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Project Management Development – Practice and Perspectives
Sixth International Scientific Conference on Project Management in the Baltic Countries

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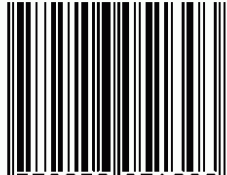


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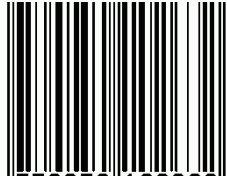
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6th International Scientific Conference on Project Management in the Baltic Countries

CONFERENCE PROCEEDINGS

Conference is organized by the **Research Institute of the Project Management**
of the Faculty of Business, Management and Economics,
University of Latvia in cooperation with the **Professional Association of Project Managers**

April 27-28, 2017
Riga, University of Latvia



Professional Association of Project Managers



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PREFACE

The International Scientific Project Management Conference organized by the Professional Association of Project Managers of Latvia in co-operation with the Research Institute of the Project Management of the Faculty of Business, Management and Economics, University of Latvia has now become a proven value for the 6th year in a row. Its international recognition has considerably grown and similarly has the quality of the submitted articles.

The articles in the proceedings are aimed at both theory and practice. They present extensive depiction of the contemporary situation in project management by covering the internationally applied methods and tools, the standards project management methodology is currently based on and developments expected in the field in the nearest future.

In the articles professionals set forecasts for the future project practice. The forecasts underline the importance of project managers' social competences. The project manager's role as a project work organizer, leader and competent implementer cannot be overestimated. Project success definitely depends on project team. Several articles of the proceedings deal with such project management part as human resource management and competencies in project management.

In project management processes it's important to have appropriate stakeholder management what was topical for several authors' studies presented in this book.

For the last decade we can see significant increase in IT project management practice development. Recent studies have paid attention also to practical and theoretical aspects for application of *Agile* methods in IT project management and also this year increased research in the field of social aspects in the IT project management.

Project management is closely connected with the risks influencing the project time-span, costs and quality. The issue of coping with project risks, implementation of risk planning and supervision of the subsequent process is discussed within construction and ICT industry. This year for the first time also study in the field of Defence has been introduced.

Project management applies not only for business environment. In the global context those tools and methods have been implemented also in public administration. Several research results for project management in the public sector have been presented also in this publication.

All above mentioned practical study cases makes a conference content and will be wide discussed by project management experts, practitioners and scientists from different countries.

We are thankful to all involved persons and supporters what invested their time to organize this important event. We wish to all participants and readers of this book reach new practical horizons in the project management field.

Prof. (emer.) Dr. oec. Žaneta Ilmete
Chairman of the board of the Professional
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PRODUCTIVITY & INNOVATION AS A SUPPORT IN PROJECT MANAGEMENT: A STUDY THROUGH CONSTRUCTION INDUSTRY IN BRAZIL

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Abstract

Construction in Brazil occupies an important role in the economy, with direct participation in the GDP and acting on an extensive productive chain of suppliers, commercialization services and maintenance. The sector has undergone major changes in recent years, facilitated by factors such as the resumption of public investments, the creation of laws that facilitate the construction of real estate, investments and funding of external resources. However, the sector faces problems of productivity that can meet the growth needs of the sector. The aspects of lack of skilled labour, nonconformity, low quality, high tax burden, outsourcing and informality of the workforce were not yet adequately addressed and resolved. This article illustrated the economics Brazilian construction scenario. Through the use of indicators of innovation, productivity, economic growth and project management actions, the main challenges of construction in Brazil industry are reported. A proposal for implanting productivity and innovation steps in construction sites is presented, searching for possible paths for the sector allow their improvement, in times of increasing productivity and competitiveness in the global economy.

Key words: *Productivity; Innovation; Construction; Developing Countries Economics; Management;*
JEL code: O1; O2

Introduction

Brazilian Construction Scenario of the Last Decade: Economic growth of the sector

Civil construction in Brazil, starting in 2000, once again plays a leading role in the national economy and is on the road to a new and important virtuous cycle of growth. Construction as a development lever has important socio-economic standpoints, helping to cope with the housing shortage, as well as contributing to infrastructure solutions, which constrain the country's rapid growth. The industry continues to be one of the leaders of the current pattern of economic growth in the country (Sinduscon, 2015).

The construction sector has a significant socio-economic role in Brazil, with a formal participation of 5.6% of total salaries paid to workers in the Brazilian economy and 9% of employed persons. The building industry needs more growth. In 2010, the Brazilian housing shortage was estimated at 6,273 million households, of which 82.6% are concentrated in urban areas (IBGE, 2015).

Data on the expansion of construction indicates that there is robust growth in the sector. Between 2006 and 2013, construction investments totalled more than 39.3% of the country's gross fixed capital formation (FGV, 2011). Fig. 1 shows the evolution of cement consumption in construction in Brazil in the last years. However, in comparison with the growth of the country, it can be seen that Brazilian construction has not been following the real growth of its GDP in relation to National GDP (Fig. 2). Although improving compared to the previous period, the proportion of growth in relation to national growth is small, to the detriment of achieving better results and proportional development.



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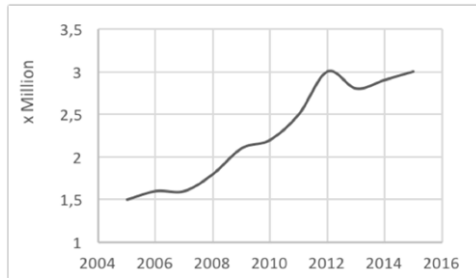


Figure 1. Jobs generated in construction.

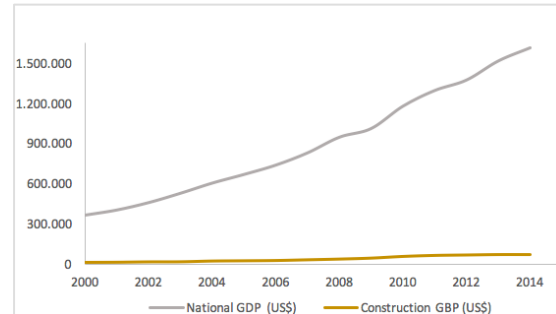


Figure 2. National growth in relation to Construction GDP in Brazil.

Factors impeding faster development of the sector

It is also considered that the sector has high indices of informality and self-employed professionals that amounts to around 40% of workers in some regions, which can be explained by the large amount of light construction, maintenance and repair, where a great part of the workers exercise their professional activity as self-employed (Dieese, 2011). The construction industry has different characteristics to other industrial sectors, including the nature of the raw material and associated products, as peculiarities of its production process. In Brazil, the products are variable and complex and may vary according to region, with a long useful life, while the production process involves a large number of players and a large quantity and diversity of inputs. It has a high staff turnover and low education level of workers. Currently, it is oriented by the decentralization of activities and by the discontinuity of the productive process, as the services are outsourced and the worker does not participate in the whole construction process of the project (Isoldi; Sattler; Gutierrez, 2009). Since 2015, Brazil has faced a scenario marked by fiscal deterioration, political uncertainties, economic recession and inflation exceeding government targets, construction has been recording falls that will slow the growth of the sector.

Productivity in Brazilian Construction

The particularities of the sector

The production process in construction is a relevant aspect in management and productivity analysis. No two construction projects are exactly the same and vary in many ways such as design, size, capacity, utilities, location, orientation, and so on. When projects are planned and budgeted based on historical data, it is important to consider the differentiators and variables unique to the project and factor them accordingly. All projects are unique and have some variables. In this way, the construction requires management indices associated to the type of project, to the workers and production methodology to obtain reference results.

Productivity measurement in construction

Productivity is influenced by many external factors. These can be related to the quality and comfort of the workplace, with the quality and quantity of work tools, with the motivation and number of workers, with the climatic conditions and with the degree of difficulty associated with the productive process, among others.



The productivity evaluation models are derived from the mass production industry, where most of the working conditions are predictable unlike the construction industry, where the number of unknowns is immense and impossible to know previously. Measurement provides performance information to workers, ensuring greater control and a possibility of improvement in those aspects that have not demonstrated the maximum yield. It is only possible to improve a task when there is a physical evaluation of it, which makes the measurement of productivity an indispensable part of any industry.

In this way, the basic tool for productivity management is measurement, resulting in several methods of measuring productivity in recent years. In Brazil, the adoption of measurement of sector productivity by construction companies is limited. Measurement is basically based on productivity on a global basis and on the financial results obtained in the activities and stages. However, global market demand, and the competitiveness and demand of customers and investors, have altered the conception of some companies that have been looking for alternatives to structure the management of production and to reduce the number of workers in constructions sites

Construction Productivity in the Brazilian Economy

The use of a productivity measurement of a process is similar to the evaluation of the performance of a work model, for a later analysis before other similar processes. Productivity indicators are present in most organizations that are active in several activities, since the measurement and control of this indicator is a guiding factor for the achievement of high performance results, continuous improvement, cost reduction, quality improvement and maintenance of the organization's sustainability.

According to the World Economic Forum (WEF, 2015), even with the economic growth of the last years, an analysis of industry productivity in Brazilian economy identifies the low levels of productivity of the workers in relation to other countries (Fig. 3).

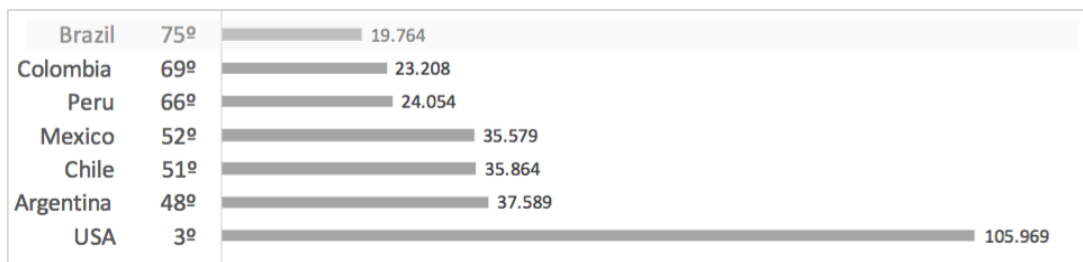


Figure 3. **Productivity of each worker in the countries (US\$ / year).**



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From the point of view of the growth of production and the economy (WEF, 2015), Brazil's productivity in relation to other developing countries in the last decades (Fig.4).

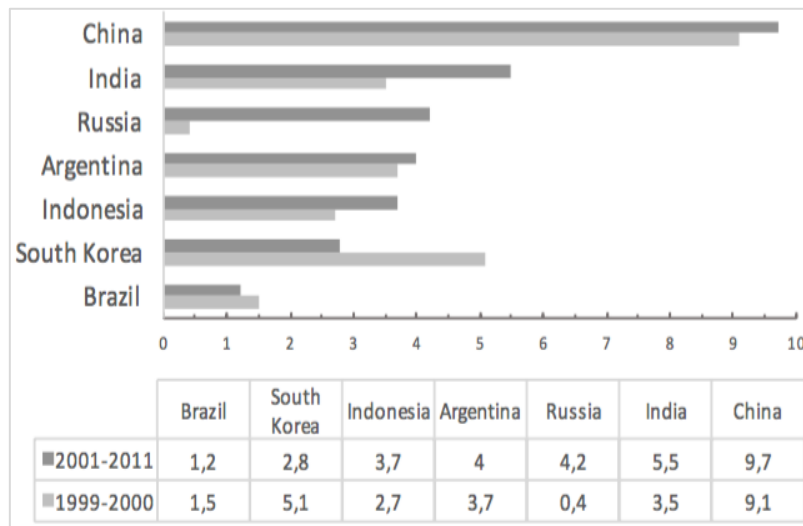


Figure 4. **Productivity Growth: Average rates by selected countries (%)**

There is a consensus in the identification of the main factors that influence productivity, but there remains no clear answer to the correct correlation between them, although there are some mathematical models that propose to explain this complex relation, but that are unable to respond satisfactorily to some phenomena. However, China may be cited as an example of a country that invests in education and the maintenance of an environment that is extremely conducive to the implementation of new business, and however questionable the policies adopted by this nation to achieve and maintain high economic growth and productivity, its success is irrefutable.

Quality development in construction sites

The introduction of new management models by the construction companies, which consider quality from a strategic perspective, is the result of a series of factors that characterize the current situation of Brazilian construction, especially building's subsector. ISO quality standards have not been developed focused on the construction industry; it is fundamental to undertake a discussion of their requirements in order to enable their implementation in the sector. An efficient construction site project, in addition to ensuring the safety of its workers, brings in its core qualities that reflect in the total performance of the enterprise, such as:

- *Better use of the energy expended by the worker;*
- *Rational use of equipment;*
- *Optimization of time (human and material resources);*
- *Rationalization of activities and use of spaces;*
- *Minimizing interference that can cause waste.*

In Brazil, a growing increase has been observed in the introduction of improvements in the search for quality in construction sites. More companies have developed checklists, work orders, logistics and material storage, accessibility, quality tools, compliance with safety standards in workplaces, implementation of ISO certifications, Integrated Management System and the implementation of the Brazilian Program of Quality and Productivity (PBQP-H).



Even though initially the awareness and training reside in the top management of the companies, through the directors and managers in search of a lean model, it is perceived that the demand for productivity is essential for development of the sector.

Project Management in Brazilian construction companies

Productivity measurement

An increasing number of studies on management and quality have been observed in recent years in order to identify deficiencies in the process and propose solutions for performance improvement in Brazilian construction. Modern construction technology is employed by companies that use technical and scientific knowledge to develop their systems and constructive processes. In the Brazilian construction industry, it is evident in the last decades that it has presented an increasing technological demand, mainly related to the productive processes. This growing demand is reflected in the gradual replacement of artisanal processes by mechanized activities that incorporate a higher level of industrial technology. Thus, the acquisition or development of technologies, and the awareness and training of workers for industry become an essential issue for the competitiveness of companies (Martins, 2013).

However, it is observed that the adoption of measurement of sector productivity by construction companies is limited. Measurement is basically based on productivity on a global basis and on the financial results obtained in the activities and stages. The use of productivity indicators in Brazilian construction is illustrated in the figure 5.

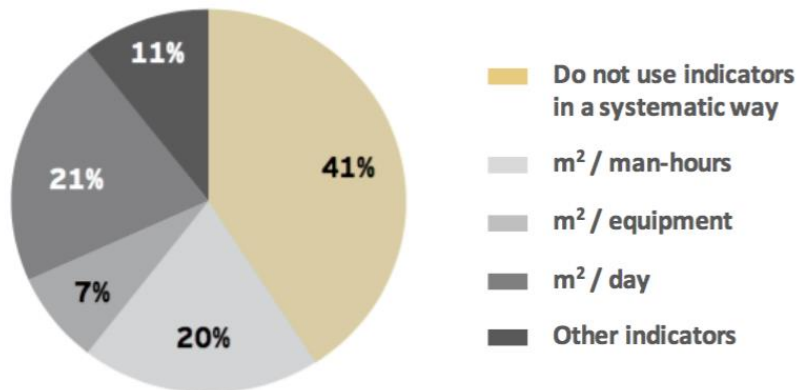


Figure 5. Use of productivity indicators in Brazilian construction.

Source: EY Brazil, 2014.

Project management maturity

The maturity of project management refers to the continued development in the process for strategic analysis and decision making in the company. The appropriate level of maturity may vary for each organization based on its goals, strategies and capabilities. Analysis of Project Management Maturity can help the company identify gaps and take important operational steps to improve its entire culture around project management.

In Brazil, the construction sector has sought to adapt concepts, methods and techniques developed for industrial production environments. However, these systems are not always able to adapt to situations that occur in civil construction, causing them to end up generating inadequate and inefficient systems (Martins, 2013).

A continuing study on the maturity of project management by companies in the Brazilian construction sector involving medium and large companies that have project



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management models accompanied by qualified professionals illustrate the scenario of the construction industry. Its latest indicators involve 415 organizations in 7,885 projects. Of this universe, 15.2% are from the Engineering and Construction areas (Archibald & Prado, 2014).

Fig. 6 illustrates the Construction average cost overrun of the companies studied, as shown.

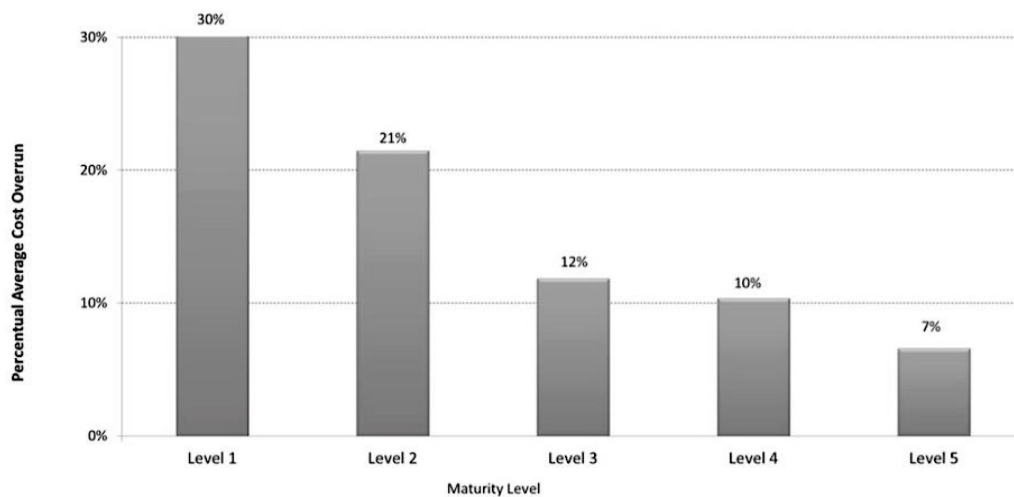


Figure 6. Construction average cost overrun (Archibald & Prado, 2014).

In engineering and construction companies studied, it is observed that only 11% of them reach 80% (level 4/5 maturity), representing a maturity average 2.9 (Level 3) - 58% of the maximum allowed in the analysis. This value can be considered good, considering the short time in which the Project Management subject became popular in Brazil. But it is certainly a low score considering how much still has to be done (Archibald & Prado, 2014).

The proposed maturity study of project management also addresses the analysis of the types of organization and the distinct differences observed in the private and governmental sectors. Fig. 7 shows the cost overrun by Brazilian organization type, as illustrated below.

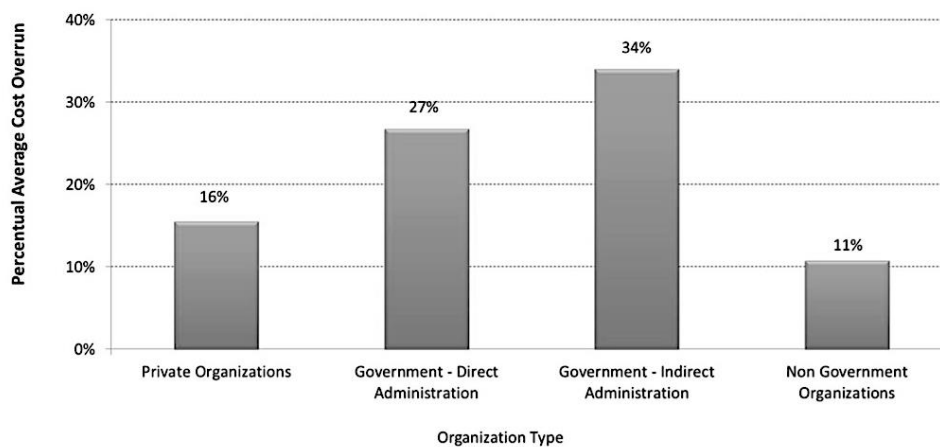


Figure 7. Cost overrun by Brazilian organization type (Archibald & Prado, 2014).



According to the organization type, it is observed that the Government reaches a percentage more than 100% of differentiation with respect to the private organizations.

Importance of innovation in strengthening growthness

There is broad consensus on the role of innovation as a major source for countries' economic growth. The relationship between innovation and economic growth has been demonstrated by several studies over several decades that have found positive correlations between various measures of innovative performance and economic growth.

