presented in this paper is not intended to be comprehensive since as in any other process of Project Management the process of tailoring must be tailored to the company needs and continually refined in light of lessons learned, as what can serve a project does not necessarily have to serve another.

As a result of efficient application, the method aims to avoid redundancy of information, optimize methodology, improve the quality of information and avoid resistance to methodology implementation.

Conclusions

We tried to tailor the current company processes to fit the characteristics of the specific project, making them more proportionate to the size, complexity and risk level of the projects. By doing this we aimed to ensure a just-enough-project-management, enabling complex and risky projects to have the strong rigor and governance required to successfully deliver a compliant project but also enabling that smaller projects are not over-burdened.

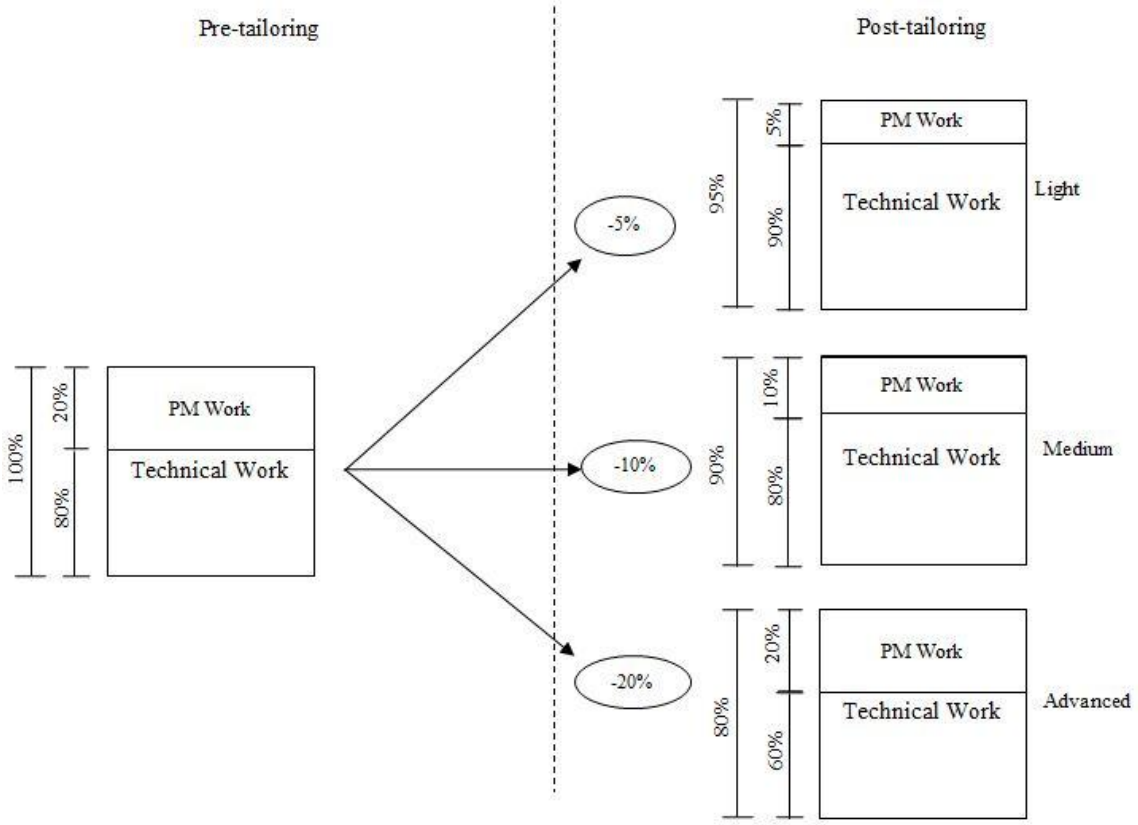

Figure 3. Impact in project total work after methodology tailoring

The results of this research had clearly indicated a considerable decrease in projects duration due to the decomposition and classification of the business unit portfolio into different project types, involving different levels of intensity about the project management deliverables required in the methodology, which in turn free valuable time for Project Managers actually manage their projects. That reduction was mostly noticeable in the "Advanced" project type, resulting in a decrease of around less 20% in total project work, as shown in the Figure 3.

For a more concrete impact measure on the method implementation, a baseline for a project plan containing the business unit project lifecycle for a typical complex project was set previous to the project management methodology tailoring. After project management methodology tailoring implementation, the same project plan was revised, resulting in a positive variance of 11 days, as presented.

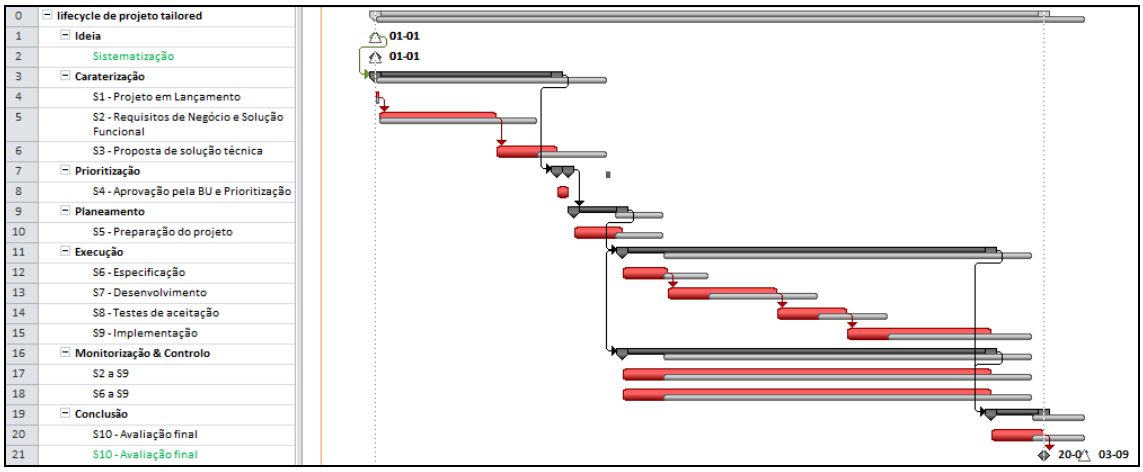

Figure 4. Impact in project total duration after methodology tailoring

Additionally from the total duration reduction, we observed that the quality of information present in Project Management documentation has improved, being now more accurate and reliable as Project Managers understand the real benefits and use of the information provided. Moreover, the variability in how the processes are performed across the organization is reduced and nowadays the business unit benefits from having a reference and a standard process for tailoring project management methodology which enables all intervenient to share the same language and easily distinguish and understand the priority given to a certain project.

Consequently, based on 31 interviews conducted after implementation to the same people who participate in initial interviews, the satisfaction of both Project Managers and organizational stakeholders has increased when compared with the initial state. A satisfaction survey was also distributed regarding the methodology tailoring applied which also corroborate this point, leading to a satisfaction rate of circa 95% among a sample of 31 people from the business unit.

Thus, despite its exploratory characteristic, this study highlights the importance of having a project management methodology that actually fits the organizational needs, taking into

account an adequate balance between project management and administrative work and leveraging the chances of project success as project managers free time to effectively manage the project.

The finding of this study also suggests some managerial implications as it is patent that the organization should adapt itself to the project by not forcing a project management methodology but instead define it in concordance with the project portfolio characteristics. In the other hand the project too should adapt to the organization in the way that, despite the different levels of project management work intensity related to project type, all projects must follow a pre-defined and standardized methodology. Hence, management could set a standardized process for project management methodology tailoring yet it should be sufficient adaptable to suit the organizational needs under the risk of achieving a new inflexion point, where Project Managers show resistance towards the applicable methodology since it doesn't suit their requirements.

Conclusions

Even though this study has a limited empirical basis, with just one case considered and narrowed to a business unit in a specific industry, we believe that the findings indicate something important: organizations need to have sufficient formal and standardized processes to achieve efficiency and consistency, but also must have the ability to provide themselves with sufficient informal and flexible processes that allow them to adapt and innovate.

Thus, in essence this paper does not deny the importance of standardization as a foundation of best practices within organizations but stresses the benefits of tailoring as well as exposes the risks of Project Management myopia which can lead to implications in project management quality and effectiveness.

Future use of this model could result in a more effective and structured approach for projects execution which in turn will result in business benefits achieved. In addition, this model can work as an incentive and vehicle for applying the tailoring method in various project environments.

Recommendations for further research could include the tailoring of specific processes within Project Management such as capacity planning or cost estimating. Little research exists on the subject of resource allocation within tailored environments, relating resource competencies and experience with different project types, which could result in more comprehensive conclusions about the role of tailoring in project management theory.

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DEVELOPMENT OF PUBLIC AND PRIVATE PARTNERSHIP PROJECTS IN LATVIA

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Abstract

The public and private partnership (PPP) positively influence the state social and economic management and development. Government representatives put weight in the dialogue between the PPP, since it can grant the entire state's stability. But in Latvia private partners do not receive state support, neither as participation aid in the EU fund project organization, nor as tax relief or direct financial subsidies, which are regular practice in other countries (Italy, Ukraine, Belgium, Finland, Sweden). [1]

The purpose of the article is to analyze PPP project development in Latvia and the EU and compare some implemented projects.

According to the analysis of PPP projects the authors carried out, encouraging the use of PPP is mentioned in the National Development Plan of Latvia and in the action strategy of the Ministry of Regional Development and Municipalities, but none of these specify any projects or PPP financing model introduction dates. The analyzed projects suggest that they have some common characteristics, such as difficulty in establishing cost efficiency, and solvency of the partners, as well as unpredictability of a project's sustainability.

Introduction

Majority of the world's PPPs are used for public services, infrastructure development and maintenance. That way economic growth is fostered and wellbeing of the population is provided. The PPPs have a very short history in Latvia, according to the FM, LIAA and CFLA sources. The web page of FM says that "the idea of PPP in Latvia dates back to the end of 1990s, when the Ministry of Transportation indicated that it was necessary to make use of the opportunities provided by the PPP financing model, and in 1998 a workshop was started to develop the Law on Concessions. For two years, devoted effort was put into it, and the law was

accepted and enforced on January 20, 2000. This was the beginning of the PPP development policies. The conception of Concession Promotion (attraction of private capital to perform government functions) was approved on April 16, 2002.

1. Development of Public and Private Partnership

The Ministry of Economics and its supervised state agency "Investment and Development Agency of Latvia" (LIAA) was appointed to be in charge of PPP policy development and PPP promotion.[2] After approval of the concession promotion conception, a Concessions Department was established at the Ministry of Economics in 2003 and later through reorganization became the PPP Department. In February 2004, the state agency LIAA began work on PPP promotion, and formed the PPP department in May 2004. [3] During this period the LIAA have been actively organizing various meetings and provided consultations to public, private, and non-governmental entities on the questions relating to PPP implementation, thus encouraging development of PPPs in Latvia.

In order to fix the most essential problems affecting application of PPP in Latvia, identified by the conception, the Cabinet of Ministers approved the policy planning document "Guidelines for Promoting Public and Private Partnership in Latvia", by regulation No. 188 of March 23, 2005, which determined the government policies, core principles, goals, and priorities for the PPP promotion from 2005 to 2009, and approved the action plan for the implementation of these guidelines from 2006 to 2009, by regulation No. 736 of November 16, 2005 "On Action Plan for Implementing Guidelines for Promoting Public and Private Partnership in Latvia in 2006-2009". [2]

In accordance with the action plan, several activities were and are still being iplemented in the following directions:

- coordination of all institutions and organizations involved in the PPP process[4] – coordinating the issues to be tackled, plans etc., ensuring their consistency;
- PPP research by the sector – analysis of economy sectors was carried out, which establishes the most appropriate sectors for PPP projects according to the international practice, and the most appropriate PPP implementation models were identified; [5]
- creating instruments encouraging PPP processes – to help understand the essence of the PPP mechanism and project development, in 2007 the "Guidelines for Implementation of Contractual PPP Projects". Similarly, a PPP project risk aversion methodology was developed in 2008. [5]
- The Ministry of Finance has developed and posted on their web page (*www.fm.gov.lv/*) standard PPP project documentation in some of the sectors of economy.
- Improvement of understanding and knowledge of PPP – according to the web page of the Public and Private Partnership Association (*ppp.gov.lv*), it collects and provides information to the public about what is happening and topical. It also provides consultations to all planned PPP project implementers.

In 2005 LIAA began preparations for five PPP pilot projects. The purpose of these pilots was to establish good practice and assess potential obstacles to PPP implementation.

The projects were selected from different sectors and assigned different potential PPP models [6]:

1. construction and maintenance of a new pre-school education institution in Cēsis (BOOT);
2. reconstruction of the Jēkabpils head supply system (Concession);
3. renovation and maintenance of the art school of Ogre (RFO);
4. Cēsis town street reconstruction and maintenance (DBFO);
5. construction of housing for social and rental apartments and their maintenance in Salaspils (DBFO).