It is through innovation that productive knowledge and creative ideas are transformed by companies into products and services with greater added value and novelty. It is not by chance that several governments have recognized that innovation has been playing an increasing role in the growth of their countries. For example, over the last 25 years, innovation has accounted for more than 60% of UK economic growth. Innovation appears as one of the main drivers of development and main motivation for the need for industrial policy. Precisely because of this, the competitiveness indicators try to capture this dimension of countries' economic development processes. The Index of Industrial Competitiveness Development released by the United Nations Industrial Development Organization measures industrial competitiveness as the capacity of countries to increase their presence in international and domestic markets – including indicators that seek to measure the success of nations in diverting their productive structure towards sectors that would be more innovation-intensive.

Fig. 8 compares research and development (R&D) spending in some countries. Typically, more developed countries have relatively higher expenditures as a proportion of GDP. South Korea, with an R&D expenditure of 3.6%, is larger than the developed countries selected in the sample. Another highlight is the substantial increase of this variable for China. Brazil has made little progress in the last decade and it is small compared to emerging countries like Russia.

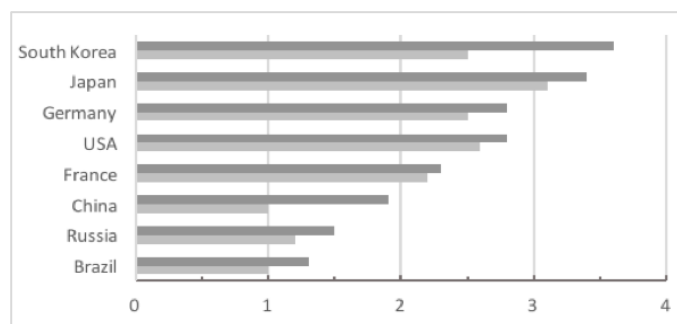


Figure 8. **R&D investments in relation to GDP by selected countries (%)**.

However, innovation should not be related only to R&D or patents. For companies in emerging countries, although R&D labs are rarer, many innovative activities can be found in the practical and commercial application of ideas not necessarily linked to cutting-edge technology.



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At the same time, significant innovations can emerge not only from sophisticated labs, but also from engineering areas. Therefore, a broad concept of innovation encompasses the implementation of changes in products and services, processes and organizational systems. In emerging countries, innovative activities often lie in engineering and design. In a second step, they can form the foundation and preconditions for achieving world-class R&D activities. Enterprises from the emerging high-tech world have begun their trajectory with duplicative imitation. Imitation practices can be preconditions for the implementation of more sophisticated engineering and R&D activities, including the expressive generation of patents (Martins, 2013).

Much of the innovation does not depend on science, and the recombination of existing technologies accounts for a large part of innovative activity over the past 50 years. Fig. 9 illustrates the scales of types and degrees of innovation, as shown.

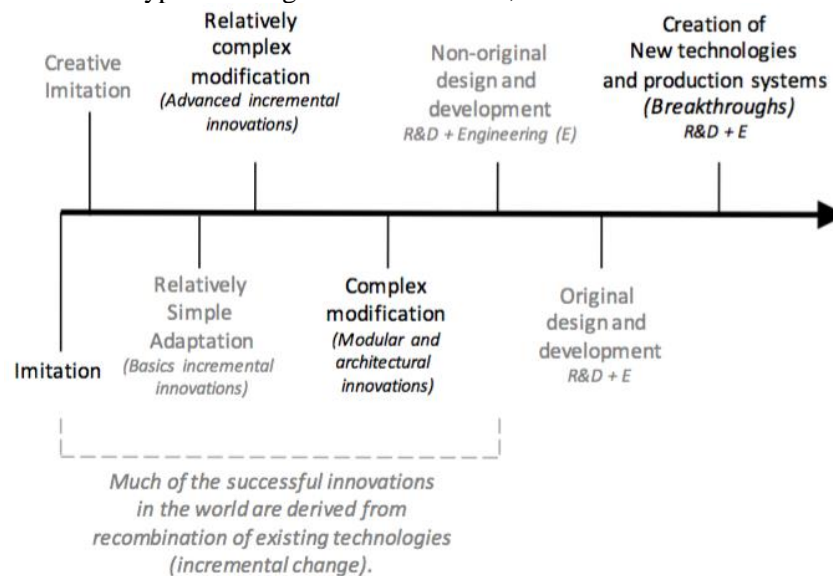


Figure 9. Scales of types and degrees of innovation.

In the longer term, rather than focusing on innovative activities, it is important to strengthen the technological capabilities that allow companies to move from innovation to an advanced R & D. Technological capabilities are a stock of resources based on human capital, technical-physical systems (software, hardware, labs, databases) and organizational systems, such as routines, procedures, standards, etc. The accumulation of technological capabilities, at the level of companies and industries, is fundamental for economic growth.

Challenges of construction companies in Brazil and proposals for actions

Although Brazil has obtained good economic growth rates, the literature indicates that there are several aspects to be faced. Studies indicate Latin America's low economic growth relative to other developing countries. Differences in growth rates of labour participation or the accumulation of capital (human in the form of labour skills and physical in the form of capital per worker) typically pale in comparison with the gap opened by lagging productivity improvements, or reversals, in the typical Latin American country (Ungor, 2016). The productivity failure can be traced to distortions in the workings of the economy that drive aggregate efficiency below the technological frontier (Blyde & Arias, 2006).

Among the main challenges in civil construction, the following stand out:



- *reducing the informality of the workforce;*
- *statutory, labour and social security reforms for companies;*
- *government investments to increase and improve professional education;*
- *encourage to raise level in small and medium-sized construction companies;*
- *partnership between companies and educational institutions to promote R&T;*
- *continuous training in companies;*
- *insertion of management tools and indicators;*
- *tax incentives for companies to invest in management and knowledge management;*
- *continued monitoring of indicators and tools for sector improvements;*
- *insertion and innovation indicators.*

Proposal of actions based on productivity and innovation available

A control option is planning is through actions based on productivity and innovation available in the company or in the market, which is known to those involved.

The productivity control associated with the value added in the activity and the innovations available in the company can be managed in the construction industry through the API Tool. It is a proposal for simplified control of the priority actions to be provided by the company, focusing on productivity optimizations in the most significant items of significant value added, which have alternatives and / or innovative solutions available in the company or in the market. Figure 10 illustrates the proposed API Tool, as shown.

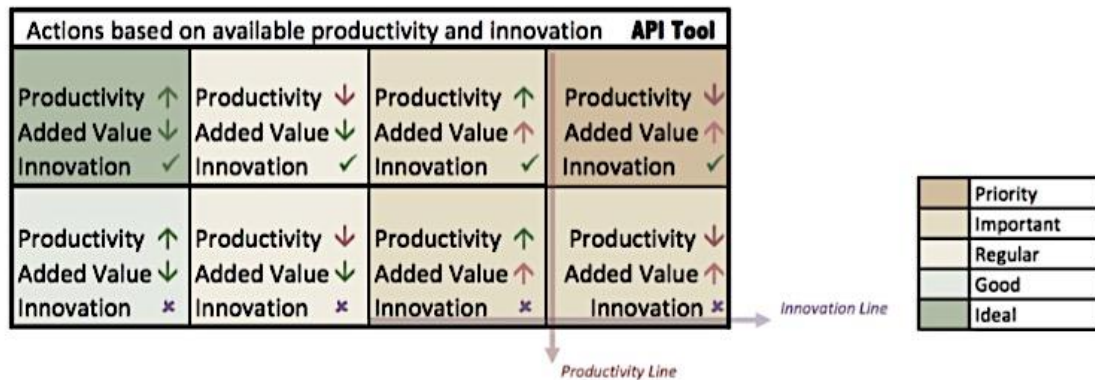


Figure 10. **Proposal of a management tool that identifies priority actions based on productivity, associated with added value and available innovation - API Tool.**

From worksheets to job productivity and value added, options for implementing improvements through innovative solutions known to those involved and applicable to processes are indicated. It is a simplified option especially for companies that are unfamiliar or specialists in project management, but need to be guided by indicators for decision making in the planning and development of processes.

The main objective is not to use this tool, but to suggest the adoption of decision-making that adopt the productivity and added value associated as parameters and using methodologies already tried by the involved ones. Making the actions available to professionals is a more pleasant beginning and does not change the daily routine of professionals. In Brazil, especially



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in the construction industry, it is observed that the traditionally high margin of gains and coefficients of safety make the control global, which makes it difficult to act in Gaps. With the globalization and advent of information technology expanded today, the industry needs transformation, which is felt especially in times of crisis, as today.

Conclusions

Planning and control are interlaced processes that form a continuous cycle. While planning is a pre-action decision-making process and aims to set goals and course, control is a process that ensures that the course of action is maintained and that desired goals are being achieved and how much margin Expected and unforeseen events. Brazil needs to overcome difficulties and restore growth in order to converge with the socioeconomic pattern of developed countries. It is of the utmost importance for construction firms to increase competitiveness, which depends on raising productivity and developing innovative technological capabilities.

In view of the literature, the size of the Brazilian challenge in the pursuit of higher productivity is clear, and that it incorporates the necessary innovation, both effective and lasting, since success depends on changes to the main structural problems of Brazil, such as social and cultural limitations due to the low quality of Brazilian education, lack of infrastructure, excessive bureaucracy, levels of informality in the workforce, high tax rates and little investment in technologies.

In addition, it is not only the government that needs to leave its comfort zone and seek new actions to promote efficiency, companies must invest in the renewal of their productive processes and in the development of really effective management processes, but such actions derive from increased competition. Therefore, there will only be productivity growth if we work in partnership. An action proposal for improvements would be the adoption of a management that uses productivity and its added value associated as parameters and using innovative methodologies and solutions already tried by those involved.

The success of a construction company cannot be basically defined in terms of profitability and success in the project. Control and planning to support strategies and support in the competitiveness of the sector, make companies have a need for strategic indicators, such as those involving productivity and innovation, in line with the interests of the company.

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STAKEHOLDERS COMMUNICATION APPROACH: A NEW ERA

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Abstract

The aim of this paper is to demonstrate that as communication must be transparent and clear and democratic, this means know why and with whom we are communicating. Are stakeholders all equal? Do they need the same strategic communication approach?

Throughout a literature review that suggests how to identify the stakeholders and how to manage them, it is proposed a new communication oriented approach as it is established that a two-way communication approach is the business model for the future.

It is suggested to investigate relationship and agreement attributes to help the project manager to categorize the stakeholders from the point of view of communication approach. These attributes are strictly connected with communication strategy as they could be modified through the right communication approach. Also it's suggested to share the identification phase of the stakeholders with the identification phase of the risks, in order to build risks/stakeholders matrix that should be integrated with relationship and agreement attribute for each stakeholder.

For each stakeholder should be ethical to shape the more appropriate communication approach. By using a new paradigm of the well-known rhetorical triangle, pathos, logos and overall ethos are the constraints to solve to build the right communication approach for each stakeholder.

The results of this study reveals that the application of the new attributes, relationship and agreement throughout the stakeholder shape tool, combined with the re-engineered rhetorical triangle will drive the project manager toward the right communication approach for each stakeholder and a successful communication plan.

Key words: *stakeholders, communication, ethics, project management*

JEL code: O15, D8

Introduction

In literature there are many definitions on what is a stakeholder, indeed the debate is very open, sometime confuse and contested (Miles, 2012). One of the most accepted definition is by Freeman (Freeman, 1984) “any group or individual who can affect or is affected by the achievement of the organization’s objectives” that is quite similar to the one we find in PMBOK “An individual, group or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity or outcome of the project” (PMI, 2013).

These definitions are, indeed, very widely and without any doubt, to stay alive, the project manager needs to assign attributes to each stakeholder to manage him/her in the best way.

In literature the most used attributes to analyze and prioritize the stakeholders are:

- power,
- legitimacy
- urgency
- proximity

where (Snauwaert, 2012):



- “Power is the ability of those who possess power to bring about the outcomes they desire (Salancik & Pfeffer, 1977)
- Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions (Suchman, 1995, p. 574)
- Urgency is the degree to which stakeholder claims call for immediate attention (Mitchel et al., 1997)
- Proximity is the degree to which stakeholders are closely associated or relatively remote to the organization/ project (Bourne & Walker, 2006)”.

Also, there are different models for classification such as “regulator, controller, partner, passive, dependent and non-stakeholder” (Mainardes et al., 2012).

In the vision of Mitchell et al. (1997), the classification options are: dormant stakeholder, discretionary stakeholder, demanding stakeholder, dominant stakeholder, dangerous stakeholder, and dependent stakeholder.

In addition, stakeholder classification is not confined only to human beings. Maheshwari and Pillai (2004) also suggest a “non-social” classification in which they consider fauna and flora as well.

As we can see, still, there are many ways in literature to identify stakeholders but always with the aim for the company “of which of them, and to what extent, should be included in its strategic issues, as all sides will not always have equal interest in certain topics or problems.” (Maheshwari et al., 2004). Nevertheless “A two-way communication and cooperation with stakeholders represents the business model of the future” (Krstić, 2014).

Stakeholder classification is a very complex topic and it is fundamental that the project manager (and program or portfolio manager) classify them in order first of all to rightly communicate with each stakeholder.

With the aim of a better focus on stakeholders’ communication, in 2012 and 2014, a tool was presented called the StakeholderShape (StSh) (Bragantini, 2012 – Bragantini, Ferrante, 2014).

Basically the tool suggest to integrate the identification phase of stakeholders and risks in order to build a new stakeholders/risks matrix, that is one of the element to shape the right communication approach for each stakeholder (Table 1).

Table 1

Stakeholdershape tool activities		
Process	To do	New activities
Initiating	Identify Stakeholders	Collect also agreement and relationship values (absolute values from 0 to 100)
Planning	Identify Risks	While compiling risks register also introduce for each stakeholder the influence for that risk comes true (percentage)

Source: Bragantini (2014)

The attributes used in the stakeholdershape tool, relationship and agreement, were chosen because are strictly correlated and influenced by the communication activities that the project manager can take over the project.



In this way the stakeholdershape tool grants the mapping of each stakeholder as part of a broader vision (systemic). Each stakeholder has his/her own shape and it is mapped, firstly, considering relationship and agreement that are attributes much more important to build the correct communication plan.

The mapping of the stakeholders is, in this paradigm, functional to the building of the communication plan (Figure 1, Bragantini and Caccamese, 2015).

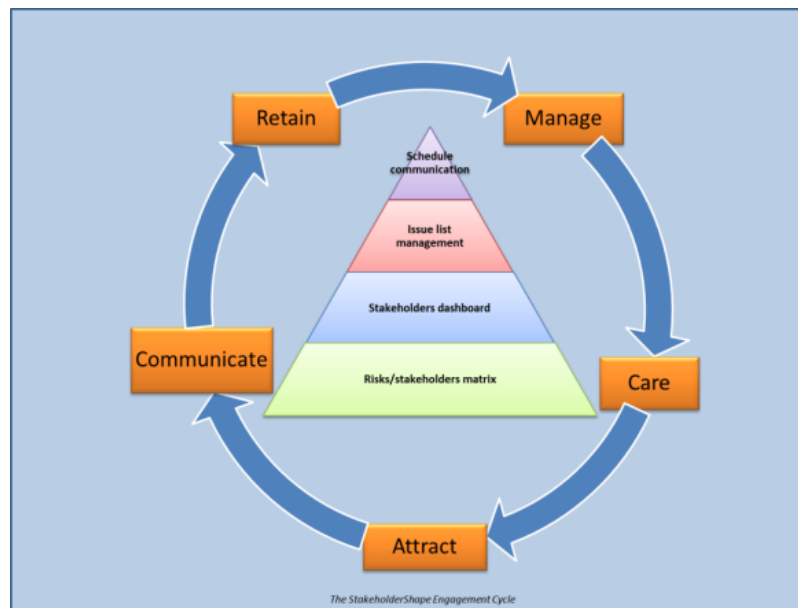


Fig. 1. **Stakeholdershape iterative process (Bragantini and Caccamese)**

No doubt, therefore, that communication is not only a personal competence or skill, but also and overall, should be recognized that communication is a prime mover in the execution of a project (or program or portfolio): “Without communication there is no efficient management, or even life. Human is a social creature, so he/she lives in a group, which demands continuous exchange of information” (Wziątek-Staško, 2011).

Communication

In common practice at least 70% of project manager time is dedicated to communication, and some sources suggest a higher percentage close to 90% (Bourne, 2009). Communication (from the Latin *cum* = with, and *munire* = bind, build, and always from the Latin *communico* = to share, to participate) is sharing something with someone, and stakeholders are precisely those with whom such sharing should be implemented. It is therefore evident that stakeholder management is strictly linked with communication. And vice versa, communication is sharing information to and from stakeholders.

As stated in A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Fifth Edition, one of the interpersonal skills of a project manager is communication. In addition, The Standard for Program Management – Second Edition observes how “the most



important competence, however, is communication” and again “Communication is the primary tool for managing stakeholders” (PMI, 2008).

The communication process is undoubtedly complicated and it is for this reason that many projects fail. The communication is the prime mover for a successful project: fostering communication between stakeholders can lead to better understanding (Jensen and Uddameri, 2009). And without doubt, communication is a process and an activity common to all stakeholders (Stephens et al., 2005): “Competent communicators should also be able to use communication behaviors to organize their work process” (Keyton et al., 2013).

Communication is also matter of corporate social performance (CSP). Barnett and Salomon (2012) in a study on the relationship between corporate social performance (CSP) and corporate financial performance (CFP) found that “firms with low CSP have higher CFP than firms with moderate CSP, but firms with high CSP have the highest CFP.” As a matter of fact the right communication approach raises the CSP value of the firm so each organization must put special emphasize on communication themes (Figure 2, Bragantini 2017). And “In large for-profit and not-for-profit organizations, communications most definitely have ethical implications” (Dekay, 2011).

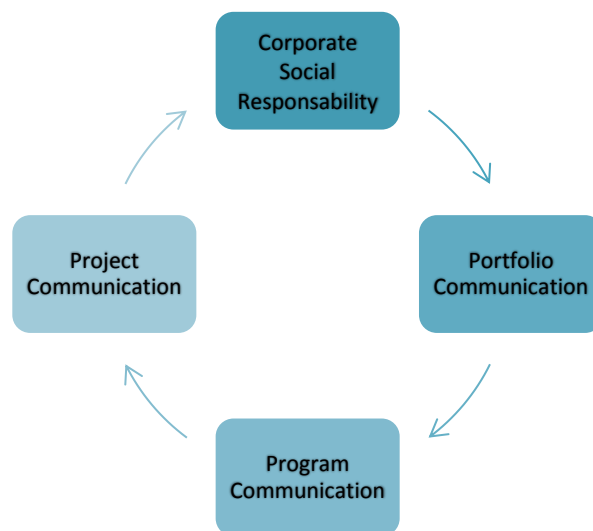


Fig. 2. CSR – Communication cycle (Bragantini)

Also, in Barkse and Pullin cited by Keyton et al. (2013), recent studies “have demonstrated the importance of positive social-emotional communication in overcoming communication problems (especially in creating work relationship)”. Ultimately, this translates into a communication plan that will include the use of communication channels, the “how”, such as one-on-one meetings, conference calls, group meetings, focusing the messages, the “what”, in terms of caring and empathy to improve stakeholders’ relationships, that is one of the attributes in the stakeholdershape tool.

In this case the communication plan should be focused on an interactive scheme, keeping in mind that, according to the Center for Risk Communication (Carpenter, 2012), one of the key elements, the “what”, are caring and empathy.



If, instead, the communication plan needs is more weighted towards the stakeholders agreement, this translates into a communication plan that will include the use of certain communication channels, the “how”, such as one-on-one meetings, conference calls, group meetings, focusing the messages, the “what”, in terms of competence and expertise to persuade the stakeholders of the value of the project and its benefits (Pritchard, 2004).

In 2012 Caccamese and Bragantini suggested the existence of a soft pyramid to drive the project, in contrast with the old conception of the iron triangle (Atkinson, 1999 – Bernroider et al., 2011 – Toor and el., 2010). The theory presented is that “the management of “soft” factors in a constrained environment (the “soft pyramid”) should complement the traditional effort of managing “hard” factors in a constrained environment (the “iron triangle”)” (Caccamese and Bragantini, 2012).