Based on the practice of these pilot projects, work began on the PPP standard documentation and guidelines. Financial calculations for these PPP projects were prepared but only one was implemented, namely the renovation of Ogre art school.

The obstacles found in regulations during the PPP implementation practice, and improvement of the PPP legal framework and coordination of the Latvian legislation with the new European Parliament and Council Directives (2004/17/EK coordinating the procedures for assigning contracts to subjects operating in the water supply, energy, transportation, and postal services, and 2004/18/EK coordinating contract assignment in construction, delivery, and services), formed the basis for beginning to work on a new PPP regulation in 2005. The created Public and Private Partnership Law was adopted on June 18, 2009 by Saeima and came into effect on October 1, 2009. [2]

Following this decision, the Cabinet of Ministers handed over the PPP policy development functions from the Ministry of Economics, including LIAA, to the Ministry of Finance, at the same time transferring the financial and human resources intended for for the provision of these functions. As a result, currently (since June 1, 2009) the Ministry of Finance is the leading government administration institution responsible for the PPP policy development and coordination of its implementation. [2]

On January 19, 2007, the PPP consulting board was formed. The board was created to promote cooperation between PPP-competent institutions. It acts as a consulting and coordinating institution aiming to foster development and implementation of a unified PPP policy.

In light of the ever more frequent application of the PPP model in the new EU member states, there is increasing necessity for unified informative basis. The European PPP Expertise Centre (EPEC) provides opportunities to share experience in application of complex financing models in the PPP implementation (Latvia became its member in 2008). [7]

A study made for the LIAA shows that the highest level planning documents (both national and those of ministries) identify general necessity to use PPPs for infrastructure project development, and introduction of state PPPs as a financing instrument (Latvija's National Development Plan 2007–2013; Latvia's natinal Lisbon programme 2005–2008; Latvia's public and private partnership promotion guidelines; State strategy framework document 2007–2013; RAPLM action strategy 2008–2010), but there is a lack of connectedness between the PPP support and promotion activities mentioned in the various planning documents on the field and state institution level, and specific instructions are missing as to the PPP usage possibilities and necessary promotion activities. [8]

As of 2009, the International Monetary Fund forbids to increase state debts. Commencing of new PPP projects was limited. The prohibition refers also to the projects envisaging state

obligations and payments to private partners. The government in this case can negotiate the possibility to implement a particular PPP project with the International Monetary Fund, as it was during the common kindergarten construction and maintenance case of five municipalities. Even though the IMF prohibition stands, the financial and economic calculations continue. As of 2012 competitions are announced and contracts concluded again.

One of them was concluded on May 2 this year – the partnership agreement between the Baltic states on common medication and medical device procurement.

The PPP and its possibilities are mentioned and underlined in several essential field planning documents approved by the PPPA as well, e.g.:

- several priorities in the national development plan of Latvia 2007–2013;
- action strategy of the Ministry of Transportation 2007–2009;
- transportation development guidelines 2007–2013;
- action strategy of the secretariate of Secretariat of Special Assignments *Minister* for *Electronic* Government 2007–2009 (updated for 2008–2010);
- National sports development programme 2006–2012 etc.

2. Comparison of Public and Private Partnership Results with EU

The currently implemented projects total 59, 19 are under way, and 25 are planned. All the projects are implemented regionally and are related to public services – public transportation, utilities and maintenance, communications and construction or renovation of public buildings.

The International Monetary Fund (IMF) [9] had set restrictions for PPP project implementation in Latvia, but they concern the PPP projects begun in 2009. The kindergarten construction was made an exception because negotiations with the IMF [10] resulted in a permission for the municipalities to begin construction.

Comparison between Two EU PPP Projects

PPP projects in the EU member states are implemented on various levels – European Union, national, sector, regional, or business. EU – regional level – compare two EU member state projects. The EU has many regional PPP projects. For comparison I chose two which, in my opinion, satisfy the conditions: regional importance, topical, enough public information available. According to these conditions two projects were selected – the Sirius Academy and Royal Children's Hospital. Both projects were implemented within the same region. The Sirius Academy was founded in 2011, when its construction and furnishing was finished. The academy is a part of a vast programme – construction for the future of schools (BSN). [11]

The programme was developed to build or renovate all secondary schools in England. The public partnership is undertaken by the UK government together with municipalities in which each particular school is located. The private partner in the Sirius Academy is the Private Financing Initiative (PFI).

The New Royal Children's Hospital (RCH)[12] was built on the location of the old RCH and began receiving its patients in 2011, when the first stage of the hospital was completed. The second stage was completed in 2014. The old RCH building is intended to become park

territory. The private partner in this project is the Children's Health Partnership consortium, formed by the following:

- sponsors from the company "Babcock & Brown";
- builders from the company "Bovis Lend Lease";
- device operators from the company "Spotless Group";
- architects from the companies "Billard Leece", "Bates Smart";
- and many other cooperation partners.

Both projects required new buildings, attachments, and various services, for which reason the contractual PPP cooperation form was chosen. The project costs are considerable – the RCH cost $1.016 billion, while the SA cost £48.5 million.

In both projects, both partners have experience in partnership from implementation of PPP projects.

The contract validity term in the projects is 25 years. The private partner maintains the property in accordance with the standard indicated in the contract, for the duration of the PPP contract validity, from completion of the construction to the end of the contract validity.

The public partners received the expected result at the end of the projects:

- new institutions built;
- innovative solutions in projects;
- service improvement, expansion and efficiency increase;
- project compliance with the public partner goals.

Comparison between to PPP Projects in Latvia

On 25.06.2009 a project contract was concluded between the rural territory councils of Mārupe and Ķekava, municipality council of Ogre, town council of Tukums, and general partnership "ACANA", for construction and maintenance of four pre-school education institutions. [13] The criteria were applied to one of four municipality kindergartens, built latest in 2011 in Tukums as part of PPP. The other selected project is the contractual PPP contract of 2011 on catering services. According to the information provided by the Register of Enterprises, the catering contract is the latest PPP contract concluded to date. Both projects were implemented regionally.

The projects used contractual cooperation between PPPs, and the public partner signed a contract with the private partner on appropriate services and/or construction. The first project involved the municipality council of Tukums procuring both construction and mainenance services for a kindergarten. The second project dealt with the municipality council of Baldone procuring ready service – catering services, undertaken by the private partner SIA "KRĪGA".

The cooperation form of choice in both projects was concession. In the kindergarten construction case, the financial efficiency was attained by a deferred payment by the council and combined procurement – quantity discounts were applied. Since the kindergarten builders did not have sufficient funds, additional investment was sought through bank loan.

An essential aspect is the availability of the product or service. The catering services provided by SIA "KRĪGA" were available in the secondary school of Baldone and music school of Baldone. The new kindergarten services can be received by all groups of population within the municipality territory.

The cooperation term between the company and the municipality council of Tukums has lasted for twenty years. Over one year, the kindergarten "Karlsons" in Tukums was built, and 19 years were spent on its maintenance by the private partner. Following this cooperation the kindergarten will become the municipality's property without further payments to the private partner. The municipality council of Baldone and SIA "KRĪGA" have a certain cooperation period, three years from the moment of concluding the contract. In both projects, this is the first PPP project for the partners.

The type of partners' investment is different in both cases – in the case of Baldone school a ready service (catering) was procured; the kindergarten in Tukums was built and is maintained by the private partner, while the municipality makes monthly remuneration payments to the private partner.

Both projects were incepted by public procurement, as a result of which cooperation partners were found and a cooperation contract was signed. Both projects were implemented in a relatively short period of time and would not be possible without a private partner.

Conclusion

In relation to the economic fall in 2009, the government of Latvia observed the IMF restrictions determining that no PPP contracts may be concluded if they increase the state budget long-term obligations. The agreement and conflict protocol for 2013, between the MK and Latvian Municipality Association on September 27, 2012, provided municipalities with the chance to renew their long-term obligations starting with the next year, for public and private partnership contracts.

Currently, Latvian government institutions cannot provide a unified answer about the number of implemented projects after approval of the law on PPPs. The CFLA together with the Ministry of Finance indicate that one contract on three projects has been carried out – the pre-school education institution construction in Mārupe, Ķekava, Tukums. The RE notes that after the approval of the law the catering service contract has been implemented.

PPP is a way to achieve sustainable development and influence the economy.

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BARRIERS TO IT IMPLEMENTATION IN PRIMARY PRODUCTION BASED ON A PROJECT OF COMPUTER AIDED FARM MANAGEMENT

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Abstract

In the introduction of the paper the reader is introduced to the analyzed issues and its purpose is clarified. The subsequent sections are devoted to the presentation of the origin of the existence of the need for implementation of IT in the primary production sector in Poland, and clarification of the target and object of the already realized project of implementing a computer-aided system of farm management. Later in the paper an attempt is made to analyze and present the main barriers and problems occurring during implementing of IT projects in agriculture.

1. Introduction

The starting point for discussion of issues of implementation of computer-aided management of projects in agriculture, is the strengthening of awareness that primary production is the same form of conducting business as steelworks, sewing mill or processing plant. As it is known, in all types of businesses, regardless of industry, there are service or material goods production processes. However, due to the specificity of agricultural activity, the low awareness of financial turnover, targeting of spending's or revenue sources continues to be a fundamental difference between a farm and a specialized manufacturing company. As a result, the farms encounter great difficulties in developing and maintaining a competitive position on the European market. The undeniable claim is that the structured knowledge about the profitability of operations, gained from conducting proper accounting records, encourages operators to optimize their functioning, which subsequently contributes to continuous improvement and development.

While the European Union, through the accepted criteria for direct payment grants, or other support of operation of farms (e.g. the Natura 2000, Young Farmer programs), enforces the collection and archiving of information on terms and types of agronomic operations carried out, the use of this information by farmers is negligible. In the era of globalization, the information society and common data management, it is the credible, reliable and giving the opportunity for further "processing" information that is a key element of decision-making. This

applies to both large corporations and small businesses. Unfortunately, in Polish agriculture this still can not be seen.

For farmers to visualize the importance of data collection, it is necessary to make them aware of the possible benefits from it, using the simplest, measurable and understandable language for them, namely money. This is the task being the major milestone in the implementation of IT in agriculture. Hence, the EU decided to actually support the farmers using grants for projects supporting the implementation of computer programs for management support of primary production. However, the implementation of these projects meets a wide range of often difficult-to-overcome obstacles and difficulties arising from the socio-economic determinants of farms functioning.

The aim of this paper is to present the problems of preparation and implementation of a project of introduction of a computer system of management support in agriculture. In accordance with the stated goal the study will address the following issues:

- The issue of a necessity of implementing IT projects in the management of primary production,
- Presentation of the project implementing the management support computer system in a farm
- Problems and obstacles in the implementation of IT projects in agriculture.

2. Origin of the Need for Implementation of IT in Agriculture

As a result of research conducted by the author's [1] a positive phenomenon was observed, namely the fact that the farms that are highly specialized (targeted) to appropriate crops or livestock breeding are characterized by a relatively high level of knowledge about the profitability of the business. Moreover, due to this specialization they are more willing to sacrifice the whole of available land and time, human and financial resources to the optimization of the performed processes.

The bad news, however, is the fact that the vast majority of traditional farms in Poland is not able to analyze its profitability, because of not having the adequate data for analysis. This is because they do not collect documentation on time and the cost of operations. Many farmers, usually not having education in the field, with small or medium-sized farms, do not use tools management in conduct, i.e.:

- Does not analyze the cost-effectiveness of production based on production cost analysis compared to profitability;
- Does not plan the production size, compared to the business cycle;
- There is also no necessary documentation allowing a historical analysis of the profitability of manufactured products.

This kind of behavior leads to a loss of the competitive position, and may even contribute to the destruction of the farm. Already according to the theory by Peter Drucker the "father of scientific management", you can not manage what you can not measure. And as farmers, due to ordinary ignorance or unwillingness to make changes, do not make attempts to quantify their activities, they are unable to optimally manage the farms. This is one of the main causes of the need for designing of special, easy-to-use tools to collect data about the realized agricultural production.

Another aspect that has a very strong impact on the pace of implementation of IT for management in farms, is the very strong, organized, and thus extremely dangerous competition of sectors of primary production of the "old" EU member states. Farmers in France, Germany and Spain, are often fluent in two foreign languages, qualified agriculture professionals, successfully using a wide range of managerial skills. They are the owners and managers of specialized farms, equipped with modern, ridden with electronics machinery park, and effectively utilized using modern management supporting technology.

Polish agriculture, although possessing great potential, it is still not able to catch up with performance indicators and cost-effectiveness of the agricultural sectors of the "old 15". This is not only because of serious underdevelopment of the Polish sector or political difficulties in achieving equal conditions for the use of agriculture support funds (European Agricultural Guarantee Fund, the European Agricultural Fund for Rural Development), but also because of chronic and deep-seated aversion of many Polish farmers to the "novelty" of technology. Reduction of this phenomenon is not aided too much by high prices of these new products. The average Polish farmer is not able to earn for the purchase of new solutions such as machines or professional software. What's more, in the case of soft projects such as the development and implementation of management at the farm (e.g. implementation of IT), Polish farmers declare a deep scepticism about the need for their implementation. As a result, frequently modernized farms, possessing better machine park and producing high quality products (all thanks to investments co-financed by the EU), are unable to professionally manage their resources in order to optimize their use. This phenomenon also intensifies the process of decline in the competitiveness of the Polish agricultural sector.

As it is known, Polish companies since 1990 have faced the need for fundamental changes in their function, associated with the transformation from a centrally planned economy to free market. All business entities had to face the real market factors (demand, supply, competition). A number of them collapsed due to not adapting to the expectations of customers, the pace of technological progress or increased pressure of competitors. The agricultural sector in the past was extremely privileged (e.g. subsidized production – central setting of sufficiently high purchase prices, or a low cost of social security in the Farmers' Fund of Social Security) up to now has not fully adapted to the conditions of a free market economy. Due to the huge difficulties, both economic, historical and mental, farmers were not able to quickly convert their farms or diversify their business. This problem was addressed in a Community proposition of support of the agricultural sector, but the granting of it is subject to a number of criteria. One of them is the implementation of basic management methods involving the use of modern methods for data collection, archiving and analysis.

An important argument for the implementation of IT in the agricultural sector, is also the fact that the availability of this type of data, showing the accounting position and the state of the farm is the basis for applying for EU aid funds aimed at supporting the development of agricultural activity. Already in the pre-accession period, the professionally managed and specialized farms (there were not many), successfully achieved funds for their development, thereby deepening the already huge gap between highly targeted and traditional (having a highly diversified production) farms. This caused the initiation of the process of association of agricultural producers in the so-called Producer Groups or the of Fruit and Vegetables Producer Group. In this way, farmers have acquired a new, much stronger than in case of "solo" negotiating, position. This cooperation, however, requires the implementation of specific programs, which give the possibility of coordination of production and, therefore, generate a strong need for the use of IT in the primary production sector.

Integrated forms of cooperation are a very important opportunity for the Polish agriculture. Farmers working in the group have a number of benefits including:

- Cooperated production planning,
- Raising of standards of production by reducing operating expenses (common collective purchase of materials for production),
- Creation of large batches of products of the same grade and quality, allowing the sale to large wholesale customers,
- Elimination of brokers of goods between the farmer and the customer.

The producer group is now considered the highest level of primary production enterprises development – it is their association, cooperation or company. In recent years the number of producer groups in the western European Union countries has been declining. This is not due to a decrease of the effectiveness of activity of such entities, but on the contrary, the consolidation of groups to join forces by extending their activity with processing. As a result, a kind of consortia's are created with a very strong competitive position.

Therefore, from the moment of Polish accession to the EU the aim of agricultural policy is to promote the creation and development of this form of co-operation also in Polish rural areas. However, despite the many efforts and grants, relatively little interest in association can be seen among farmers. For this paper an attempt to analyze the problem of forming of producer groups has been made. This analysis has been prepared based on interviews conducted in 14 farms located the Łódzkie region. Conclusions are illustrated by the following scheme of the problem of formation of producer groups in Poland (Figure 1).

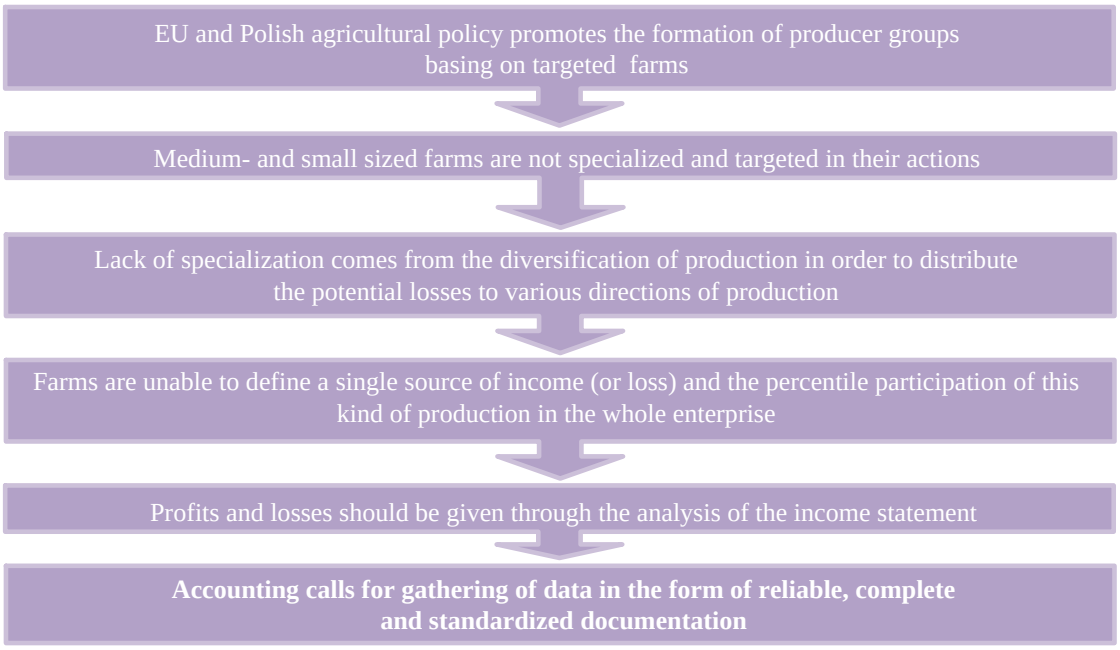

Figure 1. Diagram of the problem of formation of producer groups in Poland

Source: own elaboration

As can be seen from the above presentation, the main problem here is the need to create and implement appropriate software supporting management of both the farm group as a whole and each of the players individually. This is another argument for the dissemination of the idea of the profitability of the use of IT in agriculture and the need for the execution of projects that implement them.

The above-described most important reasons of implementation of computer-aided management in agriculture have, in fact, to "fight" hard with the socio-economic determinants of functioning of agriculture, which give relatively strongly resist any change. The most common barriers and difficulties in the execution of projects implementing new technologies in Polish agriculture are the subject of a later part of this paper. The authors in that part made an attempt to analyze this phenomenon and present it synthetically. Because the actions are based on the conclusions from the observations and analysis of the process of preparation and implementation of the project, aimed at the development and implementation of computer-aided system of farm management, they have both, the cognitive and application character. Due to the specific needs of the agricultural sector and the IT project in the next section it was decided to present briefly the scope, objectives and subject of this project.

3. Description of the Project Implementing Computer-Aided Management on the Farm

This project consisted of a set of activities related to the development and implementation of a computer system supporting the management of the farm. [2] Based on the analysis of the terms and conditions of the functioning of Polish farms and demand for management tools, a software prototype has been developed to support the management of the average farm with a relatively diversified production (mainly orchards – apples, cherries, black currants, plus the production of a wide range of other products – cereals, oilseeds, root crops, pigs and forests).

Each of these crops requires a different amount of work in the manufacturing process. Very often the plants of the same category, species or variety need different fertilizers and the amount and frequency of plant protection treatment (depending on the quality of the soil, the previous crop or other neighboring crops) to get the highest quality product. With such a large diversity of production and sources of income from each crop, the managers of the business were not able to determine clearly and reliably the most profitable directions of production. Therefore, a strong need for the introduction of notes on performed operations has risen, such as:

- Agrotechnical field work,
- Purchases,
- Sales of crops.

On the basis of accumulated knowledge about the creation and archiving of accounting records, awareness of possible errors, as well as the specific needs of the family farm, a tool was prepared as an application in MS Excel to comprehensive support the management of a farm with an agricultural and fruit-growing profile. The result of the introduction of the operation of recording of any information related to the operation of the farm, was the ability to analyze stock, crops or plant protection products. Moreover, an important part of an agricultural operation is also maintenance of a database of contacts, namely suppliers, customers and

employees, which also was one of the components of the proposed system. The advantages of the program being the subject of the project are:

- Ease of data entry,
- Utilization of numerous checkboxes in order to standardize the data and to facilitate its input,
- Ease of graphing and data analysis.

The application was entitled "Farmer". The tool has many features however, the input of data which is the most important part of the application is designed to prevent the introduction of erroneous information. To facilitate the work with the application it was divided into two modes depending on the user's knowledge, his knowledge of the program and the ability to work with a computer:

- Farmer's panel – easily and clearly structured, allows only current data entry;
- Admin panel – this level of analysis allows to archive data, requires a password as a way of granting access permissions.

This design of the program was to prevent the introduction of changes or data, which could interfere with proper operation. This was consistent with the suggestions of the panel of farmers and the final beneficiary of the project, with whom the application at the stage of its creation was constantly consulted.

The program was primarily aimed at mobilizing the farmer to systematically archive all data on the agronomic work carried out on the farm. It was also an instrument facilitating the selection of data needed to be saved by the farmer. As a result of its use it was possible to obtain complete information on the amount of revenues and costs of the specific lines of business and the profits generated from them. As mentioned above, the application contained a two-tier access system differing in the fill-in forms.

The farmer panel included a series of forms, which can be grouped as follows:

- Agricultural products entry form (tables: storage of agricultural products; introduction of new varieties of crops, adding new species of plants; introduction of plant species when adding new varieties of crops, use of crops);
- Performed agronomic operations entry form (data covering: operations contractors, workplaces, the type of performed operation, used set of machines, due date, start and end times, the comments on the anomalies in work);
- Purchases entry form (transaction data: the performer, date, type of document confirming the transaction: receipt, no document, invoice; supplier – the company or person with whom the purchase was made, the total cost of purchases – the value of purchases listed on the receipt / invoice as the sum of the whole transaction; the form of purchase – defines the place of purchase; purchased goods input table, product categories table);
- Sales entry form (entered data about: the seller – the name of the user performing the sale transaction, identifier of the customer, date, place of sale – the category of sale: direct sales from storage, sales through hawking, selling at the point of distribution, customer personal collection elsewhere than the farm, a different point of distribution);
- Warehouse catalog;
- Database of contacts.

The admin panel also included a range of documents grouped as follows:

- Catalogue of agricultural land (forms: fields belonging to the farm – table of properties of individual plots; crops planted in the fields – a table collecting information on historical and planned crops on individual plots; directory of leases – a folder containing information on the leased land and charges connected with them; cultivation on adjacent plots – tables presenting surroundings of individual plots; maps folder for each parcel);
- Warehouses catalogs;
- Catalogs of machines;
- Catalog of plants;
- Contacts;
- Analysis.

The execution of the project implementing IT in an average farm through the implementation of a computer system of management support was designed to solve basic problems related to the evaluation of cost-effectiveness of different types of production and the farm as a whole. The implemented "Farmer" application is a tool for archiving and documenting data and broadly understood analyzes.

The main objective of the project was to facilitate the gathering and organizing of information. It is important to emphasize the fact that the tool is planned to constantly evolve and adapt to the changes in the farm. After the pilot period ended in the described farm, the application has been used in a number of other entities. On the basis of direct observation and interviews with farmers and project coordinator the basic barriers were specified and the problems which we had to face during implementation of the project were described. By analyzing the information, an attempt to generalize this aspect in the whole issue of the implementation of IT in agriculture was made. The effect of these considerations is the subject of the next stage of this study.

4. Problems with Implementing of IT Projects in Agriculture

The process of implementing a project of computer-aided farm management encountered several obstacles along the way. Their analysis extended with data from interviews and observations led to general conclusions about the barriers of IT implementation process in the primary production sector. As a result of taken actions the authors have grouped the barriers, according to three types of criteria: technical, social and economic. However, before they are presented, one would discuss the observed universal issues. Importantly, the problems encountered when implementing IT projects in the sector of primary production depend primarily on the age and education of the farmer managing the farm.

The older less educated the farmer the stronger the barriers and the stronger they are embedded in the psyche. Moreover, in the group of older farmers the most common were technical barriers. They are a most troublesome group because, in most cases, they can not be overcame. The older generation, especially of poorly educated farmers, is not able to get accustomed to technical innovations such as a computer, software or the Internet. It can not be expected from them to be joyful at the thought of having to implement modern management methods.

Young farmers, often educated in the field and having a technical or higher title, are determined in their decisions and actions mainly by finite financial resources. It is true that, with the help of structural funds distributed under the sectoral policy, they can count on strong support of such activities, but despite the awareness of the needs they are still afraid to take the risk of investing a large sum in the IT field. After all, it is still a little publicized aspect, making it disrespected by the vast majority of farmers.