The spaces for the softs factors are:

- “motivational space. This is the space available for the project to activate the context for individual motivation. For example, like working conditions, job security, advancement, growth, power, affiliation, esteem, decision-making processes, rewarding systems (Verma, 1995);
- social space. This is the space available for the project to activate the protocols for acceptable behaviour. These are made of both task-related rules as well as social rules, like punctuality in task completion, agreed time to read and respond to messages, respect of consensus decisions, honesty, truth, preparation for and attendance to meetings, punctuality on meetings (Whatley, 2009);
- analytic/holistic space. This is the space available for the project to foster and facilitate the development of individual thinking models. The analytic model is centered upon analysis, linearity, sequentiality, reductionism and places high value upon expansion, competition, quantity and assertiveness. The holistic model is centered upon synthesis, non-linearity, parallelism, holism and places high value upon preservation, cooperation, quality and associationism (Capra, 1982).”

If it is true that coordinating a project, thought in an iron triangle logic, require a great effort from the project manager in term of communication it is more true that this effort must be surely heighten in a soft pyramid paradigm where the soft spaces are all strictly correlated with the etymology of the word communication.

Therefore, communication is the real core of the project, not the quality, not the scope, not the time or cost, not even the soft factors: just communication is the seed for a successful growth of the project.

Also from the comparison from PM 1.0 and PM 2.0 (Kerzner, 2014) it’s evident that “stakeholders are expected to make informed decisions rather than just any decisions.” And in this view we must adopt a two way communication approach (Table 2).



Table 2

PM 2.0 communication approach

Factor	PM 1.0	PM 2.0
Overall communications	Localized	Everywhere
Access to information	Localized and restricted	Real time, unlimited access and globalized
Amount of documentation	Extensive	Minimal
Communication media	Reports	Dashboards
Frequency of metrics measurement	Periodically	Continuously, in real time
Role of software	As needed	Mandatory
Software tool complexity	Highly complex tools	Easy to use tools

Source: Kerzner (2014)

An interesting survey demonstrates how the most important criteria for effective communication is the depth and accuracy of content (Table 3).

Table 3

Ranking of criteria for effective communication

Criteria	1 (most important)	2	3	4 (least important)
Depth and accuracy of content	50%	35%	11%	4%
Tailoring content of target audiences	39%	32%	17%	12%
Grammatical/mechanical correctness	6%	27%	49%	18%
Proper format	4%	8%	26%	62%

Source: House et al. (2009)

And what about the “why”?

The project manager must be ethically responsible and must know the “why” we are communicating, because the answer to the “why” gives the opportunity to communicate an ethical content and with ethical principles. That means the right accuracy and depth and right approach to each target audience (stakeholders).

If you know the “why” you know the “what” and the “how”!

In this view it is proposed a very easy to use tool, the well-known rhetorical triangle re-engineered (Figure 3, Bragantini, 2017), that in a PM 2.0 world, helps the project managers to



find the right communication approach for each stakeholder. Solving the triangle for each stakeholder would address the project manager toward a successful communication plan.

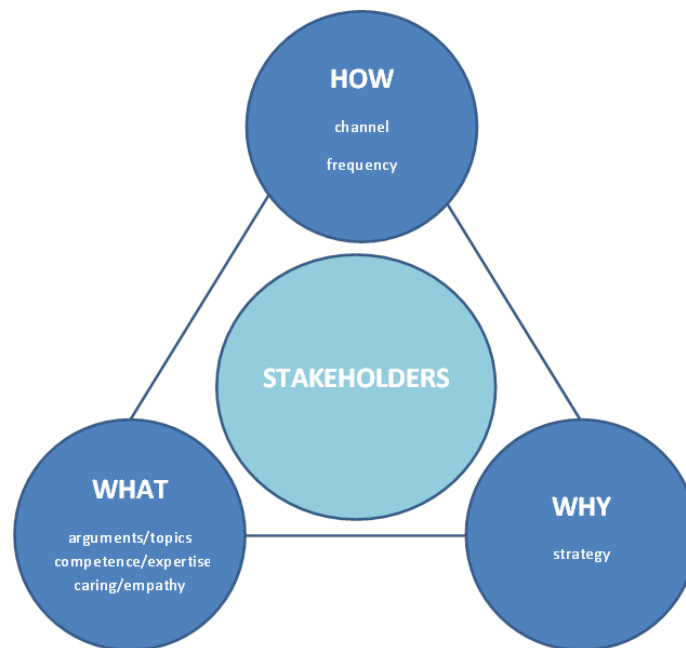


Fig. 3. **Re-engineered communication triangle (Bragantini)**

Conclusions

Especially in contexts that are becoming on time and on demand, the response of the project manager must be timely and therefore requires a suite of tools that with limited data (the attributes of stakeholders) can be updated quickly in order to constantly identify with whom (stakeholders), how, what and overall why communicate.

Corporate Social Responsibility increases through ethical communication approach and in a PM 2.0 frameworks it's more and more important to clearly discover the strategic needs of communication: the "why" (ethos) we are communicating something to each specific stakeholder.

The use of the stakeholdershape tool combined with the re-engineered communication triangle would drive the project manager to the right strategic approach in order to collect the "what" and the "how" information to build a successful communication plan.



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COOPERATION AND COMPETITION IN PROJECT TEAMS

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Abstract

The topic of cooperation and competition in the workplace is the subject of discussions between representatives of social sciences, including sociology, psychology and management. Among researchers there is no clear position on the superiority of one over the other. Either concept can in certain circumstances be effective, or on the contrary, it might have an opposite effect. Although there have been many studies on cooperation and competition within various groups and between them, there is no research available on cooperative and competitive behaviour in project teams. For this reason, authors decided to take a look at the relationships between members of such groups in order to find answers to our questions: how do respondents define the concepts of cooperation and competition (what words do they use to describe them?), have they experienced cooperation and rivalry, and if so, which do they think occurs more frequently: what promotes cooperation and teamwork? Why does competition occur, and how does it manifest itself? The aim of this article is to present the results of our study on cooperation and rivalry in project teams. The subjects of authors study are individuals working in project teams who are also students of the Faculty of Management at the University of Lodz. Authors used the biographical method to collect the data. Authors asked respondents to describe a situation from work within the scope of relevant information according to our instructions. The presentation of the results of study is preceded by a brief literature review, and a description of the methodology used (introduction). At the end of authors presentation a summary of author observations included. Although the results of this study are not subject to generalization for the entire population, it shows that employees working in project teams more often cooperate than compete with each other. Their attitude is largely due to keeping the focus on the goal of the team, and the belief that each member has specific skills, which may affect the results of the team's work. The results of the preliminary study will be used to prepare the tools for use in complex research: a survey and interview questionnaire.

Key words: *project team, cooperation, competition.*

JEL code: *M54 Labor Management*

Introduction

The topic of cooperation and competition in the workplace is the subject of discussions between representatives of social sciences, including sociology, psychology and management. The question of which of these concepts is more effective in the workplace seems to remain without a clear answer. In some situations, cooperative attitude might dominate, while in others, the competitive approach has an edge. The issue of cooperation and competition is of particular importance when it comes to the new, more flexible organisational structures where project teams are utilised.

A project team is a unit composed of employees who, on a daily basis, work in different organisational units, but for the duration of the project are given specific tasks associated with it, and are responsible for completing them. (Дедова В.Е. 2014, Дроздова В.А, 2016). Project teams are characterised by their temporary nature – they are appointed for the duration of the project and dissolve after its completion. They function on the basis of subject specialisation, selecting participants based on their expertise, which is often specialised and unique. It is also important to



direct the focus of all team members to the goal of the project, and ensure the complementary knowledge and skills of all participants.

Project teams constitute certain communities, in which interactions occur between their members and reveal a variety of behaviours, such as "they may seek to maximize their dominance over their partner (rivalry, competition), or to gain mutual benefits for both themselves and their partner (cooperation)" (Pajestka G., 2012). In the first case authors are dealing with actions aimed at individual success that is the attitude of "it's most important that I win" we are enemies", while in the second case we see a different attitude: "we are here for each other, we need each other to achieve the goal". Although subject literature presents views on cooperation and competition in teamwork within the organization, there is no discussion regarding these issues in project teams. Due to the subject and purpose of this article we have concentrated on inter-team cooperation and competition.

The analysis of available subject literature (Benndorf V., Rau H. A., 2012 Кip, 2014, Naidoo S., Sutherland M., 2016, Севастьянова И. Г., Стегний В. Н., Спосиб А. Г., 2010, Świątek-Barylska 2016), shows that cooperation is generally seen as positive. We noted that many authors emphasise that internal cooperation can lead to effective problem solving through the exchange of knowledge and innovation, which are the source of new ideas (Кip, 2014, p. 2, Севастьянова И. Г., Стегний В. Н., Спосиб А. Г., 2010, pp 98), stimulate learning processes (Benndorf V., Rau H. A., 2012, pp 12), and motivate individuals and teams to develop further, which may result in increased productivity (Naidoo S., M. Sutherland, 2016).

Rivalry, the second concept described, causes more controversy. "For many years now, at least on the basis of social psychology, there is an ongoing dispute between two opposing views on competition" (Szmajke, Urbanowicz, 2012). W. James and the supporters of his theory emphasise the economic and task-based benefits (productivity, profit, quality of work, etc.), while E. Aronson and his researchers (i.e. the Aronson option) attach greater importance to the socio-relational costs (hostility towards others, decrease in openness and trust in social relations, deteriorating social climate, etc.)

Depending on its intensity, competition can be either constructive or destructive (Barylska-Swiatek, 2016, p 93). In terms of positive aspects, authors can conclude that competing workers are often faced with the need to confront others, with their views and skills, which in turn contributes to the development of their own competencies. Competition increases the motivation and commitment of employees and stimulates them to action (Ораев Г. 2012, p. 35, Świątek-Barylska, 2016, p. 94). Competition is also an antidote to boredom; it invigorates and brings excitement and joy. Competition creates an environment in which people can fulfil their need for achievement. During competition success becomes even more attractive (Tyszka, 1998).

On the other hand, (Murayama, Elliot 2012) competition could have negative consequences if, instead of motivating to improve, it leads to evasive motivation, focused only on ensuring that the quality of work is not inferior to the level of performance of one's rivals. Competition can evoke the fear of failure in the employee, which can mean that his only motive will be not to work better than others, but do just enough to not come last in the competition. When competition arouses fear it leads to the avoidance of ambitious and challenging goals. "Individuals competing with each other are afraid of losing, and of the social consequences of failure. A person who competes may be concerned about their public image and fear the negative emotions of shame, humiliation, and the inability to free themselves from the thoughts of missed opportunities,



doubting their own abilities, or letting down the trust of others" (Skruczaj 2016). Poorly understood and executed competition leads to stress, psychosomatic illnesses, professional burnout, and relationship breakdowns. Competition causes some people to feel lost, harassed, and even forced to behave in ways they don't agree with (Skruczaj 2016, Stankiewicz 2014).

"Competition limits the rationality of action, and may cause difficulty in predicting the negative consequences of actions. Focusing on the desire to win and defeat the opponent, as opposed to the activity itself, results in competition being considered to be one of the most important factors that reduces intrinsic motivation." (Skruczaj 2016).

"Focusing on the desire to prove themselves better than others results in fewer available cognitive resources, which the individuals could use to achieve their objectives - this leads to decreased creativity, originality of thinking, and hinders learning. At the same time, persons behaving in a very competitive way are perceived by others in a negative light when it comes to their interpersonal skills". (Doliński, 1998).

Due to the fact that it is difficult to conclusively determine the advantages and disadvantages of inter-team cooperation and competition, choosing between the two concepts is often described in scientific publications as a dilemma. To solve it, we need to study the conditions of these concepts and their consequences, in order to combine both to achieve the optimal performance of teams, which means determining the level of intensity of cooperation and competition that will be beneficial for the organisation (Naidoo S., Sutherland M., 2016).

A content analysis of the literature led us to conduct a pilot study (preliminary). Our intention was to find out whether employees will want to speak about cooperation and competition in project teams, and if so, what will they focus on. In addition, authors assumed that the results of the pilot study will be used to prepare the tools for use in complex studies: (a survey and interview questionnaire).

The aim of our study was to gather information on the relationship between employees at their place of employment, and the behaviours of individuals that affect the nature of these relationships. One aspect was the issue of cooperation and competition at work. Based on the literature review we formulated questions for which we wanted to find answers in the course of our study: how do respondents define the concepts of cooperation and competition (what words do they use to describe them?), have they experienced cooperation and rivalry, and if so, which do they think occurs more frequently: what promotes cooperation and teamwork? Why does competition occur, and how does it manifest itself?

Authors decided to use the biographical approach in our research [Bednarz-Łuczewska, Łuczewski 2012]. We asked respondents to describe a situation from work within the scope of relevant information according to our instructions. Choosing this method to collect information allowed the respondents to remain anonymous and gave them a sense of security, which seemed important due to the sensitivity of the issues discussed.

The subjects of our study were working students of the Faculty of Management at the University of Lodz (studying in the areas of Management and Logistics, and part-time Masters' Degree students), who demonstrated an understanding of the issues, and declared their willingness to participate in the study, which increased the likelihood of obtaining reliable data. Authors of this research collected the biographical stories in December 2016 and January 2017. In total, we received 134 stories ranging in length from 4 to 12 standard-sized pages. For further analysis, for the purpose of this article, we chose only those stories, in which the authors declared their experience working in project teams in private companies representing various



industries. The samples were therefore selected on purpose. In the following table we summarized the authors of the biographical stories (gender, age, job tenure in the company described, and job title), as well as the companies in which their experiences took place. Not everyone provided all the required information, but from the point of view of the aim of our study, the lack of some data was not an issue.

Table 1

Characteristics of the authors of biographical stories		
No.	Author information	Company characteristics
1	Female, 24 years old, employed for 1.5 years as an International Freight Forwarder	A small, private transport company operating since 2008 in the Lodz Province, one owner, employs 12 people (2 international freight forwarders, one administrative employee and 9 drivers); providing transport and shipping services throughout Poland and Europe (Germany, Austria, Belgium, the Netherlands, France, Italy, Switzerland, the Czech Republic and Slovakia).
2	Male, employed for 1 year as a purchasing Logistics Specialist	The company belongs to a capital group of a large global telecommunications operator, and is engaged in the construction and maintenance of fibre and telecommunications infrastructure. The main area of business is to provide customers from the B2B and B2C sectors cutting-edge telecommunications and ICT solutions. On the basis of the key skills of specialists and own resources, the company also offers comprehensive services in the areas of consulting, concept development, design, construction, maintenance and servicing of a wide range of telecommunication infrastructure, electronic security systems and monitoring; a manufacturer and distributor of passive and active components to build ICT infrastructure. More than 7,000 employees throughout the country.
3	Male, 24 years old, employed for 8 months as a warehouse worker	A private company with foreign capital operating in the beauty industry, known on the Polish and global markets. It is a trade and production company. It has been operating on the Polish market for over 20 years, but her parent company has existed for over 100 years. The corporation employs over 77,500 employees worldwide, and about 900 workers in Poland.



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|----|---|---|
| 4 | Female, 23 years old, employed for 6 months as a Media Analyst | A private limited company with two owners, employing 25 workers - 15 office employees working on-site, and 10 employees working remotely; media agency |
| 5 | Female, 24 years old, employed for 2 years as a Customer Advisor | A private company managed by one owner, operating since 2002, engaged in designing marketing materials, employs 12 people. |
| 6 | Female, 24 years old, employed for 1.5 years as Assistant Manager | Trading company in the fast fashion clothing industry, operating as a franchise since 2006, employs 32 people. |
| 7 | Male, works as a Manager | A large, family-owned private company producing ceramic tiles, employs about 1,700 workers. |
| 8 | Female, 36 years old, Legal Counsel, employed for 9 years, currently as a Manager in the firm in the regional office | A firm belonging to the international consulting company of the so-called Big Four, provides world-wide services in the areas of audit, economic and financial consulting, risk management and tax consulting, as well as legal advice; operates in more than 150 countries and employs over 200,000 specialists, including 2,200 people in Poland of which 100 work at the firm. |
| 9 | Female, 24 years old, employed for 1.5 years, first as Assistant to the Management Board, and for the past 2 months as Quality Manager. | The company, which I present in this paper, is a limited liability company dedicated to developing software. It specialises in creating mobile and web applications. The company was founded in 2010 in Lodz, starting with two employees, it currently employs 40 developers and testers. |
| 10 | Male, 24 years old, employed for 7 months as a Warehouse Logistics | A private distribution and production company, employs 8 people; modern, rapidly growing company engaged in the creation, production and distribution of weight loss products, and functional, dietary, and healthy foods. |



Specialist

- | | | |
|----|--|--|
| 11 | Man, 43 years old,
employed for less
than a year as a
Project Manager | A private company operating as a joint stock company, one owner, mostly engaged in research and development in the field of social sciences and humanities. The company employs 15 workers. In addition, it works with more than a dozen people on the basis of civil law contracts. |
| 12 | Female | A private German company managed by two Polish citizens. Operating on the Polish market for over 15 years, employs approx. 200 workers, produces plastic components for the construction industry. |

Source: based on own studies

As the table shows, we analysed 7 stories provided by women and 5 given to us by men. Most of the respondents are between 23-24 years old, which is most likely due to the fact that they're graduate students. Respondents described various companies, both in terms of the size, measured by the number of employees, as well as the specific business operations of the company. The differences in these operations affect the nature of the projects implemented. However, at the preliminary research stage, we decided not to analyse the relationship between the specificity of the project teams' work and their focus on either cooperation or competition.

In this article we presented the results of qualitative analysis. In the text we referred to the statements we received from responders. In the parentheses following these statements we included the Arabic numerals indicating the particular citation from which the biographical story comes from.

Research results and discussion

The study suggests that cooperation is viewed as being associated with working to achieve common goals, sharing resources necessary to achieve these goals, mutual respect, perceiving all members of the project team as competent and motivated to work, and mutual trust. The words used to describe cooperation are positive (e.g. working together, motivating, helping and supporting each other, solving problems together, pleasant atmosphere, camaraderie). Competition, on the other hand, is understood as a desire to be better than others, to stand out from the group, and receive higher awards, including the possibility of faster promotion. When writing about competition, respondents use words like: disagreement, resentment, fighting, game, conflict, conflict of interests, race, hostility, and usually give the term 'competition' a negative tone. One of the authors of a biographical story admitted that competition is everywhere, and it results from the need to secure the best possible living conditions for oneself, "everyone wants to live as best and as comfortable as possible, which is why they try to get the best results. I do the same myself, and I don't really feel bad about it. After all, this is why I come to work (3).



Most of the respondents claim that, in the project teams in which they worked, or are still a part of, relationships are based largely on cooperation – as many as 11 people. They support this with the following statements: "We have many projects that are multidimensional (...) completing these projects is only possible thanks to a very strong collaboration between employees (8), or "cooperation is most important here, and the success of the project mainly depends on it"(10). When writing about cooperation in project teams, they mention mutual help, especially in difficult situations, e.g.: "Of course, if necessary, every one of us can count on the help or support of another person. We're happy to help each other, if the situation requires it"(1); "There was never a time in which an employee was left alone with a problem. Everyone was willing to help in order to solve the problem together. Very often I'm not able to complete all my tasks, because there are so many of them. Then I can always count on the support of the people I work with. As a member of the team, I also offer support to people who need help while working on projects"(2).

Willingness to cooperate may be based on personal characteristics. One of the authors of the analysed stories admitted that, in her case, the unwillingness to compete most definitely stems from her limited experience and short tenure at the company "(4).