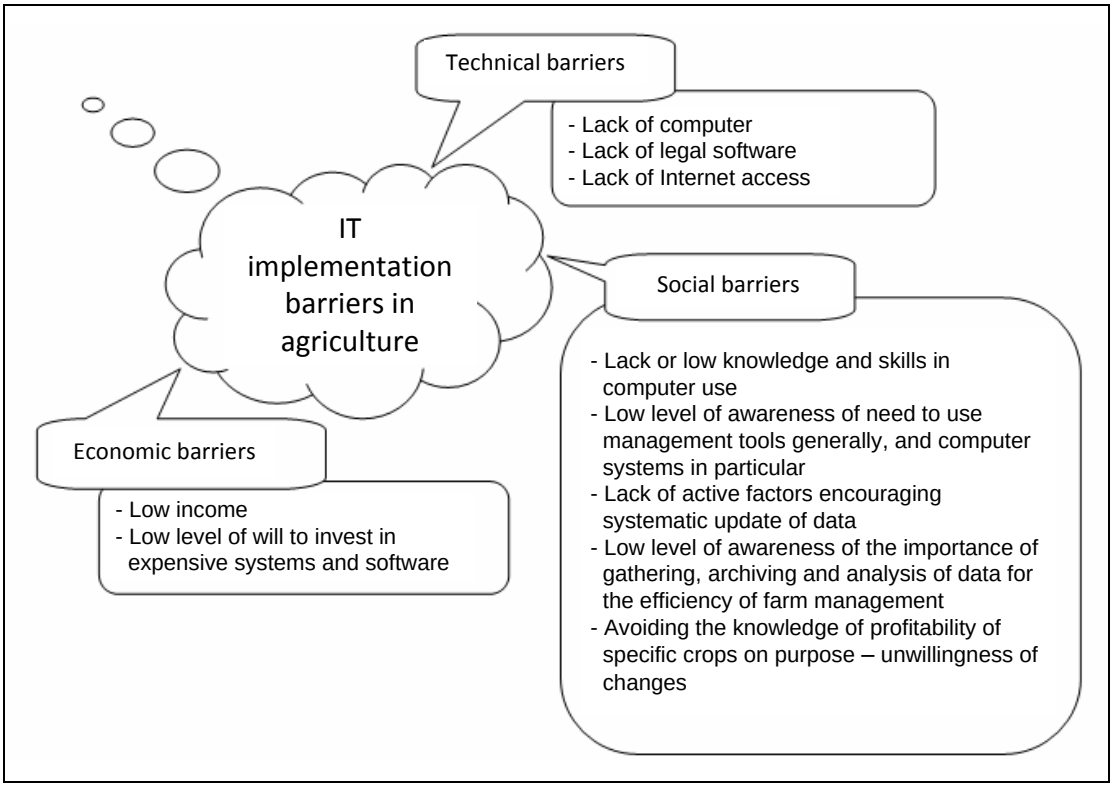

Figure 2. Barriers to the implementation of IT in agriculture

Source: own elaboration

The above figure shows a graphical representation of the process of determining the types of barriers to the implementation of IT projects in agriculture. Three main barrier types were distinguished: technical, economic and social. No computer or/and legal software is a fundamental problem in the implementation of IT in agriculture. Solving of it is a prerequisite for the existence of such a process. Difficulties in access to the Internet or too high costs of it are another issue that is a large obstacle in the professional management of the farm. Unfortunately, there are still many Polish rural areas that have great difficulty with access to the Web.

The second group of barriers (social and mental) is much more complex. This is because of the specific rural community, educational backwardness and inherited aversion and distrust of technology and technical innovations. Of course, most of these barriers are strongly correlated with age of the farmers. Lack of knowledge and skills in the use of computers is for

example a problem encountered mostly with older farmers. However, a systematic unwillingness to work with the program systematically, the low level of awareness of the need for management tools in general, and in particular, computer systems or the low level of awareness of importance of collection, archiving and analyzing data are the barriers present in almost every age group of farmers, regardless of their education. Disturbing is the fact that numerous farmers simply do not want to be aware of the profitability of individual crops, because they do not want to make any changes in farms.

The last barrier group includes economic issues. These are relatively the easiest problems to overcome, if there is a desire and demand for it. They mainly relate to financial limitations. The low level of farm income contributes to the dramatic decline in willingness to invest in expensive software and management support systems. So without major financial aid from outside the circle is closed, because for an average farmer it is very difficult to independently generate the profits to be able to freely invest in the implementation of IT solutions.

5. Conclusions

An agricultural business pursues the same objectives as a regular company regardless of the sector, meaning seeking to maximize profit at the optimum use of resources. Therefore, the primary goal should be permanent development. Improving of the execution processes in the farm may be based on various methods, among others:

- Modernization of machinery – modern, more efficient and less costly to operate machines;
- The use of modern methods of plant protection:
- Technical – such as safety netting, bird scarers;
- Chemical – broadly understood plant protection products;
- Ensuring the quality of produced goods by quality systems;
- Production insurance (a form of protection of realization processes).

Each of these methods, however, requires an investment of adequate financial resources and access to accurate and timely information, which emphasizes the importance of the implementation of the information system. Such a system may consist of several subsystems with different functions and objectives, but all try to meet the following conditions [3]:

- Collection and storage of data, giving the possibility of processing and analysis,
- Ensure that the data is presented in a manner accessible to employees at the time of everyday work,
- Provide strategic aggregated information, useful for a wide analysis
- Expand the chain of company value, meaning that system ought to be connected with external systems of information, including suppliers, customers and employees.

According to the above, one of the basic conditions for the effective functioning of the farm is to create an information system ensuring the development based on reliable data. However, in the opinion of the average farmer, the collection of complex data is almost impossible. Moreover, even if these will be gathered, without the possibility of rapid analysis they will be worthless. To meet these requirements, computer management support systems were created. This paper, based on the example of a project and the made supporting research a

trial of identification of the general barriers to the implementation of IT in the primary production sector was made. This is a very important aspect, because such knowledge may in the future lead to a precise focus of financial and substantial assistance to the agricultural sector.

In the era of computerization, trade liberalization and ruthless competition's an efficient, successful farmer, is no longer a man in wellingtons and felt coat, but a manager optimizing his production costs and maximizing profits. He is also an effective negotiator of contracts, permanently looking for sources of further development in the EU funds. Ability to implement and use the profits of technology is currently a prerequisite of effective farm management. That is why it is so important to be aware of existing barriers to the implementation of IT in agriculture and at the same time to take steps to minimize them.

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EUROREGION AS AN ORGANISED STRUCTURE FOR CROSS-BORDER EU FUNDS PROJECT (EXAMPLE OF THE POMERANIA EUROREGION)

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Keywords: cross-border cooperation, Euroregion, Euroregion project management

Abstract

The study concerns the presentation of the Euroregion as a special beneficiary and executor of cross-border programs with particular emphasis on Pomerania Euroregion. For this purpose, the European Territorial Cooperation (ETC) was described as the goal of cohesion/regional policy in the 2007-2013 period with an emphasis on its cross-border part. Then, priorities and activities of EWT are illustrated through operational programs in the selected Euroregion and attempts to identify the role of the Euroregion as an organized structure in project management in the context of ongoing projects was made.

1. Introduction

Euroregions dominated the European integration through the multiaspect impact on it. From these numerous aspects this study will address the impact of the Euroregion on the effects and the rate of use of aid funds, which find use in peripheral regions. Euroregions always had a special place in integration, which, among others resulted from the German idea of unification of the continent. However, later in addition to the integration role they have become a privileged beneficiary of aid funds. At the beginning of the genesis of the post-war integration this aspect was not so visible, but over time it became clearer, which was reflected in, among others, regional policy and its objectives. In the current financial strategy (2007-2013) EU regional policy is defined out in three objectives: convergence, competitiveness and employment and European Territorial Cooperation (ETC). In each of these objectives the beneficiary of structural aid may be a cross-border region or a Euroregion.

Euroregion differs from the cross-border region because it includes not only the definition of the extent of area basing on a cross-border cooperation agreement, but possesses institutions formed for its functioning. These are usually the Euroregion council, secretariat and thematic working groups and they are creating an organized structure. And if so, then this organized structure has an impact on the functioning of the area covered by Euroregionalization, including the acquisition and management of structural aid. And as already mentioned the Euroregion can

be the beneficiary of all regional policy objectives, but the Objective 3, namely European Territorial Cooperation is only directed to the peripheral, cross-border regions and Euroregions. However, the Euroregion as an organized region may use its organizational structure and special privileges to organize the project management of EU structural assistance.

It is common knowledge that the EU structural assistance is subject to regional policy, which is the basis for the entire process of managing, monitoring, control and evaluation. However, the euro-region can be seen (even basing on the above brief argument) as a kind of management structure. Therefore, the purpose of this paper is to present the Euroregion as the beneficiary of funds and as a link in the complex process of European project management resulting from the implementation of EU regional policy. In accordance with the stated goal the following topics will be presented:

- European Territorial Cooperation – the idea, goals, objectives and design;
- Implementation of ETC in the Pomerania Euroregion and an attempt to identify the way of the project management of EU funds.

2. ETC – Operational Programs, Areas of Support

European Territorial Cooperation in the 2007-2013 financial perspective replaced the Community Initiative INTERREG III of the previous period, namely 2000-2006 and became a separate objective of EU regional/cohesion policy. EWT operational programs are implemented through three types of programs:

- Cross-border cooperation;
- Transnational cooperation;
- Interregional cooperation.

The main differences between these types of co-operation include: the territorial scope in which the joint ventures can be pursued:

- Areas adjacent to the borders (cross-border cooperation);
- Large groupings of European regions from few or several countries (transnational cooperation);
- All EU regions (interregional cooperation).

In addition to the geographic area, various programs also differ by their thematic. And so programs in the field of cross-border cooperation primarily aim at building links between communities on both sides of the border. Transnational programs support innovation and the interregional ones – thanks to the implementation of transnational projects – contribute to the integrated development of the EU. Synthetic information on three types of cooperation is illustrated in table 1.

Due to the specific objectives support fields were created in the ETC operational programs, and they are:

- Research, technological development, innovation and entrepreneurship,
- The information society,
- Local initiatives for employment and development and aid for structures providing neighborhood services in creation of new job places,
- The natural environment,

- Prevention and combatting of natural and technological hazards,
- Tourism,
- Investments in culture,
- Investments in transport,
- Energy investments,
- Investment in education (especially vocational training),
- Investments in infrastructure, health and social infrastructure. [1]

Table 1

Types and cooperation targets in the ETC framework

No.	Cooperation type	Cooperation targets
1.	Cross-border cooperation	Development of common local and regional initiatives concerning: • environmental protection, • development of infrastructure, • cultural exchange, • youths cooperation.
2.	Transnational cooperation	EU territorial integration by: • promotion of availability, • sustainable urban development, • Innovation and environmental protection.
3.	Interregional cooperation	• exchange of experience of best practices, • strengthening the potential of institutions and local governments to support regional development, • supporting innovation and the knowledge based economy, • protection of the environment.

Source: own elaboration based on data from *http://interreg.gov.pl* and *http://www.ec.europa.eu/regionalpolicy/indexpl.cfm*

Poland participates in all types of ETC. Thus, cross-border cooperation, which is the content of this paper, is implemented in the programs concerning the following territorial scope:

- Poland (West Pomeranian Voivodeship) – Germany (Mecklenburg/Vorpommern/ Brandenburg);
- Poland – Brandenburg;
- Poland – Saxony;
- Poland – Czech Republic;
- Poland – Slovak Republic;
- Poland – Lithuania;
- Poland – Sweden – Denmark – Lithuania – Germany (Southern Baltic).

The above-mentioned ETC programs in their cross-border cooperation covered all the Polish borders with its Euroregions, which therefore become active participants of the ETC and beneficiaries of its funds. Therefore, they manage crossborder projects. The attached map illustrates the incorporation of Polish Euroregions to OP ETC.

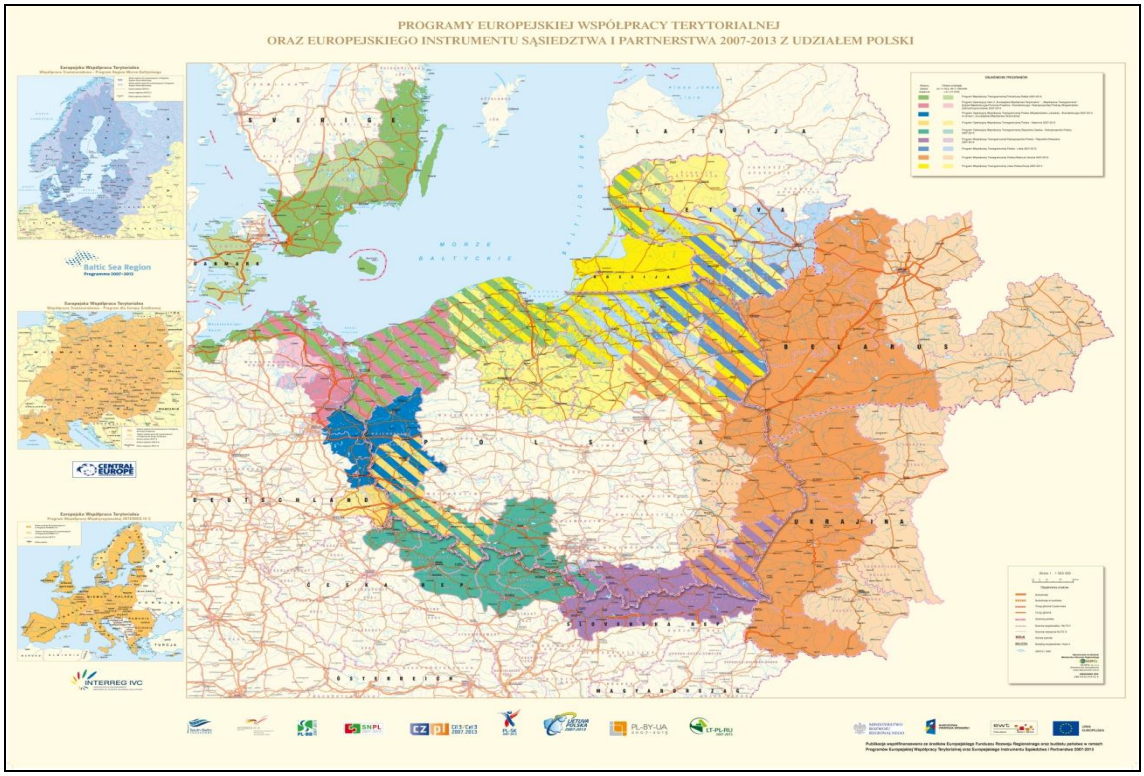

Figure 1. European Territorial Cooperation Programmes and European Neighbourhood and Partnership Instrument 2007-2013 with Polish participation

Source: www.ewt.gov.pl

The next part of the paper will focus attention on cross-border cooperation: Poland (West Pomeranian Voivodeship) – Germany (Mecklenburg/Vorpommern/Brandenburg), and because its territorial scope includes the Euroregion Pomerania, the introduction will be a brief description of that region.

3. Pomerania Euroregion as a participant and executive of OP ETC Poland (West Pomeranian Voivodeship) – Germany (Mecklenburg/Vorpommern/ Brandenburg)

The idea of Euroregionalisation entered the Polish socio-economic reality shortly before the Association Agreement and has been launched on the Polish-German border (Euroregion Neisse 1991). The Pomerania Euroregion is the youngest Polish Euroregion on the Polish-German border (1995) and the first Euroregion linking Polish and Scandinavian partners through the Baltic (Poland – Germany – Sweden). Ze strony polskiej, On the Polish side, Euroregion comprises of Szczecin and 45 municipalities of Western Pomeranian Voivodeship, on the German side are the four counties and two separated cities of Mecklenburg/Vorpommern (Rügen, Nordvorpommern, Ostvorpommern, Uecker Randow, Stralsund and Greifswald) and two districts of Brandenburg (Uckermark and Barnim) and the Swedish side is formed by

33 municipalities of the Skåne region. The Euroregion territorial reach is presented in the following map.

Figure 2. Map of the Pomerania Euroregion – the territorial coverage

Source: www.pomerania.org.pl

As for the territorial reach of the Poland – Mecklenburg/Vorpommern/Brandenburg Cross-Border Programme, it covers the Polish and German part of the Euroregion and in partnership includes adjacent counties: Demmin, Mecklenburg – Strelitz and the Neubrandenburg township district, and therefore does not include Swedish part of the Euroregion in the program. This comparison with the map showing the Pomerania Euroregion (Figure 2) is shown in the map below imaging the described here cross-border program.

Figure 3. Territorial scope of OP ETC (Poland – Mecklenburg/Vorpommern/Brandenburg) in the Pomerania Euroregion

Source: www.zrsi.szn.pl/node/103

For further considerations it seems useful to summarize the priorities and actions within the cross-border program actions, which will allow to define goals that can be achieved through program initiatives. This information is described below [2]:

- *Priority 1 Supporting activities for infrastructure supporting the cross-border cooperation and improving the environment in the area of support*
  - Measure 1.1. Improving cross-border transport connections (roads, railways, waterways, bike paths).
  - Measure 1.2. Support for cross-border economic structure.
  - Measure 1.3. Measures to improve water quality, protect the environment, preserve the landscape, preventing climate change, reducing the negative environmental impact and risks associated with the environment.
- *Priority 2 Support for cross-border economic relations and promotion of economic-scientific cooperation*
  - Measure 2.1. Supporting the Polish – German economic relations and economic cooperation networks.
  - Measure 2.2. Activities promoting cross-border tourism marketing.
  - Measure 2.3. Promoting cross-border cooperation and networking of research and technology centers in order to facilitate access to knowledge and technology transfer.

- *Priority 3 Cross-border development of human resources and support for cross-border cooperation in the fields of culture and education and health*
  - Measure 3.1. Joint projects in professional skills, environmental education, promotion of issuing of joint certificates and professional licenses.
  - Measure 3.2 Support of cooperation of local governments and public and private cultural institutions, associations and other institutions active in the field of development of cross-border contacts and social integration.
  - Measure 3.3 Small Projects Fund (SPF).
- *Priority 4 Technical support*
  - Measure 4.1 Preparation, implementation, monitoring and control, and evaluation and analysis, information and promotion activities.

Priorities of the cross-border program meet the objectives posed by each euro-region, including the one discussed here, and work for the development of cross-border partnerships. The cross-border partnership consists of several different areas of activity, stimulating both the so-called hard, and above all the so-called soft factors of regional development. Examples of projects implemented under the ETC in the Pomerania Euroregion include:

- Development of tourist base and offer
- Cultural projects,
- Organization of meetings, conferences and workshops for the exchange of experience and formation and expanding of economic and scientific networking,
- Cross-border infrastructural activities,
- Supporting the development of entrepreneurship, performing cross-border business activities,
- The protection of sites and monuments of particular cultural importance for the region,
- Cross-border research projects, activities in the field of transport and land use planning at the local/regional level, in the field of development and modernization of cities. [3]

The beneficiaries of the above mentioned types of projects may be different individuals and organizational structures, including the Euroregion units, such as:

- Local government units at all levels,
- Entities and agencies nominated or created by the state, governors in order to provide public services,
- Non-governmental non-profit organizations,
- Chambers: economic, trade and crafts,
- Universities,
- Public institutions conducting educational, research activities,
- Cultural institutions,
- Churches and religious associations,
- Euroregions. [4]

From the point of view of this paper it is most important take into account the activity of the Euro-region in the project execution, meaning the contractor in a particular project activity. Observation and analysis of projects executed in the ETC – Pomerania Euroregion, allows to develop a specific organizational plan for the disposition and management of the project, which is shown in the table 2.

The collected data shows that the Euroregion and the applicants from its area are actively involved in the absorption process and Euroregional tasks that are narrowing the development gap and help leaving the peripheral state. Poland got its first experience of cross-border cooperation through the Euroregions, first in the PHARE CBC, later INTERREG III, and today through INTEREG IV in the ETC. These early experiences led to the introduction of uniform rules for the implementation of programs, and they include:

- The creation of joint Managing, Certifying and Audit Authorities,
- Mandatory participation of at least two partners from different countries in the project,
- The use of "lead partner rule" in the implementation of projects,
- Joint implementation of projects
- The creation of Joint Technical Secretariats supporting the Managing Institutions in implementing of the programs.

And here it should be noted that they belong to the organizational structure of Euroregions.

Table 2

The cycle of realization and project management of the cross-border cooperation with the participation of the Euroregion

No	Stages and stage subjects	Description of activities in the stages
1.	Implementing Authority and the European Commission Representation	Generate guidelines and the project management cycle starts after working them out and then the Euroregion can apply for tasks.
2.	Implementing Authority and the Euroregion	Sign the agreement commissioning tasks. Then the certain tasks for both parties (state and Euroregion), the principles of fund administration and the formulation of documents are defined.
3.	Euroregion	Launches the call for proposals. After signing the contract ordering execution of state task, the Assistance Funds Team prepares the proposal concourse. For this purpose, it places on the Organization website the "Call for Proposals", with the text earlier approved by the European Commission Representation in Poland. The "call" includes: the name and reference number of the edition of the fund, the entities that can apply for funding of projects, the priorities of the fund, that is, its potential scope and completion date and method of issuing of proposals.
4.	Euroregional applicants	Take part in trainings and consultations with the Assistance Funds Team. Assistance Funds Team workers conduct consultations for applicants on-site, by phone or by email. Through such conversations, formal errors and substantive shortcomings in many applications can be avoided. Assistance Funds Team offers help and advice, but the responsibility for the content and the quality of the application lies on the applicant organization itself. The Assistance Funds Team during the call for proposals provides training, where potential applicants learn about the proper ways to build the application and the preparation of the budget and schedule. Particularly important is the formal correctness of the application.

No	Stages and stage subjects	Description of activities in the stages
5.	Euroregional applicants	Submit the applications to the Euroregion. During the call, which usually lasts 60 days, authorized organizations download from the website of the Association the complete documentation for the applicant in electronic form, get acquainted with the guidelines and on this basis draw up the call on the application form with attachments. The program, as it is known, has a cross-border nature, which means that projects implemented under the project should have positive effects for the community on two or more sides of the border. This is the so-called cross-border effect, which should be demonstrated in the application. Non-investment projects are carried out jointly with foreign partners, with their active participation, content support, and sometimes – which is highly commendable visible – also financial input. Deadline for submission of proposals, as set out in the "call" is absolute and refers to the time at which the required number of copies of the application must be deposited in a sealed and properly marked envelope in the Office of the Association of Polish Communes of the Pomerania Euroregion.
6.	Evaluating Commision	Evaluates the proposals. Procedure for the evaluation of applications varies depending on the type of funds. In the case of the Small Projects Fund a evaluation committee is appointed, which meets after gathering of the applications. The meeting of the committee takes a few days. On the first day the opening of the envelopes session takes place. Applications received within the application period will participate in the formal evaluation session. The formally error-free applications are qualified for the technical and financial evaluation. Based on the average of the ratings of experts the grading list is prepared – projects arranged from highest to lowest number of points. Applications that achieved the appropriate minimum score, according to the criteria found in the grid technical evaluation may be recommended for funding.
7.	Implementing Authority and the European Commission Representation	Approves projects. The results of the evaluation of projects are presented by the Evaluation Committee in the form of reports from the opening session and the formal and technical sessions to the Implementing Authority. Implementing Authority shall report for the final approval to the European Commission Representation in Poland. Because the Representation represents the donor of funds, the European Union, it has the right to reject individual applications or change the sum of the proposed grant. ECR decision is final.
8.	Euroregional applicants	Draw up the annex to the application as directed. The decisions of the Representation are forwarded to the Euroregion by the Implementing Authority in a form of a list of projects, the approved sum for the grant and the maximum percentage of the funding of the total eligible costs. Assistance Funds Team shall inform all applicants in writing about the outcome of the evaluation of their projects. Some applications at this stage require adaptation to the recommendations made during the selection process, like modification of the project budget, activities schedule and /or the system of indicators – in the form of an annex to the proposal.

No	Stages and stage subjects	Description of activities in the stages
9.	Euroregional applicants and the Euroregion as the supervising structure	Sign grant contracts. The winners of the competition sign a grant contract with the Association for the project co-financed by the European Union. Beneficiaries implement the project.

Source: own elaboration based on information and direct interviews in the Pomerania Euroregion

4. Conclusion

Using of the EU structural assistance by the regions has become a common phenomenon in the whole of our country and all its regions (regardless of their classification). Although the cross-border areas have benefited from such aid long before the membership and to a higher degree than the so-called internal regions. Currently, in addition to participation in all national operational programs the phenomenon of Euroregions lies in the fact that they have "their" cross-border programs, for which they are the hosts, which eventually can be illustrated by the figure 4.