The authors of these stories emphasize that cooperation is possible thanks to focusing on goals and achieving desired results. This is evidenced by the following statements:

- "We support and help each other on various levels because we know that we are a team, and we want to achieve the best results of our work" (1).
- "What's most important at our company is the feeling that we are a team, and that we strive to complete our tasks together. Our work is based on teamwork, no one here works alone and solely "for himself," we all strive to reach a common goal"(5).
- "The aim is to complete the project together, and without cooperation it would be difficult" (8).
- "Relationships are strongly based on cooperation in order to achieve the best results as a team. There is no room for competition here"(10).
- "Employees who prepare individual projects or their components are aware that their daily work contributes to the achievement of the objectives" (11).
- The key to cooperation are clear rules of operation, and the fact that project team members have specific tasks to perform. We can conclude this from the following statements:
 - "There is no competition here. Everyone has their own tasks to perform, which they focus all their attention on. A clear division of labour eliminates competition" (1).
 - "When assigning tasks, the manager, must familiarise individuals with the project, explain the business background, describe what needs to be done and what is expected. Other questions may arise during the project"(8).
 - "Proper implementation of specific tasks by individual team members determines the quality, method and the completion time of tasks by others. The key factors are: transparent rules and adequate compensation based on results. Using measurable indicators for achieving objectives has a positive effect on accountability and mutual trust" (11).
 - "Due to the small number of employees in the company we have a friendly work atmosphere. In last year's quarterly talks, 90% of staff specified our work atmosphere as



the biggest plus of working at the company. We know our strengths and weaknesses, which makes it easier to delegate work and assign specific tasks to the right people"(9).

The essence of cooperation in project teams, according to the respondents, is the opportunity to submit ideas, and for relaxed, constructive discussion. One of the respondents, in support of the above statement, provides an example from their place of work: "A recent situation can prove that work relationships are based on cooperation. We were working together with the department on an advertising campaign for a key client. One of our colleagues had a different view on how to execute the project from the rest of the group and firmly stood his ground. We did not completely reject our colleague's idea; on the contrary, we listened to all of his recommendations and even implemented some in the project. Our colleague took into account the opinions of other members of the group, and thanks to the joint compromise we were able to communicate without competing and arguing whose idea is better. Together we have achieved our goal. The important thing is that we are able to listen to each other and understand different points of view" (5). Another respondent who shared her experience said: "Communication with the project manager is a two-way street, he is open to the exchange of opinions, views and ideas of employees. A good example here is the meetings he convenes in case of problems and to implement projects. During such meetings, employees and their managers have the opportunity to present their own ideas, discuss their advantages and disadvantages, implement them in practice, and to share the responsibility for sub-tasks, which result in the successful completion of the project "(6). Another respondent also appreciates the advantages of joint consultations, saying: "Most of the tasks that we undertake is done jointly, and if not, we consult each other at every stage" (12).

In reference to the open exchange of opinions, respondents repeatedly emphasised the role of brainstorming as a useful technique when working on projects:

- "We solved every problem together. Brainstorming always resulted in great solutions" (2).
- "The head of the project team communicates his ideas in meetings, and everyone else implements the project. Cooperation also plays a role when introducing a new product. During the meetings everyone can express their opinion on a particular product. Every opinion counts, which results in selecting the best product according to general opinion" (10).
- "The project allowed for hour-long group meetings during working hours in order to search for ideas, or brainstorm, divide tasks, and establish regular meetings to finalise the completed areas of the project" (12).

Our study also shows that the key aspects for cooperation in project teams include mutual respect, understanding, and equal treatment of individuals. The authors draw attention to the above mentioned issues in the following statements:

- "(...) I worked in a very close-knit team made up of professionals with extensive experience in the construction of telecommunication networks, who had a lot of compassion and understanding for others. I couldn't imagine a better team"(2).
- "We have mutual respect for our work and together we are a team" (4).
- "What I like about our workplace relationships is that there is no unhealthy competition there. Employees don't blame each other for failures; they don't criticise, and don't complain to superiors about other team members. Every employee feels safe. He knows



that if a problem arises, there will be someone who will help him solve it. All employees are friendly to each other and treat each other with respect"(6).

- "In the development and implementation stages of the project everyone on the team is equally important. Together we determine who will be responsible for certain parts of the project: the feasibility study, the functional and utility programme, other supplements, and the appropriate application. The project manager coordinates the work and is responsible for the entire project. Individual members support each other in carrying out tasks, exchange information and insights, and benefit from the experience of other team members" (11).

Our analysis of the statements we've collected shows that working in project teams where there is cooperation between team members has many advantages, including:

- "Relationships based on cooperation are a huge motivating factor when it comes to undertaking new projects" (2).
- "I think that such projects and ideas are an interesting way to work together and get to know each other while working on various tasks, as well as a welcome break for employees from everyday responsibilities in order to fully commit and cooperate in a team setting. Recently for several months we were working on a project for building a new web tool for our audiences, which involved most of our departments, and integrated all employees who expressed their desire to participate in a joint cooperation working on the project"(9).
- "This type of work allows for flexibility and autonomy. Employees establish their own rules for cooperation" (11).

As it turns out, there are also situations that arise in project teams, which the authors associate with competition. Competition between team members occurs when employees strive to gain first place and get the biggest reward. This competition manifests itself in various ways. In reference to this behaviour, one of our respondents states: "It happens, however, that very ambitious people compete on the principle of: I will work more than you, I will take on more tasks, I'll stay in the office day and night" (8). Another worker notes that "there are people who wait for someone to make a mistake, and they are quick to report their colleague. I get very angry when I see this type of behaviour. These people are trying to compete with other employees. The competition between co-workers involves completing as many tasks as possible since these determine occasional bonuses for employees. These bonuses tend to be as high as half of the employee's salary, so they are something worth fighting for (...) Many times I have seen situations where coordinators have become negotiators between quarrelling employees. They also had to introduce discipline in the workplace and bring the arguing co-workers to order "(3). The same respondent draws attention to the "race" in submitting ideas: "An employee submitted a concrete solution to a problem, which was applied, then another worker submitted the same solution for another, but the same type of device, and it was the latter got credit for the idea and received a cash prize. I see this as a manifestation of unhealthy competition. I, myself, presented an idea to my supervisor and have recently learned that this idea is one of the points of strategic action, though it is no longer my idea but my supervisor's"(3). Another manifestation of competition in teams is a reluctance to share knowledge: "I don't like the fact that some people want to keep certain knowledge solely for themselves and use it at the right time to "get their spotlight" (7). In turn, one woman experienced a lack of willingness to cooperate several times, which, in her opinion, was due to a



large age difference. Several older workers made her feel that they don't like being supervised by someone so young, and a woman to boot. (4).

Conclusions

In today's competitive work environment, both competition and cooperation often occur simultaneously. This is demonstrated by other research as well as our study, which we present in this article.

The aim of our study was to gather information on the cooperation and competition between employees at their place of employment. In preparation for the study, we formulated questions for which we were seeking answers. First of all, we wanted to understand how respondents viewed cooperation and competition. It turned out that the terms used to describe cooperation within the project teams were associated with something positive, while those used in describing competition had negative connotations. None of the respondents mentioned any positive aspects of competition in a project team. We therefore assumed that cooperation is seen as a factor influencing the results of work of a project team, while competition is seen as a destructive factor, which hinders the achievement of the team's objectives.

Moreover, we were interested in whether the respondents experienced cooperation and competition, and if so, which of those occurred more frequently. It turned out that the majority of people (11) more frequently cooperated with others in project teams. One person admitted to being competitive. Of the 11 people proclaiming they experienced cooperation more frequently than competition, 4 provided examples of competitive behaviour that occur during interaction within the teams. Because respondents provided more examples of cooperation within project teams than situations in which there was competition between participants, we concluded that project team members, due to the nature of these organisational formats, cooperate more often than they compete.

Another question we asked was what fosters cooperation? On the basis of our study we concluded that the need for cooperation is mainly due to the desire to achieve goals and see the effects of the work performed, and the belief that obtaining better results is due to the joint efforts of all team members, often providing different skills. The importance of goal awareness, which determines the high level of commitment, is also noted by K. Kip (2014 p 3). Clear rules of operation and assigning specific tasks to team members are conducive to cooperation, as is the method of "assessing the actual contribution of each member of the project team" (Романова, 2011).

Research shows that the reasons for competition may be: striving to receive a higher award, the desire to prove yourself better than others, and to gain universal recognition. These reasons cause team members to strive to do "more work", lay claim to someone else's ideas, and be reluctant to share knowledge. Other authors also mention the problem of sharing knowledge and competing for superiority of one solution over another. Team members in project teams composed of skilled workers who have a high level of education and expertise, and have the ability to apply their skills to identify and solve unique problems, often consider themselves experts, which could lead to conflicts and, consequently, competing for their individual solutions to be implemented (Севастьянова И. Г., Стегний В. Н., Спосиб А. Г. 2010, pp 98). The same authors also refer to competing for skills. They write: employees are aware that unique skills are highly valued in the market and that the joint project will require a combination of these skills, prompting them to engage in joint action. On the other hand, it can



cause unhealthy competition for these unique knowledge and skills (Севастьянова И. Г., Стегний В. Н., Спосиб А. Г. 2010). Yet another reason for inter-team competition may be the temporary nature of the project. This awareness leads to a loss of perspective and a sense of uncertainty about the future (Огарев Г. 2012, p. 35, Севастьянова И. Г., Стегний В. Н., Спосиб А. Г. 98), which can cause a tendency to engage in competitive behaviour, and increase tensions and misunderstandings. This internal competition may give rise to conflicts. Colleagues competing with each other are fighting for projects in which they may be involved in the future. This, in turn, is the cause of mutual dislike – it causes an unpleasant workplace atmosphere in which co-workers don't trust or respect each other. On the other hand, in the course of our research we found that competition can be driven by diversity in terms of age and experience of team members.

In conclusion, the cooperation of participants in project teams is essential, and is the key to the success of these teams and today's businesses. In order for this cooperation to take place the following is needed: understanding of the project's goal, trust, mutual respect and open communication (constructive discussion, exchange of knowledge and information). Cooperation appears to be especially important in the case of difficult, complex, and complicated projects that require high competence of the people who will implement them.

Our study focused on qualitative analysis, and the results are not subject to generalization for the entire population. They results can provide inspiration for further research. For example, it may be interesting to conduct a study on whether there is a relationship between work experience and education of project participants and their preferences with regards to cooperation versus competition, as well as the relationship between the specificities of the company and the tendency of its employees to focus on either cooperation or competition. We intend to use the results of both the literature analyses and this study to prepare a complex study (including the use of a survey and interview questionnaire).

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INNOVATION IN THE MANAGEMENT OF INTERORGANIZATIONAL OENOLOGIC TOURISM PROJECTS. THE CASE OF PLA DE BAGES WINE AREA (BARCELONA, SPAIN)

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Abstract

Oenologic tourism has a long history, although it seems to be quite recent and innovative. Wine quality certifications have widely contributed to the worldwide wine tasting and vacation trends, increasing the interest of wine culture. Therefore, traditional visitors' behaviors change; also their motivations do. Visitors have a wide traveling culture and claim to new experiences, authentic services, particular and exceptional activities. The leading subject of any tourist service focuses on creativity and innovation. Design thinking is the strategic methodology to obtain differentiation. In that sense, Richards (2011) conceives creative tourism as an extension, an annex to cultural tourism. It is defined by quotidian and intangible aspects that are rooted in the culture of the resident community, to create experiences full of authenticity and identity traits. In this sense the named "identity tourism" aims to restore the past, reproduce the experiences of their people, soak up the essence of the territory, penetrate into the character of their community identity. In the specific case of tourism and enology, this creative and identity question becomes essential and offers many business chances and options. The specific case of wine origin certification in the regional area of *Pla de Bages* (Barcelona) and the case of the involved organizations illustrate the targeted concepts.

Key words: *oenologic tourism, design thinking, innovation, tourist experience, Barcelona*

JEL code: O310, Z320, Z130, R590

Introduction

This paper looks for the current key aspect in oenologic tourism projects. It tries to answer how to reach authentic, singular, memorable activities; how to create tourist identity products. Therefore, it focuses on the design thinking expressed by the business management of oenologic tourism projects in regional areas. In fact, the aim is to delve into the development of tourism projects related to the wine culture, economy and identity of a destination with the participation of public and private organizations. It intends to demonstrate how the tourist entrepreneurship and the collaboration with the administration can boost the economy of affected areas by the crisis, designing and creating competitive, different, authentic, sustainable, innovative experiences (Exceltur, 2003, 10-11). The case of the Pla de Bages wine region, nearby Barcelona (Spain) and the bagesterradevins.cat enterprise illustrate it.

The European Network of Wine Cities-RECEVIN is a European Union project to implement the co-operation among countries and wine territories. The European Charter on Enotourism is a RECEVIN project that aims the recognition of vine and wine tourism in Europe. This Charter on Enotourism defines the concept of wine tourism at the European level and establishes a common strategy for all the wine tourism regions in Europe and emphasizes the concept of "wine-growing culture". That is, the opportunity to use wine as a tool to promote the local tourism. This implies a significant number of participants, from the public and private



sectors to the ordinary inhabitants of the wine tourism destinations. There are some inherent values: sustainability of the enterprise economic activities and local development promotion; the need for cooperation among various organizations, a collective vision; promoting restoration of buildings instead of new constructions; utilizing local human resources and improving quality of life of the local residents. This project also emphasizes the authenticity, which is essential for the enotourism experience and one of the key values of the winemakers (and wine cellars).

The increase in the demand for tourism and leisure, as well as the tendency of destinations to seek new sources of income and growth, leads to the current race to position the territories in attractive enclaves for consumption. This reorientation is mainly based on policies of productive and territorial restructuring, proving how culture is configured as an excellent vehicle of attractiveness, as well as an important economic development driver (Miles & Paddison 2005; Smith, 2007; Zukin 1995; Florida 2009; Domínguez-Pérez et al, 2015). The "scene" that the visitors consume is composed of a kaleidoscope of experiences and emotions, outside the daily areas where tourists can wander and be involved into (Lloyd & Obrien, 2000: 33).

Therefore, destinations are launched to the promotion of their cultural and tourist heritage to capture new investments in a framework of prevalence of the cultural paradigm (Touraine, 2005; Bauman, 2011). The objective is that the local economy is stimulated through the culture, since the culture is placed at the center of social, economic and political discourse. The definition of culture includes knowledge, belief, art, morals, laws, customs and any other aptitude and habit acquired by man as a member of a society (Tylor, 1871). Culture is somewhat stable, consolidated and it changes very slowly. It constitutes the idiosyncrasy of people.

When cultural tourism predominates, it is difficult to distinguish spaces for "visitors" from those "local" spaces, since the leisure, entertainment and cultural sectors are considered as crucial for both neighbors and outsiders. On the one hand, residents increasingly act as tourists in their own geographical spaces (Lloyd and O'Brien, 2000: 7), emphasizing the cultural, relational and interactive sphere. On the other, it is born a kind of tourism more and more linked to experiences and emotions. Therefore the intangible heritage dimensions are increasing day by day in tourism products (Wearing, Stevenson & Young, 2010). Hence, it highlights the culture and economy union in the consumption of symbols and products. Therefore culture, lifestyle, habits are promoted by destinations as the great attractive icon.

In that sense, the destination identity is created and transmitted using an image, an icon, supported by the identity (Alvarez Sousa, 2010). The identity is that set of tangible and intangible attributes that a space recognizes and uses as brand images to launch abroad. These images also contribute to the involvement of the local identity and residents. This entire image race happens in a competitive environment to attract new investments, more visitors, etc. Therefore, strategic plans are needed.

Strategic plans are defined as "*an effort addressed to guide those decisions and basic actions to achieve a future vision, with all the economic and social stakeholders agreement*" (Santacana, 2008). The strategic plan does a diagnosis about the weaknesses and strengths of the area and proposes the actions to achieve specific goals. Increasingly, public institutions that have to do with the governance of its geographic area bet for the strategic promotion of tourism in their own destination and the market demand. They use the classical communication aspects of any destination (based with attractive routes, itineraries, museums, etc.) and incorporate a portfolio of priced products, activities and trips with the aim of promoting the tourism. This last aspect implies a new approach based on experiences and emotions, with a segmented demand



related to their motivations, expectations, and travel profile.... Therefore, they need the private sector complicity.

Public-private partnership refers to the different forms of cooperation between public authorities and the private business world, whose objective is to guarantee the financing, construction, renewal, management or maintenance of an infrastructure or the provision of a service (European Commission, 2003). There are multiple and varied forms of cooperation and usually have a relatively long duration. The project-financing model is partly guaranteed by the private sector and optionally supplemented by public funding; that is, sharing risks and power between the public and private partners. Therefore, there is no doubt that mixed entities generate positive externalities that all tourism suppliers share and appropriate, but for which only some are paid, due to the emergence of free-riders (Cambrils, 2016: 153). The aim is to expand the scope of action with the presence of private partners, pursuing a better knowledge of markets, greater consensus and share the strategy of the destination. However, it still remains a lack of trust between the private sector, for the appropriation of ideas and business. The value or utility of mixed entities is greater for the criterion "consensus and strategy" than for "efficiency" (Cambrils, 2016: 161). For the cases of Spain, there are no general formulas of contractual and institutional agreements, but there is a long tradition of collaboration based on trust, mutual benefit and co-responsibility.

In a nutshell, a new promotion strategy involves a new destination management model based on a close relationship with the private sector. It is a strategy that needs the joined work to design and create competitive products. That is, it implies to start a new relationship that helps the private sector to originate new tourist products to integrate the cultural identity, the emotions and the memorability. A new policy based on market niche specialized product to make the destination more competitive, differentiated, sustainable and full of quality. All these set of elements generate high added value. They entail being different from the competence and specializing the destination and its supply. Therefore, these new specialized products create and boost the tourist destination by designing plans of stimulation and marketing, based on experiences and emotions. Design thinking is the strategic method and tool that designs and creates innovative products and services. It supposes a holistic and global vision of the client; it means to know their functional needs, as well as their cultural, social and emotional requirements. Therefore, design thinking focuses on the client; that is, the key needed elements are empathy and interdisciplinary team works.

Oenologic tourism projects

Wine tourism is based on visits to vineyards, wineries, festivals and wine shows in which tasting, learning and experiencing of the attributes of the wine are the main factors of motivation and recreation for visitors (Dodd, 1995; Hall & Macionis, 1998; Getz 2000; Telfer, 2001; Mitchell & Hall, 2001; Cohen & Ben-Nun, 2009; Bruwer & Alant, 2009; Bruwer & Lesschaeve, 2012). Thus, visits to wineries, fine tastings, vineyard landscapes, and workshops for amateurs and specialists, etc. constitute the center of interest of lovers of oenological tourism. This interest in wine also tends to be accompanied by a pairing with gastronomic dishes that characterize and define the territory. Furthermore, oenotourists' motivation also includes the knowledge of the natural and cultural landscape, lifestyle and inhabitants' idiosyncrasy, their past and identity.

All these emotional activities involve daily and intangible aspects rooted in local community, creating authentic and memorable experiences. A memorable wine destination



means that some part of its value channel has an added merit, a set of feelings that suggest, remember a specific moment. And all these remembered moments bring positive attitudes related to the visited destination, building important ties and belonging feelings.

Private and public strategic plans look for building this transcendent experience, this memorable remembrance, and this emotional aspect. The oenotourism has lots of emotions joined to the taste, smell, sight, touch and even hearing. Any wine can be aggressive, kind, honest, sincere, strict, faithful, spiritless, and charming... They are plenty of sensitive attributes and imply great, unique, memorable experiences. Tourist memorable experiences have to include hedonism, participation, novelty, significance, tasting, local culture and knowledge (Tsai, 2016).

In the specific case of wine, the image and brand for an oenologic area is the designation of origin (DO). Protected Designation of Origin (PDO) and Protected Geographical Indications (PGI) constitute the system used for the recognition of a differentiated quality, due to its own specific characteristics. It is a way to appreciate and recognize the importance of oenologic destinations and wine-growing zones. The use of the brand linked to the territory highlights its unique and competitive character (Blain et al, 2005; Gomez et al, 2015), and necessarily promotes knowledge of the local environment and development, through strategic public-private alliances.

Research results and discussion

Methodology

A Catalan regional area is used as illustrative case to analyze the main attributes of oenologic tourism projects to be successful and contribute to the crisis end. Therefore, this research is based on qualitative methodologies as the participant observation and the experts' opinion, using the Focus Group technique to deeply interpret the current tourist and oenologic situation in the Bages territory. The methodology consists of semi structured and collective interviews (6 participants) with different tourism responsible managers of public and private organizations. These sessions took place between the 3rd and 4th June in 2015 with a maximum duration of 90 minutes' time to collect the opinions of the participants and consider an eventual saturation of the information. The sessions were videotaped, transcribed and treated based on the analysis of the discourse (Critical Discourse Analysis - CDA-, Chiapello & Fairclough, 2002), which allowed to collect the diversity of the answers, different points of view and qualified opinions.