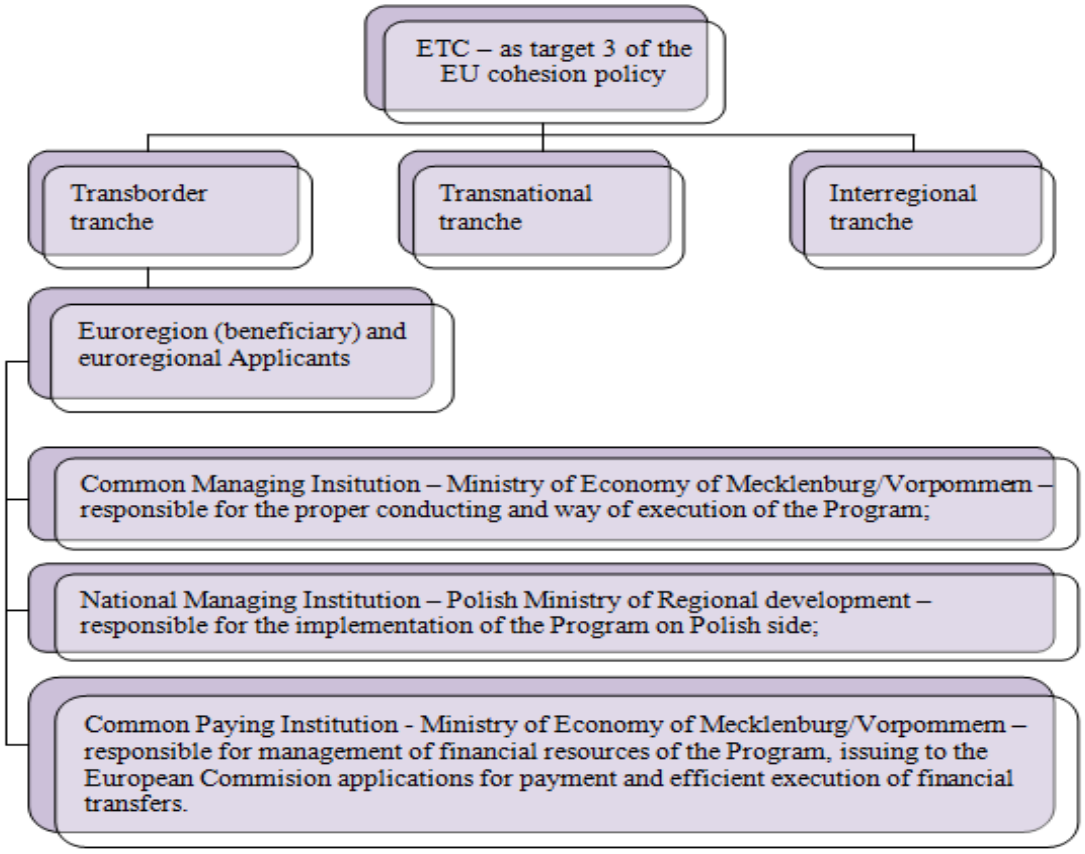

Figure 4. Euroregion – the beneficiary of ETC

Source: own elaboration based on material collected in the study

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THE HUMAN FACTOR IN PROJECT RISK MANAGEMENT

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Abstract

Very often the main reason for the failure of risk management in projects is not the lack or false application of analytic methods and techniques. In a lot of cases the real cause lies a little deeper. All these mathematical and statistical methods and techniques are the pillars you need to build the house. But much more important is that you have a solid basis to put these pillars on. This basis is a fundamental risk understanding, risk attitude, risk ethics etc. Let us denote this altogether as the risk culture or the human factor in risk management. Without this, all other measures will not be successful. In this context the interpretation and evaluation of risks is a crucial aspect. The risk culture is not only influenced by the individual perception, but is also imprinted by the family, the company, the nation etc. Risk management requires human judgements and this human element introduces an additional layer of complexity into the risk process. One topic may be that people tend to think in averages instead of densities. Another topic is that risk evaluation is affected by perceptions.

1. Introduction

In every project there is the need to implement some kind of risk management (cf. [1], [2], [3]), which normally contains the following phases:

(1) risk management planning,
(2) risk identification,
(3) qualitative risk analysis,
(4) quantitative risk analysis,
(5) risk response planning, and
(6) risk monitoring and control.

As always this has to be seen as a chain that you permanently have to work through. But as always a chain is as weak as the weakest link. So if you are not able to identify the really crucial risks, there is nothing to analyze. If you are not able to evaluate risks and therefore cannot plan how to respond in an adequate way, you cannot handle the risks.

The risk management plan defines the roles and responsibilities, the risk budget, the methodologies etc. in the beginning. Therefore you can see this as setting the infrastructure of the risk management process. The next step is the identification process.

2. Misunderstanding of Risks

As already mentioned the risk identification process and the qualitative risk analysis are very crucial for the whole risk management process. We have to be aware that this is of course again done by human beings. And of course, people are very different in risk acceptance, risk handling, and risk culture. So we have to admit that people involved in a project have different interests and attitudes.

Because there is often a legal obligation to implement a risk management process in the given project, sometimes you find a risk management process that does not earn this name. If you look at the offshore oil split on the Deepwater Horizon platform in the Mexican gulf, you can be sure that all the legal obligations (like fire instructions, storm warnings etc.) were kept. I suppose that everybody on the platform knew where and when to wear the helmet, but not what to do if the oil spills off. This is a totally wrong understanding of the purpose of risk management and I do not want to talk about that here. Another aspect that should not be in the focus of this contribution is the different interests of stakeholders that can be the source of risks in a project... For example if you take a large and prestigious project (like the new Berlin airport) people tend to underestimate the real risk in the initial phases, just to let the project start. A lot of risks that could have been identified are ignored just to let the project happen. But this should not be treated here, as it is an issue of its own in the stakeholder management (c.f. [4]).

What should really stand in the focus of this contribution shall be the traps and pitfalls that people step in, although they really try to perform a good risk management. I structured this contribution in three parts:

- People work with parameters (like averages) instead of distributions.
- The tails of a distribution are most important.
- You should also take into account the results of the "Prospect Theory".

2.1. Working with Parameters

Most of the people are used to calculate with numbers and not with probability distributions. Therefore they try to create parameters out of the distribution and perform calculations with them. But this does not work, what should be illustrated by an example.

Imagine that we have a very simple project plan with 20 parallel and independent tasks (see Figure 1). Each duration is assumed to be triangular distributed with optimistic duration 5 days, most likely duration of 10 days, and a pessimistic duration of 15 days (see Figure 2).

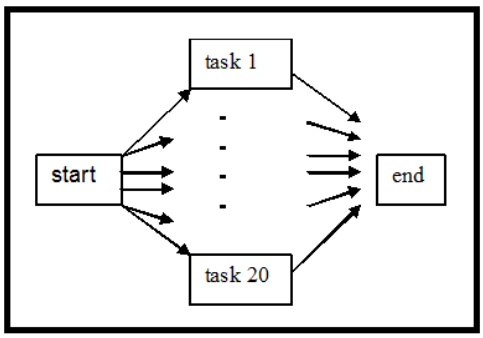

Figure 1. A Very Simple Project Plan

If you try to avoid the calculations with densities (like in PERT) and choose to calculate with averages, you get the following: Because we have symmetric densities, the average duration is nothing than the median, which is 10 days. And because we have 20 parallel tasks, each with an average duration of 10 days, the whole project will be finished after 10 days. How high or low would you estimate, is the probability of finishing the whole project within 10 days, if you calculate with densities?

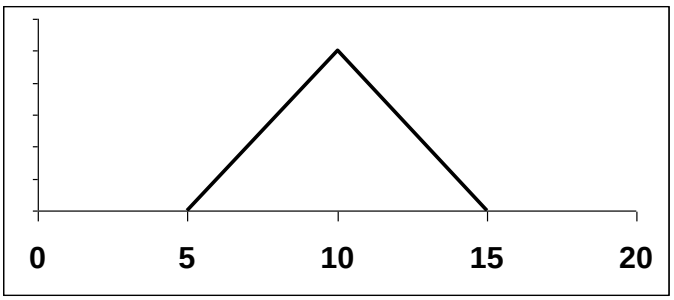

Figure 2. Density of the Duration of the Individual Tasks

So, let us now use the densities: The whole project will be finished within 10 days, if all the 20 tasks will be finished within 10 days. Because all the tasks are independent, we can multiply the individual probabilities and as we know the triangular distribution, we can calculate the values. This leads mathematically to:

Prob(duration of project < 10 days) = prob(dur. task1 < 10 and … and dur. task20 <10)

= prob(dur. task1 < 10) · prob(dur. task2 < 10) … prob(dur. task20 < 10)

= $(1/2)^{20} = 1/(2^{20}) = 1/k^2 = 1/1{,}024^2 = 1/1{,}048{,}576$

which is 1 to a million!

The result is at first sight a little astonishing, but here you can recognize the fact that can be expressed by the phrase: "You can easily drown in a lake with an average depth of 5 inches."

2.2. The Tails of a Distribution

Very often people introduce the term "residual risk" into the risk management process. With this expression they want to describe events that can only happen with a probability that is that low, that it can be neglected. With other words you can also call it a "threshold". But if you look at a distribution, typically the probabilities are the lowest in the tails of the distributions. But these are the most interesting regions of the distribution because the tails of the distribution reflect the extreme risk and the extreme chance. For example if you look at the risk of the overheating of a nuclear power plant, people often mention that the probability of such an accident is that low, because this can only happen if several events would occur at the same time, like an earthquake, a tsunami, the breakdown of power supply etc.

But again: In this situation the perception of probabilities at the two tails of a distribution is quite different. In Germany we have a lottery that takes place twice a week (Wednesday and Saturday). The probability to win the jackpot is about 1 to 140 million. On a "normal" Saturday

about 65 million bets were placed and on a "normal" Wednesday about 25 million. In weeks with a very high jackpot, these numbers increase dramatically. So you can get the impression that people seem to believe that there is a fair chance to win the jackpot.

Let us assume that you place one bet during 25 years, week per week, then you get a total of

n = 25 x 52 x 2 = 2,600 bets

with a given probability p = 1 to 140 million for the individual bet. The probability for the number k of positive outcomes within the 25 years follows a binomial distribution:

$$b(k;n;p) = \binom{n}{k} \cdot p^k \cdot (1-p)^{n-k}.$$

If you calculate that expression for k = 0, you get b(0; 2,600; 1/140,000,000) = 0.99998143. This means that the probability of winning the jackpot within 25 years is less than 0.002%. But people still place their bets! And remember that we had at least 3 nuclear power plant accidents (Fukushima, Harrisburg, Tchernobil…) in the last 25 years!

2.3. Prospect Theory

"Prospect Theory" is a behavioral economic theory that describes the way people choose between probabilistic alternatives that involve risk, but where all the probabilities are known. The theory was developed by Daniel Kahneman (1934-) and Amos Tversky (1937-1996), as they discovered the cognitive bias and handling of risk of human beings (see [5], [6], [7]). In 2002 it was for the first time that the Nobel Prize in Economic Sciences was awarded to a psychologist. The theory describes the decision processes in two stages: Editing and evaluation. During editing, outcomes of the decision are ordered following certain heuristics. In particular, people decide which outcomes they see as identical, set a reference point and then consider lesser outcomes as losses and greater ones as gains. In the following evaluation phase, people behave as if they would compute a value (utility), based on the potential outcomes and their respective probabilities, and then choose the alternative having a higher utility. This utility function is of course unknown and depends on the individual person. But Kahneman and Tversky showed in a lot of experiments that this function is concave and strongly asymmetric between gains and losses. Kahneman and Tversky could create a mathematical model for this and could also explain some findings that seemed to be strange or even paradox and that on the other hand contradict results of other theories (see [8]).

Let us look at the following example (one of the numerous variants of the Allais paradox): You were offered two alternatives and have to choose one of them.

Alternative A		Alternative B	
100%	2,400$	33%	2,500$
		66%	2,400$
		1%	0$

I suppose that most of the people would choose alternative A and in fact in the experiments of Kahneman and Tversky 82% of the test persons chose A and only 18% preferred alternative B.

And what about the two alternatives C and D:

Alternative C		Alternative D	
34%	2,400$	33%	2,500$
66%	0$	67%	0$

In the experiments it turned out that 83% of the test persons preferred alternative D, so it was just the other way around compared to the first example.

But let us now compare the two situations with each other and formulate alternative A in the equivalent formulation:

Alternative A		Alternative B	
34%	2,400$	33%	2,500$
66%	2,400$	66%	2,400$
		1%	0$

And now we change in both alternatives the outcome that occurs in 66% of the cases from 2,400$ to 0$.

Alternative ~~A~~ C		Alternative ~~B~~ D	
34%	2,400$	33%	2,500$
66%	~~2,400%~~ 0$	66%	~~2,400$~~ 0$
		1%	0$

By changing both alternatives in exactly the same way, we turned the preferences. If somebody works with averages and calculates the expected values, he will get:

$E[A] = 2400 < E[B] = 2409$ and $E[C] = 816 < E[D] = 825$.

Therefore the use of expected values as a utility function would not have altered the preferences. But it looks even stranger if you assume some (unknown) utility function u and try to evaluate the results.

$u(A) > u(B)$
$u(2{,}400) > 0.33 \cdot u(2{,}500) + 0.66 \cdot u(2{,}400) + 0.01 \cdot u(0)$
$0.34 \cdot u(2{,}400) > 0.33 \cdot u(2{,}500)$

$u(C) < u(D)$
$0.34 \cdot u(2{,}400) < 0.33 \cdot u(2{,}500)$

It can be seen that the dealing with probabilities is something that the human being is not trained for and that especially the asymmetry of the utility function leads to very strange results. Kahneman and Tversky made the following experiment:

Assume that there was a disease affecting 600 people. You have the choice for two alternative therapies:

- therapy A, where 200 of the 600 people will be saved;
- therapy B, where there is a 33% chance that all the 600 people will be saved;
- and a 66% chance that nobody will be saved.

The majority of the test persons choose therapy A, showing a preference for certainty. After that they tested the preferences between therapies C and D:

- therapy C, where 400 people will die;
- therapy D, where there is a 33% chance that nobody will die;
- and a 66% chance that all the 600 people will die.

Now most of the test persons preferred D. But you can easily see that A and C are exactly the same, as well as B and D. We only changed the formulation from positive to negative. It is very important whether a risk is formulated with gains or with losses, with win or loose, because of the asymmetric utility function. Kahneman and Tversky called this phenomenon "framing".

You would be very surprised if you ask for a choice between:

- therapy 1: There is a probability of 50% that half of the people will survive;
- therapy 2: There is a probability of 60% that 40% of the people will die.

The calculations of the expected value of survivors will lead to $0.5 \cdot 0.5 = 25\%$ for therapy 1 and to $1 - 0.6 \cdot 0.4 = 76\%$ for therapy 2, which means that therapy 2 has an expected value of survivors that is three times higher than applying therapy 1.

3. Conclusion and Remarks

One of the main aspects in the whole risk management process in a project is the sophisticated handling of probabilities. Unfortunately the adequate way of handling probabilities is not as easy as it seems on the first sight. Although many people really try to identify and evaluate risk in the best possible way, they fail, because they do not know all the traps and pitfalls. Therefore also in the risk identifying phase of the risk management process many project teams should look for and accept help from experienced and well trained people.

Probabilities are topics that human beings normally hesitate to work with, and therefore there is the need of permanently analyzing one's own choices, values and frames – as Kahneman and Tversky called it. Otherwise there is the danger to ruin the whole risk management process by starting with wrong initial assumptions.

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PROJECT RISK MANAGEMENT DOCUMENTATION MATURITY MODEL

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Introduction

Project methodologies do not describe the process of designing project risk management documentation and the author believes that the methodologies do not sufficiently substantiate the content of risk management documentation. One of the reasons for this might be that in project management methodologies the risk management process has no levels of maturity, the specification degree of the process description is low and the project risk process is not linked to the process of the documentation design.

The aim of the study is to analyse project risk management documents by using the elaborated model for designing project risk management documentation.

The theoretical substantiation for the study is the Organizational Project Management Maturity Model (OPM3, year 2003), or OPM3 model of PMI (Project Management Institute) and Business Process Model and Notation (BPMN, version 2.0).

The OPM3 model distinguishes four levels of the process improvement – Standardize, Measure, Control and Continuously Improve [1]. The first level of maturity is characterized by the process standardization, i.e., risk management documentation must correspond to the standard of project risk management selected by the organization. The aim of risk management documentation is to provide that the project participants carry out the steps of the risk management process in accordance with the risk standard adopted by the organization.

The second level of maturity is characterized by the process measurement, i.e., the project risk management documentation must contain information on the measurements of the risk management process. The aim of the risk management documentation is to ensure that the project participants carry out the steps of the risk process in accordance with the standard adopted by the organization and measure the compliance with the standard.

The third level of maturity is described by the process control, i.e., the project risk management documentation must contain information on how the risk management process is controlled. The aim of the risk management documentation is to ensure that the project participants carry out the steps of the risk process in accordance with the standard adopted by the organization, measure the compliance with the standard and control the process.

The fourth level of maturity is described by the process improvement, i.e., the project risk management documentation must contain the information which will provide for the improvement of the risk management process or will serve as a basis for the improvement of the risk

management process. The aim of the risk management documentation is to ensure that the project participants carry out the steps of the risk process in accordance with the standard adopted by the organization, measure the compliance with the standard, control and improve the process.

In project risk management two risk management documents are traditionally mentioned – the risk management plan and risk register. The risk management plan comprises the description of the project risk management structure and risk management process, the so-called risk management methodology, roles and responsibility, risk categories, risk management resources and time schedule, risk scales, risk tolerance of the project participants, reporting procedure and recording of the management results [2]. A similar structure of the risk management plan is presented in other sources [2] [3].

The content of the risk register varies in different sources. A Guide to the Project Management Body of Knowledge risk register contains a list of risks, their causes, likely risk reactions, risk owners, risk indicators and attributes as well as results of the risk analysis – the so-called risk probability and influence [2]. The risk register of Tasmania Government Project Management Guidelines contains a unique risk identifier, risk description, risk influence and probability, risk value, changes in the risk value, strategy for the risk reduction, responsible persons, time schedule as well as necessary resources [4].

The primary goal of BPMN is to provide a notation that is readily understandable by all business users from the business analysts that create the initial drafts of the processes to the technical developers responsible for implementing the technology that will perform those processes, and finally, to the business people who will manage and monitor those processes [5]. BPMN defines four types of conformance; one of them is Process Execution Conformance. Process Execution Conformance elements are a set of Activities, Events, Gateways, and Sequence Flows.

Research Results

During the study the author analysed the Tasmanian Government Project Management Guidelines in order to establish whether in the descriptions of the risk management process it is possible to identify Process Execution Activities, Events, Gateways, and Sequence Flows according to the process maturity levels. The following elements of the Process Execution Conformance were identified: Start Event, End Event, Sequence Flow, Task, and Gateways.

The visualization of the project risk management process by its maturity levels is presented in tables 1 and 2. According to the risk management process the subset of BPMN elements was used as follows – an unidentified Start Event, End Event, Sequence Flow and Task (see table 1) and Gateway elements in table 2. Gateway elements are necessary for describing the control and process improvement of the risk management process.

For the study purposes the author assumed that risk management documentation must contain the information that corresponds to the maturity level, e.g., at the third maturity level it must contain the information on measuring the risk management process, for example, in the risk register or other risk documentation. The risk management plan was not analysed because the presence of information in the management plan does not serve as documentary evidence to the implementation of the actions specific to the maturity level. Evidence to this could be the presence of the information in the risk management documentation used by the risk management process participants during the process, for example, the risk register or documents that correspond to the maturity level, such as tables of measurements. During the analysis the author used three

Tasmanian Government documents – Tasmanian Government Project Management Guidelines [4], Risk Management Plan; Template & Guide [6] and Project Risk Register. Template & Guide, version [7]. These documents corresponded to the following criteria:

1. Public availability in the Internet of all the documents used in the study;
2. The risk management methodology contains the description of the risk management process or there is a separate document which describes the risk management process.

Table 1

Risk Management Process by Maturity Levels

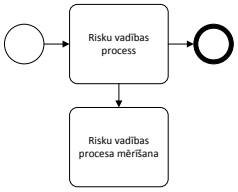
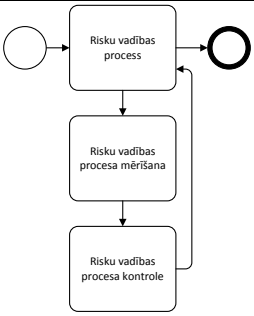
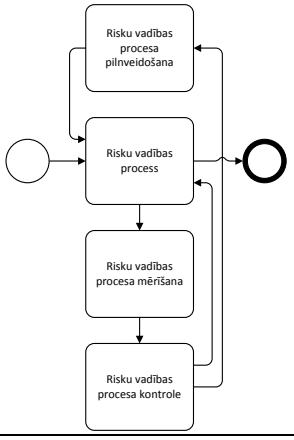
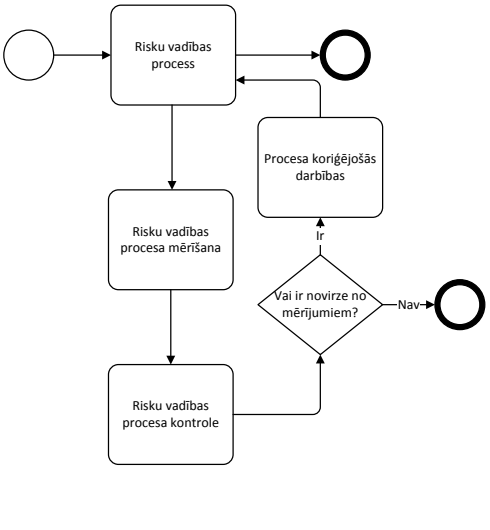
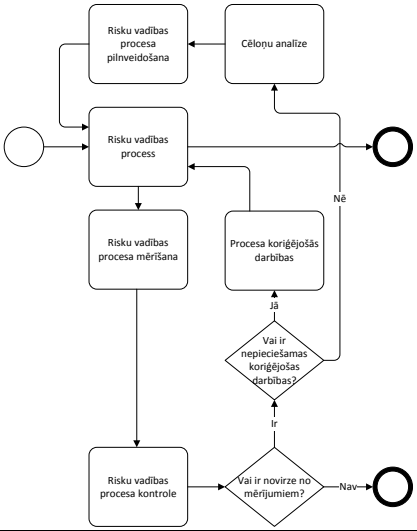
First maturity level	Second maturity level	Third maturity level	Fourth maturity level
			

Table 2

The Third and Fourth Maturity Level with the Gateway Element

Third maturity level	Fourth maturity level
	

In none of the documents the terms of BPMN and maturity model were used. The process description did not correspond to the process description adopted by BPMN. Consequently, a table was designed where the author expressed his assumptions in accordance with the generally accepted description of the risk management process in the methodologies of project management, the so-called Tasmania Government Project Management Guidelines, a selected BPMN subset and maturity model.

Table 3

Assumptions on BPMN Elements

BMPN element	Assumptions
Start event	It is a necessary component of all stages of maturity
End event	It is a necessary component of all stages of maturity
Sequence flow	It is a necessary component of all stages of maturity With increasing maturity, the task flow sequence number to rise
Task	With increasing maturity, the task number to rise
Gateways	In the third maturity level variation of the process measurement and corrective action In the fourth maturity level for the process improvement

Start event.

None of the three documents the beginning of the event is not defined, but it can be assumed that risk management is the start of the project initiation phase and are documented Project Proposal or Project Business Case [4]. The risk process can be considered the beginning of events Establish Project Objectives & Context, because it is a condition when can start risk assessment.

End event.

None of the three documents the end event is not defined, but the end event can be considered the end of the project, as risk management processes are iterative throughout the life of the project [4].

Sequence Flow.

Risk management process is described in the Risk Management Plan, as part of the Project Business Plan or separate document [4]. Risk management describes the processes to identify, analyse and respond to project risk [4]. In addition Tasmanian Government Project Management Guidelines the risk management process diagram, the risk management process is illustrated in more detail, named process elements – Establish Project Objectives & Context, Risk Assessment (Identify Risks, Analyse Risks, Evaluate Risks, Assign Responsibilities), Treat Risks, and Communicate and Consult un Monitor and Review [4].

Gateways.

Although the project manager is responsible for monitoring and managing all aspects of the risk management process [4], however, the way in which monitoring is not described. Process control is, for example, the project sponsor and/or project steering committee has ultimate responsibility for oversight of the Risk Management Plan, including ensuring mitigation strategies are implemented, and that mitigation actions are identified and allocated

for all high-grade risks [4] or risks should be reviewed regularly throughout the life of the project to ensure that changing circumstances are tracked and managed [4], however, does not describe whether and how the results of monitoring are used.

Conclusions

After analysing the three documents can be concluded that there is not compliance with the maturity model, when use BPMN for the maturity stage maturity model description.

Compliance can be identified only by first maturity level, and only when the assumptions for the start and end events are used. Compliance with the second maturity level could not be established.

Compliance with the third degree of maturity can only be detected at the level of contention, because the documents are not specifically described in the operation of the process control, it just tells you that the process is under control. Compliance with the fourth maturity level could not be established.

These conclusions are consistent with other studies of compliance maturity levels, which analysed the degree of maturity of the requirements document [8] [9].

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BIOGAS PROJECTS – A HOLISTIC APPROACH FOR PROJECT MANAGEMENT

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Keywords: renewable energy projects, change management, business development projects

Abstract

The transformation of central energy production from fossil or nuclear sources into a de-central system of energy production from renewable sources is one of the major challenges of the next decades [5][6]. Green and renewable energies have major impact on the technological, ecological, business and social environment. Especially biogas projects are heavily disputed with respect to all four aspects. A sustainable energy production project based on biogas has to address all four aspects to be successful. A project management focusing only on the technical or the business side is likely to create no success [8] [9]. Therefore, project management has to provide a comprehensive approach and it has to synchronize the progress in all four aspects of the biogas project [1] [7]. This can be achieved by understanding the underlying characteristics of the project and the relevant stakeholders. Based on an analysis of these characteristics recommendations for a holistic project management are derived and discussed. The research is based on a case study in Germany.

1. Introduction

Today, projects do not necessarily fail due to technical issues. Especially projects with very diverse effects on their environment fail often due to a lack of ecological or business sustainability or because of resistance from major stakeholders [7]. Project management sometimes does not consider these aspects because project managers tend to manage the things happening inside their projects rather than the things happening outside their projects [1]. They focus on the execution of the (technical) work packages leading to the result of the project. For renewable energy projects the focus quite often is the construction and operation of the technical power generation machinery. Such a limited view on the project carries major risk for the success. A renewable energy project is always at the same time a technical/ecological project, a business development project and a change project within the relevant socio-ecological system.