The participants had previously received by email the guidelines for the topic discussion, that is, the evolution of tourism and oenology in the territory. The choice of the participants was due to their knowledge of the tourism and oenologic sector (managers of two public institutions: Turisme del Bages and Pla del Bages DO), the responsible of the Natural Park of Sant Llorenç del Munt i l'Obac and 3 cellar owners. The extensive professional experience and diversity of disciplines of the participants enriched the work team and the points of view, in order to develop a data collection as comprehensive and diverse as possible.

Moreover, it has been analyzed data collected from these aforementioned public institutions that have provided the context to develop the guidelines for the interviews. And finally, the participant observation of the owners of bagesterradevins.cat during the tourist visits in the wine cellars of the area and the analysis of the demand's interests. All these methods are included under the global term ethnographic methods that are the base of the design-thinking



tool to create business value.

The case of Pla de Bages wine area

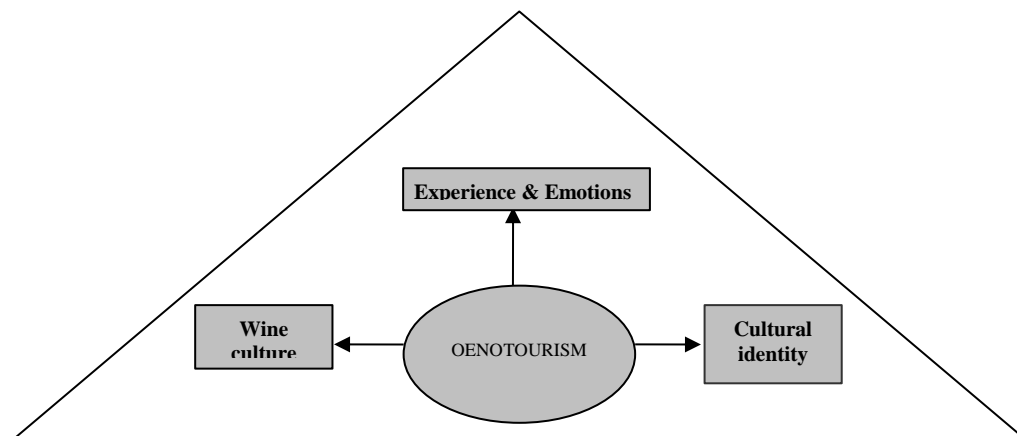
The Bages area is a Catalan region of wine, with the DO Pla de Bages (since 1995) and the development of wine tourism from its wineries and other leisure enterprises. The certification of a DO shapes a very marked and unique identity, something that many other regions of wine lack and which gives it a specific added and differentiated value.

The wine production of the Pla de Bages Denomination of Origin extends between some mountainous formations that have been declared Natural Park. So this region has a prominent role not only for its wines, but also for the landscape. Furthermore, it should be noted that the region has been declared *Geopark of Central Catalonia* (in 2012). A Geopark has a remarkable geological heritage and carries out a development project based on its tourism promotion, with initiatives of conservation and dissemination, and that favor socio-economic and cultural development at the local level.

As for tourism and wine, the 12 Bages wineries have own vineyards and produce wines impregnated with balsamic notes of lavender, thyme and rosemary. The autochthonous grape variety is the *Picapoll*. Through this grape variety, it is produced a fruity white wine with a fresh aroma, splendid texture and personality. This grape has become a symbol of Bages' identity since it is the only place in Spain where this precious variety is cultivated. As for the black grapes, it highlights the indigenous varieties black *Picapoll*, *Sumoll* and *Mandó*, which help to consolidate the particular profile of the area. Furthermore, this section is complemented by unique architectural constructions of dry stone that is large jars built for decades by wine producers in the region.

Following the aforementioned tourist strategic aspects, the pillars of the oenotourism in Bages are the wine culture, the cultural identity and the proposed tourist experience and emotional activities. The Figure 1 shows these pillars.

Figure 1. Pillars of successful oenotourism development



Source: Own elaboration

All these strategic aspects have been taken into account by bagesterradevins.cat when



designed its main wine activity. Bagesterradevins.cat is the pioneer company in the Bages linked to oenologic tourism. It has developed an oenotouristic product based on visits to the wine large jars. These large jars are located at the foot of the ancient vineyards. These jars are unique and unusual architectural heritage that explain a very relevant period in the region's wine history, when due to the arrival of phylloxera in Europe, Bages became one of the country's largest wine producing areas. These visits intend to connect the region vineyard reality with its past through the "journey" offered by the landscape and these dry stone forgotten constructions, recently recovered. The connection is made on the way when the visitor can imagine the jars in a landscape full of vineyards (now only populated with pine trees and some young oaks), explaining the use of these constructions, their particularities and the reasons that make them unique, to end up enjoying a tasting with the DO Pla de Bages wines and gastronomic products of the area. This historical-gastronomic configuration of the activity, besides the experiential and emotional level, allows highlighting the identity of the current winegrowers, their wineries and their wines, the socioeconomic situation that explains their characteristics, and even the use of varieties in their wines.



Large wine jars

In that case, walking through the Bages wine large jars, visitors connect with the past, the identity and the history of the local residents. They imbibe the idiosyncrasy of the old wine producers, participate on the reconstruction of the history, taste DO wines, local cheese and cold meat and have a fun time, talking about so many interesting things. All these set of aspects make the moment becomes special, magic, and memorable.

Finally, Turisme del Bages, the public administration responsible of the tourism promotion in the area, is working on a tourist strategic plan adding these variables in its proposals, trying to point out the identity, culture and gastronomy of the territory. The starting point has been bagesterradevins.cat. To surprise, to move visitors is the key.



Conclusions, proposals, recommendations

The use of design thinking in the tourist products is perceived as totally necessary. The current trend and tourists' interest centered on emotional tourism activities make totally mandatory the use of ethnographic methodologies to create innovative experiences.

Design thinking is a tool that allows the development of new products and services in which emotion and memorability are contemplated, since empathy is the basis of any creation. Design thinking is projected as indispensable to current tourism challenges, where emotions and life experiences are essential, for which empathy in the process of creation and design are key aspects.

The cultural context, the geographic, social and historical environment of a destination, the particular idiosyncrasy of each territory is essential elements in the design and creation of products, either in the starting phase or the consolidation and saturation phases. For all these phases, this strategic tool serves to find ingenious business tourism opportunities.

Tourism strategic plans are regularly developed in public administrations and serve as a reference and support for private businesses. In the case of the Bages area, the recent strategic plan proposal takes as reference the inspiration of a private company in the creation of oenologic products and experiences. The most linked municipalities to the wine region lead this Bages strategic tourism plan. Bagesterradevins.cat is the company that took profit of the opportunity and firstly created the identity wine tour. Tourislab is the consulting company that is elaborating the tourism dynamization plan. This strategic plan is developed, in part, from the private initiative and the entrepreneurial project of bagesterradevins.cat and gives form to projects that necessarily involve different organizations, public and private. The need to create synergies between different products and entities is critical.

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THE HUNGARIAN SMES' OPINIONS ABOUT THE PROJECT FINANCING

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SUPPORTED THROUGH THE NEW NATIONAL EXCELLENCE PROGRAM OF THE MINISTRY OF HUMAN CAPACITIES

Abstract

Project financing is a new product in a credit market. Project financing is a way of financing large projects, and provides opportunities for development with high leverage and significant risk-sharing. The project financing (because of the significant risk) was strongly affected by the crisis. The main actors in the market were those institutions, which were strongly been involved in the sub-prime crises as an MLA, as a bond arranger or financial adviser. The available resources declined due to the crisis, banks had become more cautious, and borrowers skipped the most costly large investments. Project financing is a credit for large companies, but before the crisis it had been used by SMEs as well in Hungary.

The problem of the creditless economy had been hardly felt in Hungary too, as in all over the world, so the only solution was the help from the state, from the national bank. But this help is temporary only. This type of credit financing should be an important financial form in the future, because it is able to help the companies to reach a higher investment potential. The aim of the study is to present the awareness and the assessment of the project financing based on the findings of a two-rounded questionnaire research carried out in Hungary.

Key words: *project financing, crisis, national credit programs, questionnaire research*

JEL code: G01, G10

Introduction

Investments are essential for the growth and development of the national economy, because they are one of the defining elements of the GDP. Technological development and employment play a vital role in a country's progress, but it cannot be dissociated from the size of the investments either. Investments are important not only for the growth of the economy, but for the competitiveness of the country and the region too, since they belong to its main factors (Körösi, 2009), along with human capital and infrastructure (to only name a few). On top of the above, the adequate level of technological development is needed as well for the expansion of the economy and only the investments are capable of its implementation into practice (Erdős, 2004). The investments of a country can be financed from internal resources (resulting from the unconsumed part of the national income) or from external sources (external borrowing, working capital import). Rostow (1960) said in his widely hailed classic work that the investment ratio has to be at least 18-20% in order to stimulate the development. However, the notion and initiation of the economic growth has basically become a mania (Tóth, 2016), as – in Tóth's words – part of the "Trinity" (growth, effectiveness, competition).

The opinions vary regarding the necessity or unnecessary of the economic growth. Nonetheless, on the basis of the prevailing majority opinion, an economy cannot be modernized without investing in it. The outdated tangible assets need to be replaced, new premises have to



be established, but the exploration of new energy sources is needed too. Investments are carried out in the form of projects. The key factor to the success of a project is the financing, since if it is insufficient, even the most brilliantly planned project will fail. The basic methods of funding projects are equity funding and debt financing. Apart from the financial resources the projects require other investments of monetary value as well, such as current and non-current assets, intangible assets, credits, loans, property rights, liens or even licenses (Gorshkov – Epifanov, 2016). If the enterprise implementing the project does not have enough equity capital, it can supplement the funding on credit or through other credit-like sources. Two groups of credits are available to the enterprises:

- Conventional corporate lending – which is a balance-sheet-based model, and it increases the leverage and indebtedness of the borrower enterprise, and moreover, it also burdens the assets of the enterprise, and
- Project financing – which is not balance-sheet-based, because a project company specifically created for the project (SPV¹) receives the funding, so it does not increase the indebtedness of the parent company, and the assets of the enterprise remain free too.

Project financing is a relatively new area among the forms of credit. When we hear the word project finance, we usually identify it with the large variety of funding projects, but the latter is a much wider category, as on top of bond financing it also includes venture capital financing and community financing, to name just a few.

The key target areas of project financing are assessed by Fight [2006] as follows energy sector, oil and gas industry, mining, construction of highways, telecommunications, other projects (paper projects, chemical industry, construction of hospitals, schools, airports, prisons).

In line with the above, project financing is a special kind of credit, with the help of which such high-cost but sound projects may be financed as well that could not be carried out through normal corporate lending because of the large-scale indebtedness. In the case of project financing the credit is addressed to a project company, it represents 70-80% of the whole budget of the project, and it is about lending a large amount as a loan. In addition it is able to spread the risks between the financiers of the project, which is definitely beneficial to the owners and the sponsors. Every time when a project financing is successful, the reputation of the owners and sponsors grows too, and this might be a basis for further business investments. The future cash-flow of the project serves as the coverage of the loan, while prior that the contracts signed by the project company provide the necessary guarantee. Due to the large amount of credit, in many cases it is given by not one bank but a consortium or a loan syndicate that takes a high risk in connection with the reimbursement of the loan. Syndicated loans alone are quite expensive, as they are always priced above a reference rate (LIBOR, FIBOR, Prime Rate) (Daniels - Ejara, 2016). Every participant in the syndicate only provides a part of the credit in accordance with the joint loan contract, which is structured together on the basis of the opinions expressed (Bushman – Wittenberg-Moerman, 2009). Syndicated loans reduce the risk of project lending in the bank portfolios through diversification, but at the same time the national credit risk rises if the loan is provided by the banks of one country (Drapeau – Champagne, 2015). Development financial institutions² also often join the syndicates, and they are meant to indicate

¹ Special Purpose Vehicle

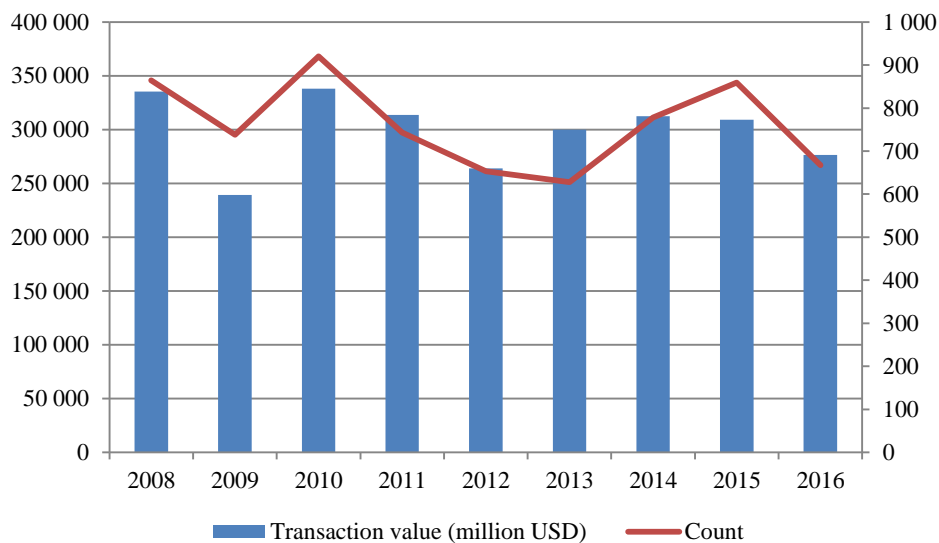
² Development Finance Institutions (DFI)



the effects of the political risks for the financiers, along with the financial support of the priority projects (Hainz – Kleimeier, 2012).

The banks are trying to simulate the risk of lending with the help of various index numbers (indebtedness rates, debt service coverage ratios – ADSCR, CADSCR, LLCR, PLCR ratios), but in any case, they will have to face the uncertainty of the future cash-flow. Because of the high risk of project financing, the credit-providers ask for several reports and statements, and for the sake of managing this risk they set up a reimbursement schedule as well (Mellichamp, 2016). Given the above, the downside of project financing is the strict documentation requirements that is compulsory both prior the start of the project and during its execution. Additionally, it is an expensive form of financing, combined with a strong control from the financiers.

Therefore, project financing heavily depends on the global financial sentiment. When they sense the precursors of the crises, the financiers cut back their lending activity greatly. For that reason, it can be stated that the sub-prime crisis and the Mediterranean crisis had a significant influence on this form of financing, especially from the side of the banks and the bond investors (Csiszárík-Kocsir, 2016), as it has been mentioned before.



Source: IJGlobal, 2017

Figure 1: The global project financing volume based on the overall value and number of the transactions

As the above diagram shows, the project financing transactions plummeted by the impact of every crisis, which can clearly be seen not only in the number of the transactions but in their values as well. The impact of the 2008 sub-prime crisis was felt on the global project financing market in 2009, a bit delayed, when the value dropped by 28% in comparison with 2008. However, at that time the market had not anticipated the decrease, since until 2008 the allocated amounts and the number of transactions had been steadily rising. In the case of the Mediterranean crisis the signs were already visible in 2011, because that's when the value



started decreasing. Following the stabilization of 2013, last year we could experience a decline again. This downturn of 2016 can be attributed to such macroeconomic uncertainties like the Brexit, and even the uncertainty due to the migrant crisis could probably have an effect on it, but both events would also be able to have grave repercussions on the market individually. The data of 2016 indicate that up till now the amount of project financing has not been able to reach the 2008 figures. The 2016 figure was only 82% of the one from 2008, but even the value of 2015 represented only 92% of it. The reason behind this is obvious: the liquidity that had characterized the markets before the sub-prime crisis and had basically devastated almost the whole world disappeared.

Research results and discussion

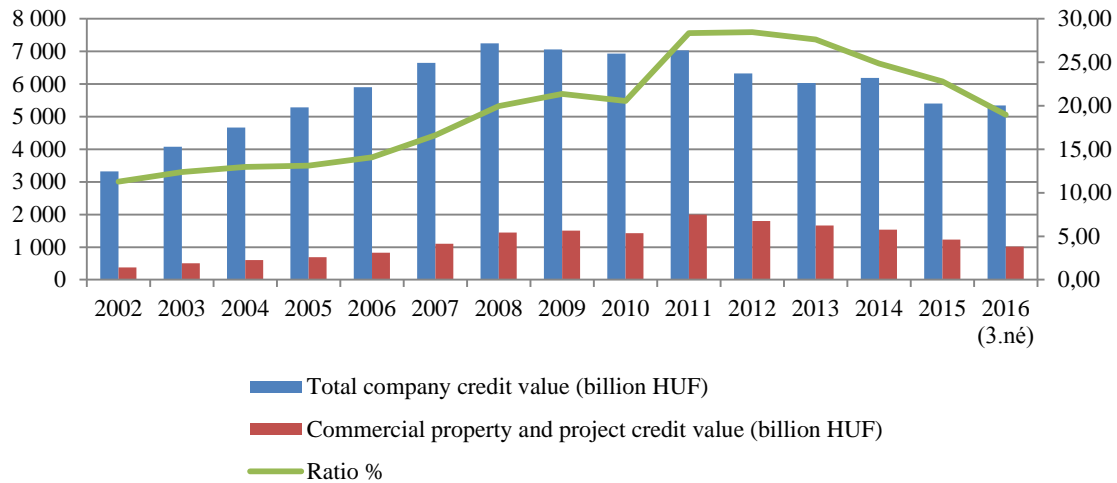
1. Project financing in Hungary

As it has been discussed earlier, project financing is a relatively new form of financing. It has been popular mostly in countries where the capital markets and the financial markets are developed, in parallel with the developed state of the financial culture. Quite a lot of actors are needed for the successfulness of the project financing (to highlight only the most important ones): financial, technical, legal and other advisors, lead arrangers of syndicated loans (MLA³), development finance institutions (DFI⁴), bond issuers. In the previous section I have already talked about the relationship between project financing and the crises. Narrowing it down to Europe, it can be established that the larger British, German and French banks were the market's main actors, who were notably involved in both crises, but they felt the effects of the Mediterranean crisis most of all. The Hungarian project financing market was not an exception either. Project financing and commercial property financing together constitute almost 95% of the structured financing transactions, given that buyout financing represent only a tiny fraction of these deals. Excessive borrowing had been specifically typical of Hungary prior the crisis of 2008, and the liberalization of the bank sector (Lentner – Zéman, 2016) had characterized every segment of the economy.

The large-scale foreign currency lending also made things worse, for it made the debtors more vulnerable due to the changing exchange rates (Lentner, 2016). Apart from the issues of excessive borrowing and denomination, the unhealthy structure of the loans created a huge problem too. This was the time when the volume of high-risk property and project loans soared in the corporate sector. In many of the cases the expected level of careful planning or preparation was missing from behind these loans, to which the attention is drawn by every relevant literature of project financing. Unfortunately, the Hungarian property and project financing turned the risk of inadequate preparation and planning into real failure when the crisis hit, since a large proportion of these loans were among the first to collapse, causing massive damages to the banks.

³ Mandated Lead Arranger

⁴ Development Finance Institutions



Source: Hungarian National Bank, 2016

Figure 2: **Credit growth and the value of property and project loans in Hungary (end-of-year stock data)**

In light of the 2016 figures, if we compare the 2002 values to the Hungarian lending data then it can be stated that the crisis of 2008 occurred as a trend changer. In spite of the above introduced very fragile amount of credits, after 2008 in Hungary these outstanding amounts decreased only slightly, although a much larger decline could have been expected. However, the year 2011 made the deleveraging obvious. The data for the third quarter of 2016 reached only 74% of the 2008 figure and only 76% of the 2011 stock data. It is also clear that contrary to other countries hit by the crisis, in Hungary the market-based lending could not gain momentum at all or just incredibly slowly after the crises. As a result of the continuous contraction in lending and the lack of willingness to provide loans, the Funding for Growth Scheme (FGS) was launched in 2013, with the specific purpose of helping the SMEs as it was the least attractive sector in the eyes of the banks. Still, even with the lending under the FGS taken into consideration, deleveraging has not stopped due to the reimbursement of the previous debts.

Project lending shows a similar tendency as the total outstanding loans. Interestingly, in Hungary project lending has not come to a halt as much as the entire corporate lending, albeit there have been a massive downfall in this segment of lending everywhere on a global scale. While globally in 2009 the project loans represented barely more than three-fourth of the previous year's figure, Hungary managed to produce a growth. This can be explained by the refinancing and restructuring. Project loans peaked in 2011, when the global project loan market reached its second lowest point. This meant a 34% increase, in comparison with the numbers of 2008. The freefall did not happen suddenly because the banks providing the loans did not write the bad debts off and kept them in their books as long as it was possible. Afterwards the removal of the bad project loans from the banks' balance sheets started, parallel to the freezing of project lending. According to the latest statistics it can be established that the currently outstanding project loans are slightly more than half of the 2011 figure, remaining far below the stock data of 2008 as well.



2. Methodological background

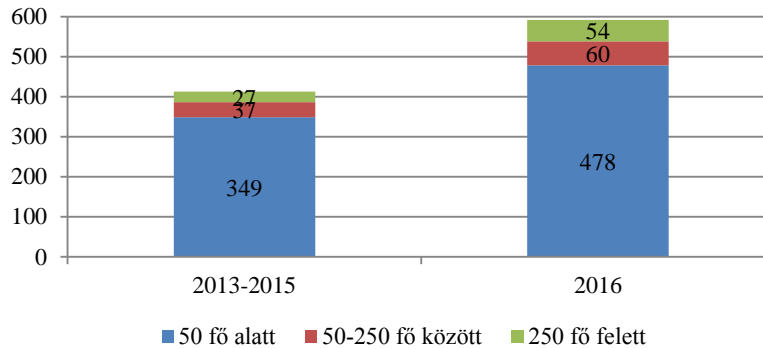
On the basis of the Hungarian project financing situational picture outlined above, I was also curious about what the opinion of the enterprises was about this type of financing. The research results introduced in the present study form an integral part of primary questionnaire surveys conducted between 2013 and 2015, and in 2016. Both researches took place in Hungary via pretested, standardized questionnaires⁵. In both researches the data was collected with the help of a complex questionnaire, covering the financing and investment activities of the enterprises. In the first round 413, while in the second round 592 questionnaires were entered into the sample. The research of 2016 is still ongoing, therefore the results introduced in this study are only partial results, reflecting the opinion of the 592 enterprises filling the form. The survey of the enterprises' detailed project activity has been added to the 2016 questionnaire, additional to the issue of project financing.

The basis of the study is the primary research conducted in 2016, which has been carried out through a pre-tested and standardized questionnaire⁶ in Hungary. The research is still ongoing and the introduced results are only partial results, reflecting the opinion of 592 enterprises that have answered the questionnaire form. The questionnaire assessed the enterprises' point of view in three aspects: their financing, investment activity and project management. This essay is dealing with the evaluation of the results of the project part. The finalization of the questionnaire had been preceded by in-depth interviews, and then the questionnaire form was created by using the outcome of the qualitative research. The questionnaire contained only closed questions for the sake of the better assessment of the sample and the answers.

There was an earlier round of the examination between 2013 and 2015, prior to the present form of the questionnaire, where the issue was assessed in the same thematic areas but with fewer questions. The sample chiefly consists of SMEs because of their weight and economic dominance. The questionnaire was filled by the enterprises completely anonymously, and their identity has not been identified in any way. Due to the segmentation of the sample, the research required only the company form, the scope of activities, the domestic property rates, and the main balance sheet and income data (net sales revenues, earnings after taxes, balance sheet total). The results are not considered representative, but they provide for the possibility of conducting and establishing a representative research at a later time. The sample introduced above was assessed with the help of the SPSS 19.0 and MS Excel 2010 programmes. In the present study I introduce the results of the two researches based on the employment data of the responding enterprises. The composition of the sample is shown on the diagram below.

⁵ I hereby would like to thank for the help of the students of Óbuda University, who contributed to the spreading and filling of the questionnaire forms.

⁶ Hereby I would like to thank for the assistance of the students of Óbuda University, who contributed to the dissemination and filling of the questionnaires.



Source: own research, 2013-2015, N = 413; 2016, N = 592

Figure 3: **The composition of the sample according to the number of employees**

The results of the research

The respondent enterprises assessed the listed 14 statements about project financing by using a four-point Likert scale, where 1 represented complete disagreement and 4 meant full agreement. On top of that the respondents had an option to refuse to answer, if they did not have enough information to decide on the questions. The table below contains the percentage distribution of the answers, and also their means and variances. The information disclosed below applies to both researches.

Table 1

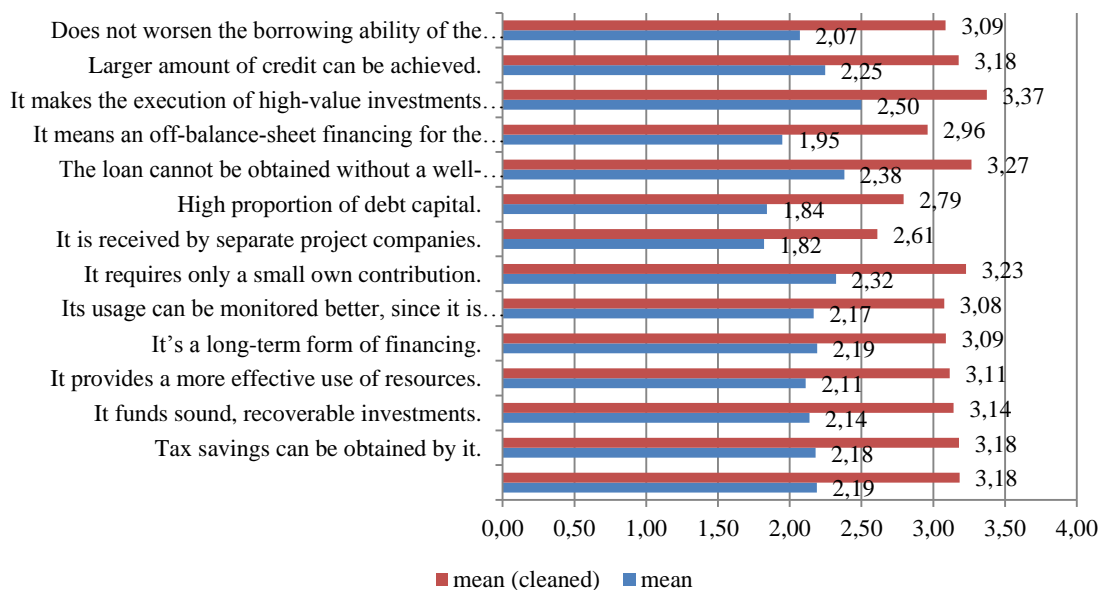
The assessment of the answers with regard to project financing in the research between 2013 and 2015

	0	1	2	3	4	mean	variance
<i>The previously signed contracts and the future cash-flow of the project constitute the main guarantee.</i>	31,2	0,7	7,5	39,0	21,5	2,19	2,48
<i>Tax savings can be obtained by it.</i>	31,5	1,9	9,7	31,0	25,9	2,18	2,60
<i>It funds sound, recoverable investments.</i>	32,0	2,9	11,4	26,9	26,9	2,14	2,64
<i>It provides a more effective use of resources.</i>	32,2	1,5	9,7	36,3	20,3	2,11	2,47
<i>It's a long-term form of financing.</i>	29,1	3,4	12,1	30,3	25,2	2,19	2,48
<i>Its usage can be monitored better, since it is received by a separate project company.</i>	29,5	3,6	9,4	35,4	22,0	2,17	2,43
<i>It requires only a small own contribution.</i>	28,1	1,2	8,7	34,4	27,6	2,32	2,49
<i>It is received by separate project companies.</i>	30,3	8,5	21,3	28,8	11,1	1,82	2,00
<i>High proportion of debt capital.</i>	34,1	3,6	20,6	27,4	14,3	1,84	2,23
<i>The loan cannot be obtained without a well-founded preparation.</i>	27,1	1,2	9,7	30,5	31,5	2,38	2,52
<i>It means an off-balance-sheet financing for the parent company.</i>	34,1	2,4	13,3	34,6	15,5	1,95	2,36
<i>It makes the execution of high-value investments possible.</i>	25,9	0,2	7,0	31,7	35,1	2,50	2,52
<i>Larger amount of credit can be achieved.</i>	29,3	1,0	10,4	34,4	24,9	2,25	2,47
<i>Does not worsen the borrowing ability of the parent company.</i>	32,9	3,1	9,2	33,4	21,3	2,07	2,54

Source: own research, 2013-2015, N = 413



According to the results it can be noted that the enterprises within the sample considered the highest achievable investment ratio to be the biggest advantage of project financing, with an average rating of 2.50. Apart from three characteristics, every statement was rated above 2, which means that there is no complete consensus between the respondents, and it becomes smaller as the rating gets closer to 2. The respondents put the importance of the preparation (2.38) and the small amount of own contribution (2.32) to the second and third places. In light of the above we can acknowledge that the enterprises of the sample gave very poor average ratings to the listed features, although they all belong to the essential characteristics of project financing. This can be explained by the fact that more than a quarter of the responding enterprises marked the answer “I don’t know” with reference to the statements. In case of such a large-scale refusal of expressing opinions, it is definitely worth to draw the conclusions on the basis of the cleaned data, because another good quarter of the enterprises in the sample rather chose 3 when assessing the statements.



Source: own research, 2013-2015, N = 413

Figure 4: **The assessment of the answers with regard to project financing in the research between 2013 and 2015, after taking out the “I don’t know” answers**

As the above figure shows, there is a clear improvement in respect of the filtered sample. Although the opinion of the relevant respondents indicates that the assessment order of the statements has not changed, with the exception of three statements (that didn’t even reach 2 as an average rating in the total sample) all the others were classified with an average rating higher than 3. It can be asserted that the enterprises that are familiar with project financing as a form of credit can assess its main features more or less correctly. However, the assessment of the statements also proves (every mean figure is below 3.5) that not all the enterprises have complete faith in project financing, the causes of which are the Hungarian enterprises’ hard feelings about loans, trust and confidence in banks, and sometimes their own experiences.



When segmenting the sample of 2013-2015 by the size of the enterprises, other priorities emerge among them. The smallest enterprises – the ones with less than 50 employees – produced the same order during the evaluations as the whole sample, since they constituted the vast majority of the sample. According to the medium-sized enterprises, the biggest advantage of this form of credit is the ability to finance high-value investments, but traceability and long-term vision is important to them as well (with the same mean), and the more effective use of resources as a feature received a high rating from them too. In the case of the largest enterprises it can be seen that almost all the respondents knew project financing as a form of credit, since there were hardly any enterprise with more than 250 employees that could not assess the statements. They claimed the biggest advantages to be that it does not worsen the borrowing ability of the parent company, it's a long-term form of financing and it requires only a small own contribution. In addition to these, the financing of high-value investments and the tax savings were rated high as well. Consequently, the largest enterprises are the ones that could form the most relevant and most accurate point of view concerning this option.

Author also examined the question during a primary research conducted in 2016. Author asked for the respondents' opinion about the same 14 statements with the help of the previously introduced Likert scale. Following the first round of the research, author would have expected the assessment of the respondents to become better in relation to project financing, attributed to the improvement of the global financial situation. Nearly ten years after the crisis when the financial markets calmed down somewhat, in Europe and even in the countries of the world, lending was initiated more and more frequently, which had a positive impact on the trends of project financing too. Project financing (as it was mentioned earlier) is a financing method heavily influenced by the crises. On the other hand, by 2016 the crisis events that had a major effect on the financial markets were already over. When analysing the situation of Hungary, with knowledge of the formerly shown outstanding project loans it can be seen that after 2011 both the amount of credits and the outstanding project loans have been continuously decreasing. In light of this it is hardly surprising that, contrary to the global situation, the assessment of the certain characteristics of project financing by the Hungarian enterprises turned out to be rather worse than better, as the below table shows.

Table 2

Assessment of the answers regarding project financing in the research of 2016

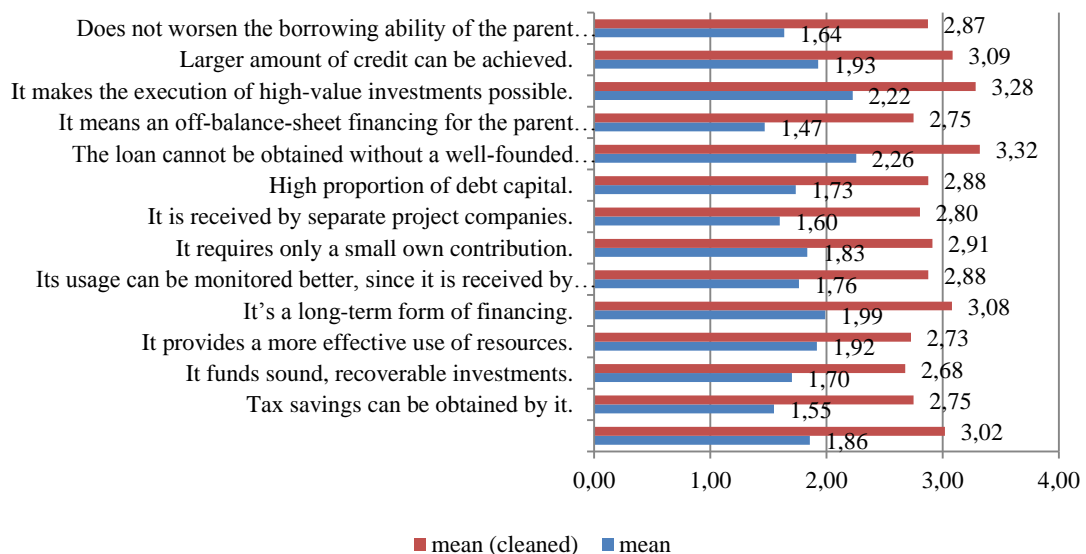
	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>mean</i>	<i>variance</i>
<i>The previously signed contracts and the future cash-flow of the project constitute the main guarantee.</i>	38,5	1,5	13,5	28,7	17,7	1,86	2,54
<i>Tax savings can be obtained by it.</i>	43,8	4,1	18,1	22,0	12,2	1,55	2,30
<i>It funds sound, recoverable investments.</i>	36,5	8,4	18,1	22,5	14,5	1,70	2,26
<i>It provides a more effective use of resources.</i>	36,5	1,2	12,3	34,1	15,9	1,92	2,44
<i>It's a long-term form of financing.</i>	35,5	3,9	11,0	25,7	24,0	1,99	2,68
<i>Its usage can be monitored better, since it is received by a separate project company.</i>	38,7	3,0	16,2	27,4	14,7	1,76	2,39
<i>It requires only a small own contribution.</i>	37,0	3,5	16,2	25,5	17,7	1,83	2,46
<i>It is received by separate project companies.</i>	43,1	5,7	15,4	20,1	15,7	1,60	2,45
<i>High proportion of debt capital.</i>	39,7	4,2	13,7	27,7	14,7	1,73	2,43
<i>The loan cannot be obtained without a well-founded</i>	32,1	2,2	8,1	23,3	34,3	2,26	2,85



<i>preparation.</i>							
<i>It means an off-balance-sheet financing for the parent company.</i>	46,6	3,2	17,4	22,3	10,5	1,47	2,26
<i>It makes the execution of high-value investments possible.</i>	32,3	1,7	9,0	25,5	31,6	2,22	2,78
<i>Larger amount of credit can be achieved.</i>	37,5	1,7	12,3	27,4	21,1	1,93	2,63
<i>Does not worsen the borrowing ability of the parent company.</i>	43,1	3,9	14,4	23,8	14,9	1,64	2,47

Source: own research, 2016, N = 592

Based on this table, a larger proportion of the enterprises participating in the sample chose not to express their opinions in the matter than during the first round. The percentage was around 30-40%, as opposed to the previous 25-30%. For that reason the total sample mean declined further as well for certain statements, making most of them to be below 2. Since the average rating deteriorated too due to the high percentage of enterprises not voicing their opinions, once again it is worth to draw the conclusions on the basis of the filtered sample means, illustrated by the diagram below.



Source: own research, 2016, N = 592

Figure 5: Assessment of the answers regarding project financing in the research of 2016, after taking out the “I don’t know” answers

With the exception of a few statements, the average ratings of the 2016 research are smaller than the ones measured earlier. The respondents deemed the significance of a well-founded preparation the biggest advantage of project financing, with an average rating of 3.32, which was higher than the rating previously attributed to it (3.27). The ability to fund high-value investments was also rated high, although this statement slipped down to the second place from its former first position, and moreover, its assessed value was weakened as well (3.28 instead of 3.37). The third most important factor was the available large amount of credit, which had not



belonged to the strongest advantages before. It can be seen from the evaluation of the results that only 4 out of the 14 statements received a higher rating during the 2016 research: being a long-term form, the existence of the separate project companies, the high leverage and the relevance of the well-founded preparation.

Conclusions

In view of the above it can be stated that project financing as a special form of debt financing has a strategic importance from the aspect of the national economies. This form of financing is capable of funding several high-value investments in a way that the owner of the project would only have to make a minimum proportion of the necessary resources ready. Project financing is extremely sensitive to the changes in world economy due to its riskiness, and therefore it is a great indicator of any kind of crisis. In Hungary, project financing – along with foreign currency lending – used to be one of the riskiest activities of the banks. This is why subsequent to the sub-prime and Mediterranean crises the problems immediately began to surface on this field, hence the amount of project loans significantly decreased too after 2011. In parallel, the opinion of the enterprises changed as well regarding this form of credit, as the research results show. While in the first round the respondents rather agreed with the statements assessing the features of project financing, in 2016 they gave the statements much lower ratings. The percentage of enterprises providing opinions shrank too.

There are numerous reasons for this. The enterprises received more information and obtained more experience about project financing, especially about the projects that had failed. They got to learn the pitfalls, so they were able to see the risks better as well. At the same time the banks restrained their lending activities, which they haven't changed back yet, and as a consequence the market-based lending is still struggling in Hungary years after the crises. The Funding for Growth Scheme did not offer solutions either to project lending, since it targeted SMEs, whereas project financing is rather a field for the larger enterprises. In my opinion, however, it is worth dealing with this type of credit and it is imperative to promote and introduce it to the economic actors, because the larger investments that could effectively contribute to the economic growth and to the creation of new workplaces can only be carried out with the help of such financing instruments.

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CRISIS – PROJECT – RISK: ACCORDING TO THE OPINIONS OF HUNGARIAN SMES'

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SUPPORTED THROUGH THE NEW NATIONAL EXCELLENCE PROGRAM OF THE MINISTRY OF HUMAN CAPACITIES

Abstract:

The subprime crisis appeared in 2008 brought many changes in Hungarian and European companies' life as well, even all over the world. The relatively high supply of resources, the low cost of funds, has encouraged the borrowers. Because of the over-supply of credit, companies launched further and further investments. The abundance of the resources before the crisis suppressed the perception of business and project risks, and suppressed the perception of risks as well. It also showed some projects in favourable light, which had been clearly rejected otherwise. The crisis had changed the conditions in macro economies in national and international level too. Loans and credit became more and more expensive, which draw attention to project risks also. Companies had to handle the financial, technical, and other risks more realistically, than they did it before.

Dozens of scientific papers dealing with the management of project risks, with identifying and making recommendations to avoid them. Most of the risks are unavoidable, but still manageable. The perception of the project risk is different. It depends on the size, on the activity as well. The aim of the study is to present the project risks, the opinions about them according to a Hungarian questionnaire research.