2. Biogas Projects

Biogas projects have a quite drastic impact on the surrounding environment [4] [7] [10]. Compared to wind power or solar power projects they are rather big and have many connections into the socio-ecological system. Wind power and solar power plants are based on a big investment and rather low operating costs since wind and sun are for free. Biogas projects have an investment phase, too. But apart from this they have high ongoing operating costs. From business development point of view they are not a typical investment project but more like a small and midsize enterprise (SME). Biogas power plants need several thousand square meters of land for the power plant and several hundred hectares of land for growing crops and distributing the biological waste. They need farmers as suppliers and staff for operations. In addition, they compete with local farmers for land and crops.

Therefore, biogas project management has to address the following issues:

- Planning faces a high level of uncertainty since the technology is rather new and still developing fast.
- The regulatory framework is complex since it is combining law regulations from construction, agriculture, energy, environmental protection and health protection.
- The project is not finished with the construction but has to take at least 20 years (e.g. according german renewable energy sources act [11]) of operation and modification into consideration.
- Financing is not based on fixed asset financing but on project financing (cash flow based non-recourse financing).
- The project requires skills in business administration, technology, farming, finance and supply chain management.
- The project affects many stakeholders and changes the socio-economic environment in the respective region (esp. changing the distribution of economic power and resources between farmers).
- The project has an impact on the ecology in the region (changing the farming, e.g. towards maize as main crop).

To address all issues with the necessary tools and methods requires an elaborated project and risk management.

3. Case Study: Biogas Power Plant in North Rhine Westfalia, Germany

Many observations in this contribution are based on a real biogas project in Germany in the state of North Rhine Westfalia. Germany is one of the major biogas markets, in 2010 more than 85% of the biogas power plants based on agricultural crops and animal waste were run in Germany [13]. This is due to the german renewable energy source act (EEG [11]) which guaranties a 20 years purchase contract for all electricity produced by an operator of a biogas power plant. Prices are fixed for 20 years, too. The electricity is purchased by the local grid operator and the cost is distributed to all electricity consumers.

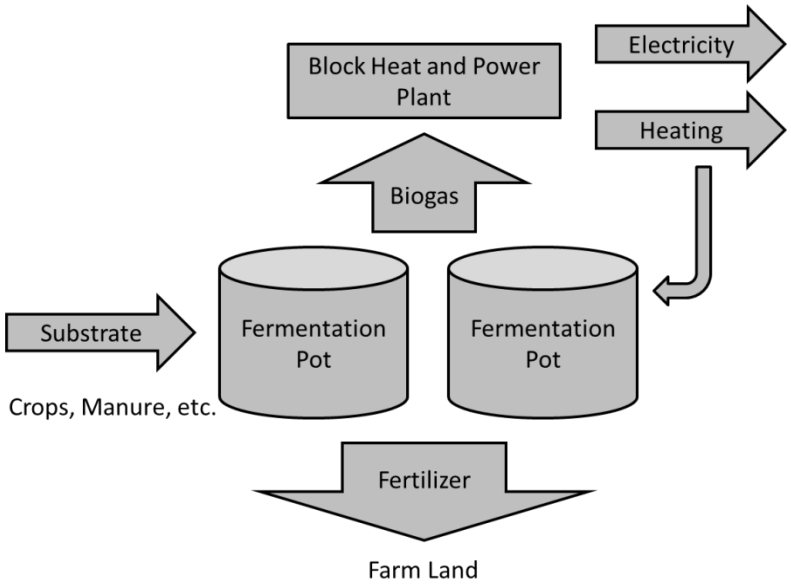

Figure 1. System View of a Biogas Power Plant based on Agricultural Products

Due to this pretty simple system of subsidizing biogas power plants, more than 7000 biogas power plants were built in Germany until 2012. These biogas power plants are mainly based on a very similar concept. They have medium size (around 400 kW electrical power), a similar annual revenue (between 500 kEUR and 1 Million EUR) and are fed with biomass from agriculture and farming. The biomass is processed in fermentation pots and produces biogas (approximately 50-60% methande) and liquid fertilizer. A block heat and power plant uses the biogas to produce heat and electrical power.

In the case study, a biogas power plant with two heat and power plants (340 kW and 250 kW), 2 fermentation pots (4500 cbm total fermentation volume) and storage silos for 10000 to of crops and 4500 cbm of fertilizer was build. The construction was done in two phases. Phase 1 from August 2009 - May 2010 was doing the construction of the 340 kW power unit, the silos and the fermentation pots. Phase 2 from September 2011 – May 2012 was adding the 250 kW power unit and the fertilizer storage. The total invest of phase 1 was 1.4 Mio EUR, the phase 2 investment was 1 Mio EUR. The project was financed by raising investment money and by long term bank loans. A 20 years contract with the local grid operator guarantees the revenue.

The project was facing several severe issues:

- The first planning was done in 2007 and the investing company applied for a public permit for the construction and operation in early 2008. The aim was to produce the first electricity by the end of 2008. This was due to the fact, that thegerman renewable energy source act was changed at beginning of 2009 reducing the financial parameters for the electricity price. The law has a clause guaranteeing the 2008 prices to every power plant that starts electricity production in 2008. This was not achieved. The public permit was not granted until August 2009. The reason was a big resistance of local farmers against the power plant. Due to their influence on the local city

government, the permit was blocked as long as possible. This permit was granted after many negotiations on county level. The conflict with the farmers and the local city government was not solved before 2011 and is still a risk for the project.

- Due to changes in the biogas technology the initial planning was changed in 2009. Following to the late permit and the changes, the construction phase extended into winter. In Germany, winter 2009/2010 was the longest and coldest winter since 1947. This extended the construction phase until May 2010 and added technical problems to the whole system. The issues were only partly anticipated due to the novelty of the technical design. The delay added substantial financial stress to the company.
- Between phase 1 an phase 2 of the construction project, the biogas power plant was operated in an half-ready status. This caused technical issues and additional effort. Nevertheless, it made it easier to set up the necessary supply chains (e.g. for crops) and the learning curve for the operation was less risky.
- For phase 2 the schedule was substantially tightened due to an unexpected change in the german renewable energy source act in January 2012. This change with a drastic decrease in electricity price was announced in spring 2011. Therefore, the target for phase 2 was to get the 250 kW power unit up and running until end of 2011 (to secure the price level of the old law). This was achieved in December 2011. Nevertheless, construction continued until May 2012. Meanwhile, the conflict with the local farmers was reduced by winning them as suppliers (crops) for the biogas project. The situation with the local city government was relaxed by initiating a green energy heating project for a local housing community.

The project was continuously documented with monthly plan updates, financial figures for both the investment and the operation (P&L sheet) and business plans. All technical data of the operation was recorded (it is anyway needed for government reporting).

4. Synchronize Technical Development, Business Development and Change

A successful biogas project has to cover the whole life cycle of the project. It is not enough to consider only the construction project or the first year of operation. The project has to be run as a consecutive or parallel execution of planning, construction and operation phases. The planning phases have to consider the complex regulatory environment. In Germany, this is given by the renewable energy source act (EEG [11]), the regulatory environment of the energy sector (both national and EU level [13]) and the regulatory environment for agriculture (mainly EU level). Meaning, it combines some of the most complex parts of legislation. The construction phase has to consider the fact, that the biogas technology is quite new and not yet mature. The operation phase has to deal with technical and agricultural challenges. During all three phases, at the same time and in parallel the inherent technical project, the business development project and the change management project is ongoing. A holistic project management is balancing the needs of all three phases and all three project types. The project manager is using tools from all three project phases and project types and connects them.

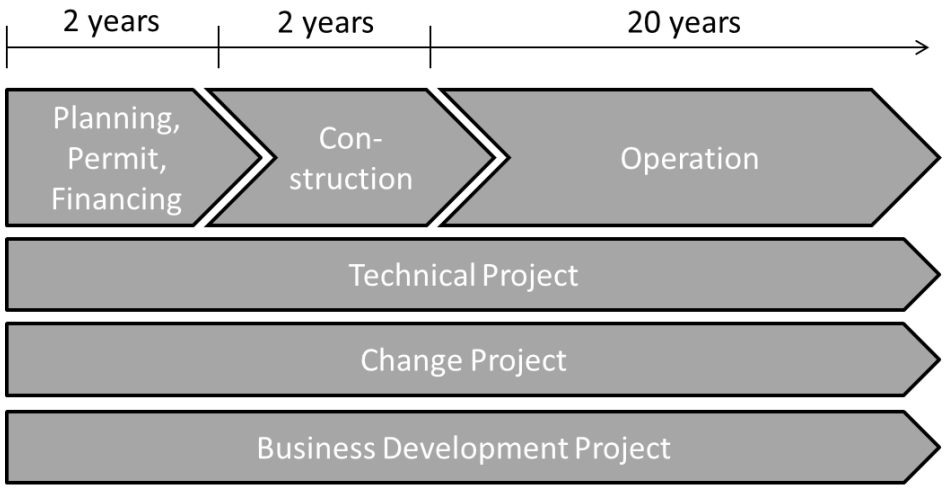

Figure 2. Phases and Aspects of a Biogas Project

In the planning phase, it is required to synchronize the technical planning decisions and the business plan updates. This process involves a learning curve. Unfortunately, both parts are highly dependent on the regulatory framework, especially on the renewable energy source act and the dates for the change of this law. This affects the communication with the bank for securing the long term loans. In general, a bank needs at least 2-3 month of a stable business case to come to a financing decision. This "window of opportunity" has to be managed carefully. In addition, a communication process with the other stakeholders has to be started. It is necessary to win supporters with high reputation within the local community [7]. Nevertheless, the stakeholder management is difficult since business changes or regulatory restrictions can still change the whole project quite drastically.

The construction phase is usually under high time pressure since the deadlines for the changes of the regulatory framework (again mainly the renewable energy source act) have to be met. If the electricity production cannot be started before the deadline, the whole project is usually dead, too. The recent changes in the renewable energy source act in Germany (2004, 2009, 2012) had major impact on biogas technology and the respective business cases. In the construction phase, a close interaction with the public bodies is mandatory. The stakeholders from the public bodies are more or less project members in this phase. Since biogas technology is changing fast, adaptations of the technology during the construction phase as well as changes to the regulations (e.g. environmental protection) are quite normal and have to be implemented. This is only possible, if public bodies take pragmatic decisions. In this phase, construction companies, public bodies and banks are the main stakeholders.

In the operation phase, the project turns into a small and mid-size enterprise (SME) running a predominantly agricultural business. The operation is driven by phases of harvest and phases of fertilizing the land (an average biogas power plant needs around 15000 to of input per year and produces around 13000 to of fertilizer). One focus is the management of the respective supply chains and the maintenance activities. During the operation phase, the project changes the socio-economic environment. Usually, the region turns from an energy importer into an

energy exporter. This results into a financial flow into the region and into the system of farmers and technical maintenance companies. The farmers owning the power plant may purchase additional land, they are gaining economic power. The ecology of the region is changed due to new crops and new forms of farming. Therefore, stakeholder management is necessary to keep a reasonable level of acceptance for the project.

Risk Management is mandatory during all phases of the projects. In connection with an ongoing sensitivity analysis of the business case and a careful stakeholder analysis, the risk management is a continuous source of mitigation actions. A good tool for assessing the risks and deriving respective action is the failure mode and effects analysis (FMEA) [12].

5. Results and Conclusion

The execution of the biogas project described in the case study contributed to the development and the assessment of the methodology. Today, the biogas power plant is in full operation. The lessons learned for the project led to the emphasis on the 3-projects-in-1 view on biogas projects. A key to make such a project successful is the parallel execution of a technical project, a business development project and a change project. If all three views on the biogas project are considered in a balanced way, the issues can be identified and addressed early. In the case study, the first two years of the project were suffering from an underestimation of the change aspect. This led to a 1.5 years delay of the public permit and put major stress on the overall project. Addressing the change of the socio-economic system by setting up the green energy heating project for the local housing community and by purchasing crops from more local farmers helped to solve the issues.

On the other hand, especially the business development project was addressed with high effort from the start of the project onwards. A good modeling of the business case allowed early sensitivity analysis. This helped to convince the banks and to secure financing. While going through the learning curve, a good prediction of investment cost and profit&loss was possible. This was needed when the project experienced financial stress due to the missing public permit.

There is a lot of demand for future research. Biogas projects in Germany were mainly started between 2006 and 2011. They are all in a similar phase and they still have to be operated for at least another 15 years. Due to the fixed electricity price and the (consequently) fixed revenue, the projects have to find ways to cope with the rising cost curve. Since the cost curve will possibly cross the revenue curve in the second half of the project, issues have to be expected especially in the late years of operation. Solutions for this problem still have to be found.

Meanwhile, biogas projects in Germany are nearly impossible due to the recent renewable energy source act 2012, due to limitations in the availability of farm land and due to growing resistance in the german population against all kinds of energy projects. Nevertheless, biogas can still play a major role in the german green energy agenda since the energy (gas) can be stored. Furthermore, a major demand from other countries is expected. Especially, emerging economies can benefit from this kind of renewable, de-central and demand driven type of electricity and heat production.

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