Key words: *project risk, crisis, financial resources, exchange rate, credit risk, questionnaire research*

JEL code: G01, O22

Introduction

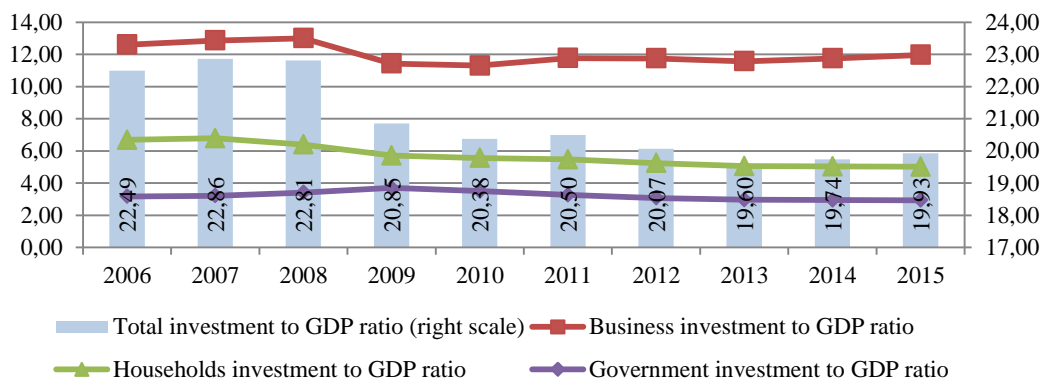
Projects as investment actions are essential for the economy of a certain country and a region too. Investments, as the classic macroeconomic income formula⁷ shows, are capable of substantially influencing the GDP rate both in a negative or a positive way. Enterprises are special factors of the economic growth, which they are able to affect significantly through their financing and investment activities. This is why it is imperative to discuss the financing and investment decisions of the enterprises together and consistently. As the previously mentioned income formula indicated, in addition to consumption, governmental purchases and income deriving from external relations, investments are also needed for the growth of the economy.

Prior the crisis we had consumed on credit and we had invested in nearly every region of the world with the aid of credit, since the resources had been available without a limit and at a low price. Before the economic crisis erupted in 2008 the countries had tried to push the rate

⁷ $Y = C + I + G + (Ex - Im)$



of their economic growth up, which they had accomplished via the cheap loans accessible in masses (Csiszárík-Kocsir et.al, 2016). Due to the credit-funded early consumption and investments the investment ratio in the countries of the European Union had been over 22%, which shrank strongly below 21% and then later below 20% as a result of the crisis. The downturn was detectable in every sector of the economy, as the diagram below shows.



Source: own compilation based on Eurostat, 2017

Figure 1: Investments in the countries of the European Union before and after the crisis

In order to increase the investment ratio we need projects, which are specific forms of investment actions. The projects always have a well-defined start date and end date, and they are always carried out to achieve some specific and usually unique goal. Consequently, a project differs from the normal corporate activities, because in this case we always have to face some new and unknown series of actions. However, this process is full of risks and uncertainties (Chapman, 1998). These two concepts are often treated as synonyms, although they have different meanings, as it was expressed mathematically by Knight (1921) as well. In his opinion, we talk about risks when we know the probability of occurrence of a certain event, whereas it is an uncertainty if we don't know this probability.

Nevertheless, it has to be noted that it is almost completely impossible these days to make such a distinction, as the probabilities are hard to foresee, which is why these notions are used as synonyms after all. The main point of the risks can best be set out as factors that threaten the achievement of the goal or divert the desired outcome. According to Renn (1992), uncertainty is a condition for the risks, because the future is always unpredictable. Hillson (2002) agreed that the risk is a presumption of an uncertain event, which can have a negative or a positive impact too. Bernstein (1998) also explained risks with the existence of uncertainty, which is down to the lack of and inaccuracy of information.

Numerous articles, studies and books deal with the risks of the projects. The risk of a project is basically the probability of some kind of danger materializing, which will have a rather negative than positive effect on the goals of the project or on the organization as a whole. In accordance with the opinion of the PMI (2013), the organizations and stakeholders always sense and assess the risks that occur during a project. The attitude towards the risks is determined by the organization's risk appetite, tolerance and the size of its risk threshold that the organization still considers bearable. Many studies have tried to analyse and examine the risk predisposition and risk detection as well.



The Big Five Personality Model (extraversion, agreeableness, conscientiousness, neuroticism, openness to experience) – introduced by Zhao and Seibert (2006) – needs to be highlighted, on the basis of which Wang and his co-authors (2016) wished to look into the relationships with the project risks. Certain factors are able to influence the attitude towards risks both in a positive and negative direction, as Ulbert and Csanaky (2004) noted too in connection with the positive illusions, which are usually related to the judgement of the abilities and skills of the individuals. These are relevant from the aspect of the project managers.

Based on some surveys, 70% of the projects fail due to inadequate planning. The most common mistakes are the underestimation of the budget and the insufficient management of risks. The failed projects will not be able to contribute to the increase of the investment ratio and to the promotion of the economic growth. Hence the failed projects will always appear as a loss or damage, for which the organization wasted the resources in vain. These effects also show up at the level of the national economy as a loss in the form of lost growth.

Part of the risks derives from the complexity of the projects. With regard to the complexity of the projects, Geraldi et al. (2001) named the following five dimensions: structural complexity, uncertainty, dynamic, pace – speed, and socio-political dimensions. Every one of them is a risk-generating factor that needs to be evaluated in the course of an exploratory analysis.

The risks are meant to be handled by the risk management of the project (PRM⁸), which is more and more considered to be a factor increasing the probability of the project's success (Olechowski et.al, 2016), yet the usage of these techniques and tools is still rather occasional to the project managers (Raz et.al, 2002). Several techniques exist for the management of risks. Some of them can be eliminated by insurance, while others can be minimized or shared (Lewicki et.al, 1998) by an appropriate calculation, like for example by NPV calculation (Paquin et.al, 2016) or by contracts (Adler et.al, 2016), but still there are factors that remain unmanageable. Fekete (2009) mentions two levels of risk management:

- risk controlling, as a cause-specific measure (reducing the probability of occurrence, reducing the effect), and
- risk financing, as an effect-specific measure (insurances, contracts).

The companies have to create their action plan to manage risks in light of the above.

The risks can be very diverse, and there are several forms of their categorization. Renn (1998) claimed that there are technological risks created by the social environment, high-volume risks that cannot be controlled by individuals, monetary risks and risks voluntarily taken by individuals. Coenen (2004) named five groups of risks: market risks (competition), operational risks (operation), financial risks (equity transactions, exchange rates, interest rates), environmental risks (legislation, business), and other risks (organizational structure, natural environment).

⁸ PRM = Project Risk Management



Research results and discussion

Methodological background

The basis of the study is the primary research conducted in 2016, which has been carried out through a pre-tested and standardized questionnaire⁹ in Hungary. The research is still ongoing and the introduced results are only partial results, reflecting the opinion of 592 enterprises that have answered the questionnaire form. The questionnaire assessed the enterprises' point of view in three aspects: their financing, investment activity and project management. This essay is dealing with the evaluation of the results of the project part. The finalization of the questionnaire had been preceded by in-depth interviews, and then the questionnaire form was created by using the outcome of the qualitative research. The questionnaire contained only closed questions for the sake of the better assessment of the sample and the answers. There was an earlier round of the examination between 2013 and 2015, prior to the present form of the questionnaire, where the issue was assessed in the same thematic areas but with fewer questions. The sample chiefly consists of SMEs because of their weight and economic dominance. The questionnaire was filled by the enterprises completely anonymously, and their identity has not been identified in any way. Due to the segmentation of the sample, the research required only the company form, the scope of activities, the domestic property rates, and the main balance sheet and income data (net sales revenues, earnings after taxes, balance sheet total). The results are not considered representative, but they provide for the possibility of conducting and establishing a representative research at a later time. The sample introduced above was assessed with the help of the SPSS 19.0 and MS Excel 2010 programmes.

In the present study we examined the sample by number of employees and the sector. The composition of the sample is shown in the following table:

Table 1

The composition of the sample according to the number of employees and the working sector

	Number of employees			Sector	
	db	%		db	%
below 50	478	80,7	primary	59	10,0
between 50-250	60	10,1	secondary	139	23,5
above 250	54	9,1	tertiary	394	66,6

Source: own research, 2016, N = 592

The results of the research

During the part of the research presented in this study we asked the respondents to rate the listed project risks on a Likert scale of 1 to 4, reflecting how significant they were. On this scale 1 meant that the risk was not significant at all, while 4 was the rating of the extremely significant risks (the respondents marked with 0 could not assess the size of the risk). A wide

⁹ Hereby I would like to thank for the assistance of the students of Óbuda University, who contributed to the dissemination and filling of the questionnaires.



spectrum of risks is included in the list, containing elements from both the macroeconomic and microeconomic levels.

Table 2

Assessment of the project risks based on the % of the answers given to the certain levels, along with the mean and the variance of the ratings

	0	1	2	3	4	Mean	Variance
Risk caused by suppliers	2,20	3,89	27,36	48,31	18,24	2,7652	0,7553
Authorization difficulties	2,53	1,52	15,71	38,18	42,06	3,1571	0,8433
Change in the exchange rate of the forint	2,36	2,70	17,06	39,86	38,01	3,0845	0,8660
Change of loan rates	2,70	2,36	16,89	40,03	38,01	3,0828	0,8815
Delay in time	1,86	2,03	16,89	43,07	36,15	3,0963	0,7707
Risk of information flows	3,55	5,41	27,53	36,82	26,69	2,7770	1,0297
Lack of capacity	3,89	6,76	27,87	39,36	22,13	2,6909	1,0261
Risk caused by contractors	2,53	2,20	17,23	42,40	35,64	3,0642	0,8419
Cost overrun	2,03	1,69	16,39	44,26	35,64	3,0980	0,7620
Management risk	3,38	4,90	32,94	43,75	15,03	2,6216	0,8380
Incorrect identification of milestones	8,28	7,09	26,35	36,82	21,45	2,5608	1,3161
Technical design risk	2,53	3,04	23,31	43,75	27,36	2,9037	0,8486
Risk of the financial situation	2,87	2,03	14,86	43,75	36,49	3,0895	0,8465
Risk of financial planning	3,21	1,01	17,23	45,27	33,28	3,0439	0,8339
Political risk	6,59	8,78	25,84	29,90	28,89	2,6571	1,3763
Lack of specialists	2,36	5,57	17,40	36,82	37,84	3,0220	0,9894
Natural hazard	4,56	20,10	39,02	25,17	11,15	2,1824	1,0496

Source: own research, 2016, N = 592

The responding enterprises considered the authorizations to be the largest risk with the average rating of 3.1571. This means that the delays in taking the project-related administrative steps, which the enterprise has no power to influence whatsoever or only marginally, constitute the biggest obstacle in front of the successfulness of the project. According to the results, the second most significant risk is the cost overrun (3.0980). Underestimated expenses or their sudden increase during the implementation and operation of the project is also a major cost



factor. The risk with the third highest rating is the delay in time (3.0963). Two of the three most significant risks are part of the project triangle well-known from the basic knowledge of project management. If two items of the triangle are among the most substantial risk factors, then it also gives an explanation to the previously mentioned 70% failure rate. These risks belong to the group of manageable risks, if the enterprises implementing the projects can see them and are aware of their importance, because in that case the enterprises are able to respond as well.

All the subsequent risks in the order are of a financial nature: risk of the financial situation (3.0895), change in the exchange rate of the forint (3.0845) and change in the loan rates (3.0828) are all regarded as high and significant risks. The distinction between the means of the above factors is only a few per thousand, so they are situated broadly at the same level in the respondents' way of thinking. On the basis of the assessments, the respondents characterized the risks with a rating of 3 or 4 in nearly 80% of the cases. They classified the natural hazards (2.1824) as one of the least significant risks. The reason for this is that Hungary is sheltered by the Carpathian Basin, and natural disasters that would inherently ruin the ongoing development of a project (whether it is a construction, R+D, infrastructural, telecommunication or other project) when every other condition is unchanged are relatively rare. The risks deriving from the incorrect identification of milestones (2.5608) and the management risks (2.6216) are deemed less serious too. These risks were seen by the respondents as ones that can be minimized with the help of adequate management and planning.

Furthermore, we were curious about how the segmentation features above influence the assessment of the risks. We measured the correlation via Pearson's Chi-square values, with the assistance of a crosstabs evaluation. The correlation was statistically proven where the Chi-square values were under 0.05. The values are shown on the following table.

Table 3

Correlation between the assessment of project risks and the size and activity of the enterprise

	Number of employees	Working sector
Risk caused by suppliers	0,364	0,278
Authorization difficulties	0,092	0,182
Change in the exchange rate of the forint	0,357	0,135
Change of loan rates	0,746	0,462
Delay in time	0,403	0,383
Risk of information flows	0,034	0,235
Lack of capacity	0,350	0,106
Risk caused by contractors	0,490	0,352
Cost overrun	0,188	0,125
Management risk	0,048	0,127



Incorrect identification of milestones	0,078	0,617
Technical design risk	0,316	0,412
Risk of the financial situation	0,033	0,187
Risk of financial planning	0,018	0,209
Political risk	0,000	0,113
Lack of specialists	0,000	0,291
Natural hazard	0,011	0,072

Source: own research, 2016, N = 592

As the table demonstrates, the scope of the enterprise's activities does not have an impact on the perception and assessment of the risks at all. On the other hand, in certain cases the number of employees can be associated with the risk assessments, since the rating of the information flow, the management risk and some of the financial and macroeconomic risks are clearly affected by the size of the company.

When evaluating the risk of information flow, based on the value of the adjusted standardized residuals the smallest companies marked 4 as the expected value lesser times, and it is the other way round with the largest companies. A similar correlation cannot be found at the risk of financial planning, because the AdjR values stay below 2 in absolute terms every time. By the assessment of the risk deriving from the lack of specialists, according to the AdjR values the connection is detectable when value 1 is selected. In this case the smallest enterprises performed under the expected value again, whereas the largest companies produced results higher than the expected value. The previously described link can be seen again at the risk posed by the financial situation regarding the selection of value 1, but here the category of the medium-sized enterprises appear too, and they marked value 2 in a percentage higher than expected. In connection with the natural hazards, value 4 was chosen above the expected value by the largest companies, while in the case of political risks the recently introduced correlations apply.

It can therefore be concluded that the smallest companies, where the number of employees is below 50, assessed the highlighted risks with a lot stronger rating than it had been anticipated. The smallest enterprises rated the risks with 1 fewer times than expected, which means they considered them to be higher. The explanation lies in the smaller enterprises being more exposed to risks, for they have less means to manage them and to reduce their impact. Moreover, they are more vulnerable financially as well, it is harder for them to get loans and they don't possess enough reserves, which restricts the ability of the projects' risk management to take actions.

The results based on the size and the sector

We further analysed the average values of the risks on the basis of the segmentation features introduced above, for the sake of the better visibility of the risks that evolve at the certain segments the strongest, which is illustrated by the below tables.



Table 4

Assessment of the project risks based on the average values, with regard to the number of employees of the enterprises

	below 50	between 50-25	above 250
Risk caused by suppliers	2,74	2,77	3,00
Authorization difficulties	3,18	3,23	2,85
Change in the exchange rate of the forint	3,10	3,08	2,94
Change of loan rates	3,08	3,05	3,15
Delay in time	3,09	3,05	3,22
Risk of information flows	2,73	2,90	3,04
Lack of capacity	2,69	2,70	2,72
Risk caused by contractors	3,08	3,00	3,00
Cost overrun	3,10	3,03	3,15
Management risk	2,58	2,77	2,80
Incorrect identification of milestones	2,52	2,65	2,81
Technical design risk	2,91	2,97	2,76
Risk of the financial situation	3,09	3,05	3,09
Risk of financial planning	3,07	3,03	2,85
Political risk	2,72	2,40	2,35
Lack of specialists	3,07	2,95	2,65
Natural hazard	2,14	2,33	2,37

Source: own research, 2016, N = 592

As it is laid down by the table, by their size the enterprises viewed different risks as the most serious. The smallest and the medium-sized enterprises also deemed the authorization the highest risk factor, but in their case the change in the forint's exchange rate is on the second place (which is fifth based on the sample mean). This is because these enterprises can start projects mostly from loans, or previously they started projects from loans. Foreign currency lending posed a huge problem for both the households and the corporations in Hungary after the crisis, and the enterprises experienced it directly almost without exception. That is why this risk factor was placed so high on the list. The smallest enterprises put cost overrun to the third place, followed by the risks resulting from the financial situation, while they ranked the other important element of the triangle – delay in time – fifth, which was third according to the sample mean.

The medium-sized enterprises gave the third place to the change of loan rates, which is closely related to the factor that comes second in the list. The medium-sized enterprises are more creditworthy in the eyes of the banks and they are granted loans more preferably, due to which the risk of changes in the loan rates is real to them as a factor affecting the results. The risks on the fourth and fifth place are the same as introduced above.

The largest enterprises assessed the risks from the aspect of the project triangle and the finances. To them the delays in time, the changes of loan rates and the cost overruns cause the biggest problems, and not the administration and the financial situation. It is surprising, since thanks to their size and knowledge these enterprises are the ones that have the most means to control the



certain elements of the triangle. In their case the financial situation is only fourth, but the risk of information flow appears too, which was not present at the previous two categories. The larger enterprises are more aware of the value of information, they treat them as a production factor, and as a consequence of their higher project activity they consider information to be precious more than their smaller counterparts do.

We have conducted the same evaluation in connection with the scope of activities, which is shown in the following table.

Table 5

Assessment of the project risks based on the average values, with regard to the scope of the enterprises' activity

	Primary	Secondary	Tertiary
Risk caused by suppliers	2,76	2,86	2,73
Authorization difficulties	3,05	3,10	3,19
Change in the exchange rate of the forint	2,85	3,08	3,12
Change of loan rates	2,97	3,04	3,11
Delay in time	2,97	3,10	3,11
Risk of information flows	2,95	2,78	2,75
Lack of capacity	2,56	2,78	2,68
Risk caused by contractors	2,97	3,11	3,06
Cost overrun	2,93	2,99	3,16
Management risk	2,41	2,68	2,63
Incorrect identification of milestones	2,47	2,47	2,60
Technical design risk	2,78	2,97	2,90
Risk of the financial situation	2,85	3,14	3,11
Risk of financial planning	2,85	3,05	3,07
Political risk	2,71	2,47	2,72
Lack of specialists	3,07	3,05	3,01
Natural hazard	2,07	2,33	2,15

Source: own research, 2016, N = 592

Segmenting the sample on the basis of the activities, we get a different list than by the sample mean. The enterprises belonging to the primary sector, the ones that produce and manufacture goods, named the lack of project specialists as the most significant risk. This is completely understandable, because the decrease in the number of specialists and the growth of the number of white-collar employees (graduates) at the expense of the number of blue-collar workers is detectable not only in Hungary but at a European or even global level as well. The enterprises of the primary sector also ranked the authorization difficulties second, and then they put the risks of loan rates to the third place. The fourth position went to the risks caused by contractors, which is connected to the lack of qualified professionals, and the risk due to delays in time was fifth on this list. The enterprises of the secondary sector put the financial situation, the risks caused by contractors and the delays arising from the authorization difficulties to the podium.



The presence of the risks caused by contractors makes sense, since both sectors carry out production and conversion activities directly or indirectly, for which they need buildings, machines and instruments. These are specific tangible investments, and their success highly depends on the experience, capacity and expertise of the contractors. The delay in time and the change in the exchange rate of the forint are on the fourth and fifth place, which were among the first five significant factors in the sample mean too. The enterprises of the tertiary sector – that are involved in service activities – picked the same first two factors as the sample mean, namely the risks caused by authorization and cost overrun. Afterwards they named the more significant financial risks, which are the change of exchange rates and loan rates, and finally they put the delay problems to the fifth place.

Conclusions

In view of the above it can be stated that to date, mainly to the impact of the crisis in 2008, the risk management of projects has become a priority area of project management, although according to the experts the priority of this field is still not what it should be. The risks may be diverse, but as a result of the crisis we deem the financial risks the most critical. Thanks to the post-crisis shifts in the market we have learnt that there is no such thing as free money or unlimited liquidity. We have also learnt that there are no cheap loans either.

The results of the research revealed that the enterprises regarded the administrative activities as the highest risks, which are able to cause such damages and losses due to the prolongation of the deadlines that can take the whole project to a very negative direction. They attached roughly the same value to the financial risks, which meant a high rating, above the average 3. Some of the financial risks are of a macro nature, thus the enterprises have no direct influence on them. Indirectly these risks can be reduced by certain financial instruments or prevented by insurances, but they still have a strong impact on the project, and usually a negative one. The risk assessments of the enterprises have changed considerably due to the crisis. We have a more realistic picture of the sources of financial risks than we did before 2008. Every enterprise possesses the receptiveness to risks, but it is rather linked to the size of the enterprise, as it was seen through the Chi-square results as well. Mostly the smaller enterprises are receptive to the financial risks, which is absolutely understandable, since these enterprises do not have such an extensive system of relationships that could provide ample resources for them. It became clear that the enterprises feel uncertainty towards the two main elements of the project triangle (time and cost).

The task of the future is given. We have to introduce the methodology of risk management to the enterprises, especially to the smaller ones, for the purpose of which the non-profit organizations that are meant to serve the development of the enterprises are perfectly capable of. The relevant literatures under this topic offer numerous means and methods for the management and measurements of risks, the utilization of which is essential for the future success of the projects because of the growing investment ratio, so that the next crisis would not hit the enterprises that badly, neither at a national nor an international level.



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PROPOSAL OF THE MONITORING AND EVALUATION APPROACH FOR COMMUNITY PUBLIC INFRASTRUCTURE IMPROVEMENT PROJECTS

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Abstract

Local governments in Bosnia and Herzegovina do not have clearly defined objective requirements or prescribed method for monitoring and evaluation of local public infrastructure projects. Decision making process in selection of infrastructure projects to be implemented is usually based upon an ad hoc basis or is driven by specific interest of different groups. However, effects on citizens' life quality of implemented projects are unknown, except clearly and obviously visible benefits, without any support in objective evaluation or analyses. This paper attempts to increase the awareness of necessity to introduce monitoring and evaluation principles in implementation of the infrastructure projects financed by public funds and shows that application of monitoring and evaluation principles is feasible and necessary for the implementation of such type of projects for their objective validation for achievements and results, as well as project selection, performance based decision making and project management issues. Using combination of tools, selection of quantitative and qualitative performance indicators, cross referenced by public opinion survey results, it is feasible to create an optimal monitoring and evaluation framework for monitoring of effects of implementation of any public infrastructure project. Such approach make the project implementer responsible, accountable, goal oriented and objective performance based decision maker. It also ensures maximization of results to be achieved by project implementation towards high expectations that have been earlier set up through analytical process. Such framework also assists in justification of project proposals to be implemented in initial stage to public and stakeholders, but also in evaluation of benefits and results after project completion and years to come.

Key words: *monitoring and evaluation, local public infrastructure, local public facilities, city planning*
JEL code: R530, R580, D23

Introduction

Local authorities continuously conduct various projects for improvement of local public infrastructure. In Bosnia and Herzegovina, the decision-making process of the local authorities in the selection of infrastructure projects to be implemented is usually based on an ad hoc solution and/or such process is driven by special interests of different groups. Very often, there are no objective and evidence based criteria for determination of potential benefits of project selection. In the other hand, monitoring of the project implementation is focused usually to the technical and financial aspects of such projects. This paper aims to increase awareness of the need to introduce the principles of monitoring and evaluation processes in the selection and implementation of infrastructure projects that are financed from public funds. The application of the principles of monitoring and evaluation is feasible and necessary for the implementation of such type of projects, especially for the objective evaluation of their achievements, benefits and results for community, but also for the project identification, project management and performance, where decision-making process should be evidence-based.



“The most common mistake organizations make is measuring too many variables. The next most common is measuring too few”

*Mark Graham Brown
Keeping Score (1996)*

“...But perhaps an even bigger mistake is to keeping doing the same thing, hoping for better results.”

*Ann Doucette
Making Evaluation Data Actionable (2017)*

Implementation of the local community infrastructure projects are often limited by the local budgets, so their funding assumes long term administrative and political procedures of planning and execution, but the budget amendments are equally complicated. This implies the fact that it is unrealistic to carry out projects of sufficient quality and benefits without proper planning and that ad hoc practice can sometimes cause more damage than good. Taking in consideration that capital projects in local communities affect community as a whole, implementation of such projects requires not only engineering and budget management skills, but project management, human resources management and monitoring and evaluation skills.

The management of public infrastructure improvement projects in local communities in the current practice in Bosnia and Herzegovina generally lacks the long term planning approach and setting of priorities, which is done often nontransparent and without clear vision. Essentially, it can be noticed that practice is addressing the symptoms and not the cause of problems. In this regard, local authorities should be able to implement their own monitoring and evaluation tools to identify and manage infrastructure improvement projects, what usually is not a case.

Public infrastructure improvement project description

Effective planning is required at the beginning of the project to be successful. Planning consists of a series of operations that decision makers try to conduct: identify and define the key issues and set goals, analyze relevant environmental and strategic terms, needs, opportunities and constraints, transformation objectives into operational objectives, identify alternative course of action to achieve the goals and objectives, calculate the costs and benefits of each alternative, to assess the likelihood of future events, projected trends occur, determine the potential of the non-economic gains, losses and consequences of each alternative, choose the optimal alternative or set of operations and integrate the selected course of action in a comprehensive plan.

Aiming to show possibility for change of current practice in Bosnia and Herzegovina, the imaginary infrastructure improvement project was designed in imaginary local community. The theory of change, graphically illustrated below provides a simplified depiction, which is based on the primary objectives of interest and the underlying program principals. This graphic represents the basic causal chain that characterizes the project. It builds on community outreach, awareness, existing community infrastructure, funding, human resources, collaborative opportunities and construction contracts (inputs) to improve status of infrastructure and communal services, shorter travelling time in public transportation, better hygienically conditions in community, with more visits and interest by citizens and tourists to public events at public squares (outputs). The project expects that this will lead to a creation of new jobs,



better conditions for doing business, increased tourists' interest to visit community, decreased pollution of air, water and ground and increased community wellbeing (outcomes). Impact of this project is characterized by longer-term outcomes such as increased citizens' satisfaction, economic development, environmental benefits, improved health status of citizens and development of community as a landmark.

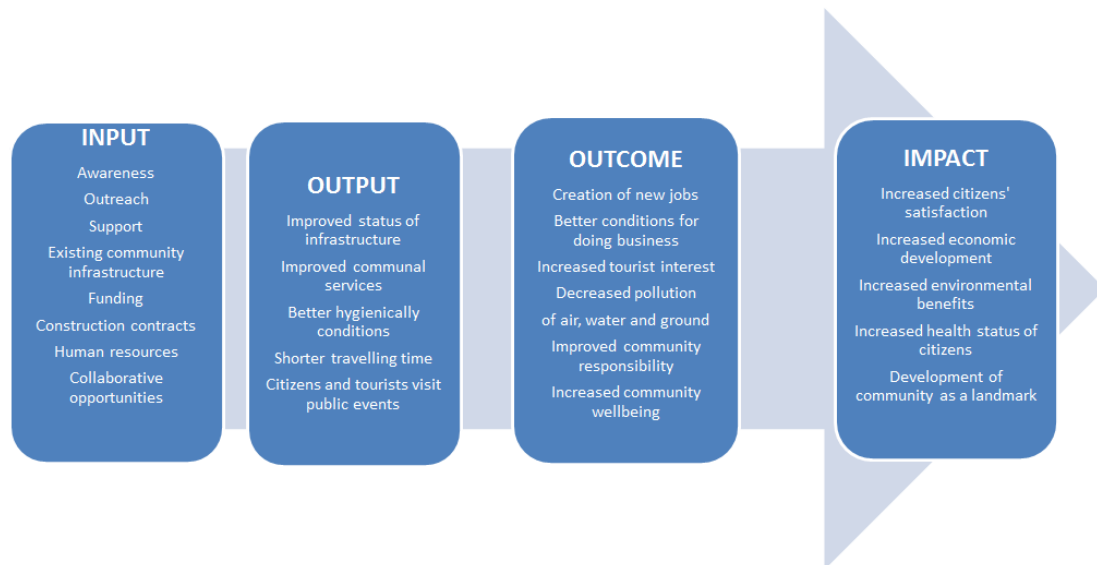


Fig. 1. Theory of Change

Source: Authors' construction

The ultimate imaginary project goal is to improve local community infrastructure. This is envisioned to be done through improvement of the traffic infrastructure, public transportation, Waste management, power supply, water supply, waste water collection and treatment system, telecommunication and public space management. As highlighted earlier, this is imaginary project for improvement of local community infrastructure. New directions of project implementation can be added or some deleted as a fit to the observed local community needs.

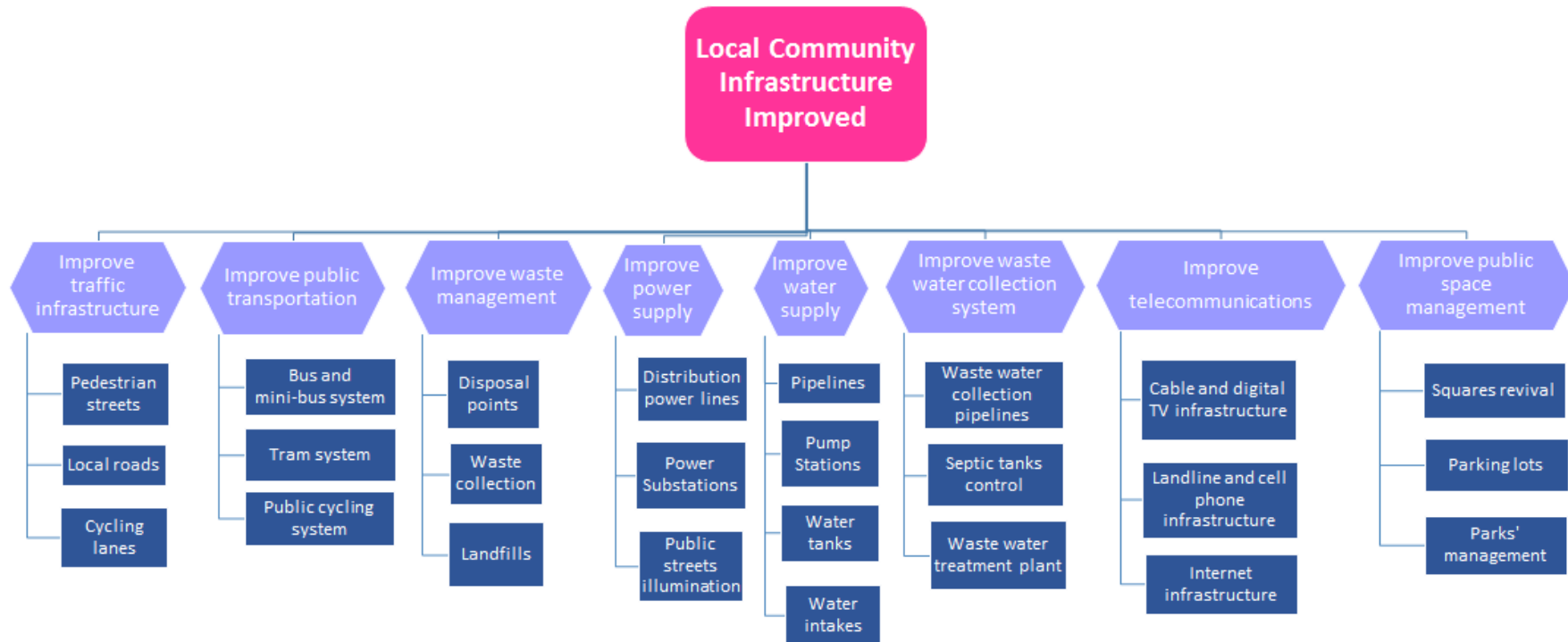


Fig. 2. Project Results' Framework

Source: Authors' construction



The structure of the project is presented on *Figure 2* through Results' Framework. Envisaged improvement of local traffic infrastructure will be implemented through the repair, modernization or total reconstruction of existing local roads and/or construction of new local roads where necessary. Pedestrian streets are supposed to be paved by stone or concrete tiles with tactile paving. Traffic infrastructure improvement will also consider rehabilitation of existing and/or construction of new cycling lanes.

The local public transportation improvement will consider improvement of existing bus, mini bus and tram lines with introducing new lines and to cover hillside parts of the community with public transportation, including purchasing new vehicles. The public cycling system will be established throughout the downtown community.

The function of waste collection system is very important for any community. This system will be improved through activities related to organization of disposal points, improvement of garbage collection and landfills management, followed by purchasing equipment and garbage collection vehicles.

Power supply system in community is supposed to be improved by rehabilitation of low and medium voltage overhead and cable lines with substitution of substations where necessary and rehabilitation and introducing of illumination of streets.

Water supply system is to be improved by repair of leaks on existing pipelines and construction of new distribution pipelines where necessary to reduce water loss, and with refurbishment, reconstruction or new construction of pumping stations, reservoirs and water intakes.

Waste water collection and treatment system improvement will consider activities on separated sewerage pipelines, and waste water treatment plant. In areas, where sewage system will not be constructed soon, regular inspection and control of septic tanks should be introduced and conducted to prevent pollution of ground water.

It is an assumption that telecommunication system in community is relatively new and in good state. Some activities will be focused to further development of the cable and digital TV infrastructure, landline, cell phone and internet infrastructure.

The additional undertaking of this project to improve public space management. That considers to make city squares more attractive for citizens and tourists by organization of different art and entertaining events. Additional attention will be paid to solve issues with limited number of vehicle parking positions in community by reorganization of existing open parking lots and construction of underground garages. Some activities will be devoted to improvement of parks in the city by installation of playgrounds for children and equipping with parks' mobiliare and outdoor work out equipment.

The logframe of the project set up the causal links, where all activities lead to outputs, and outputs to outcomes in form of matrix. The logframe shows which resources, activities and processes must be in place in order to meet objectives and goals, than what conditions must exist that project can be successful, how success will be identified and measured and what the project wants to accomplish. *Table 1* shows just an excerpt of the project logframe wishing to show logic of this causal links matrix.



Monitoring and evaluation tools

Monitoring and evaluation are two different terms but interrelated. Monitoring is internal project activity for systematic tracking key project components (inputs, activity progress etc,) which helps to assess the alignment of project implementation with original intent and design. Monitoring tracks change (performance) in relationship to outcome targets, identifies what has changed and identifies need for modification or adaptation of the project course.

Table 1

Project Logframe (excerpt)

Level of result	Narrative summary	Performance Indicators	Data sources	Assumptions
Project goal	Improved standards of living in community by infrastructure improvements	<ul style="list-style-type: none"> • Citizens' satisfaction with quality of communal services delivery • Score on capacity index for communal services delivery 	Citizens' Attitudinal Survey Capacity Index Survey findings	Budget
Purpose 1	1. Improving of local traffic infrastructure	<ul style="list-style-type: none"> • Citizens' satisfaction with local traffic infrastructure; • Score on capacity index for communal services – Dimension 1 	Citizens' Attitudinal Survey Capacity Index Survey findings	Budget
Activity 1.1 Improve pedestrian streets	Outcome/Output 1.1 Pedestrian streets are paved with stone and concrete tiles and equipped with tactile paving Input 1.1 Design and construction of pedestrian street with stone or concrete tiling including and new tactile paving	% of pedestrian streets covered by stone or concrete tiles % of pedestrian streets with tactile paving	Project records and annual reports by local community utility office	Budget
Activity 1.2 Improve local roads	Outcome/Output 1.2 Majority of local roads are paved with modern road elements and equipment Input 1.2 Design, reconstruction and construction of local roads	% of paved local roads with modern road elements and equipment	Project records and annual reports by local community utility office	Budget
Activity 1.3 Rehabilitation of existing and/or construction of new cycling lanes	Outcome/Output 1.2 Increased length of cycling lanes in the community Input 1.2 Design, rehabilitation and construction of new cycling lanes	Length of cycling lines in community	Project records and annual reports by local community utility office	Budget



Source: Authors' construction

Evaluation is episodic assessment of change associated with project implementation which often incorporates external efforts, aimed to assess inputs and activities to identify contribution to outcomes, as well as impact in terms of investment, substance and values to determine the effectiveness and efficiency of the implementation process.

Thus, monitoring and evaluation process should be designed from the very beginning of the project implementation or earlier through Monitoring and Evaluation Plan. For this particular project, it is suggested to develop Monitoring and Evaluation Plan that will apply three tools. These are Set of Performance Indicators, Community Infrastructure Capacity Index and attitudinal survey that will measure citizens' satisfaction with infrastructure developments in the community. Such approach will provide triangulation of the findings from different perspectives to the observed in light of changes made by project implementation.

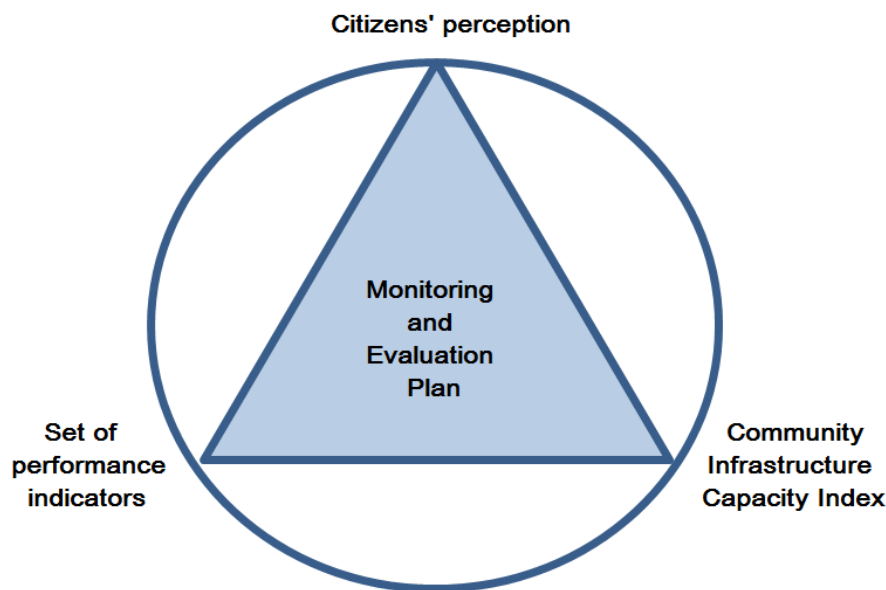


Fig. 3. Illustration of Monitoring and Evaluation Plan

Source: Authors' construction

Performance indicators are the basis for observing progress and measuring actual results compared to expected results of the project. Performance indicators are tied for the specific levels of outputs, outcomes and impacts of the project. They represent the reflection of the project outcome to be achieved. Performance indicators should be precisely defined and represent the objective measurement. They need to fulfill specific characteristics like practicality, feasibility, cost-efficiency, to be sensitive to detect change in desired outcome if it occurs and unaffected by other changes, distinct and with possibility for data disaggregation.



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Taking in consideration the type and specified results of the imaginary infrastructure improvement project to be implemented here, establishment of set of the performance indicators should not represent significant challenge. The *Table 2* shows the excerpt of the performance indicators table related to Project Goal, Purpose 1 and Activity 1.1.

Performance Indicator tables needs to define each indicator with its title, description, unit of measure, data source and collection method, reporting frequency and targets. Baseline values should be established before the project implementation starts or at the very beginning of the project. Based upon the baseline findings for each performance indicators, targets for each year of project implementation should be established in cooperation with stakeholders and representatives of citizens and community. In addition, each performance indicator should be defined in details through Performance Indicator Reference Sheet (PIRS).

The other tool to assess development and results of the project is capacity index. For this imaginary project, there was created Community Infrastructure Capacity Index. Capacity indices are tools that convert qualitative data to the numeric values. The index can be tailor made just for particular project for assessment of all activities or generally for all infrastructure aspects in observed community. The first approach is better for tracking the actual project implementation, but the second one is more favorable to assess the infrastructure needs of community and for the selection of projects to be implemented directing field of future intervention

Table 2

**PROJECT FOR IMPROVEMENT OF LOCAL COMMUNITY INFRASTRUCTURE
 PERFORMANCE INDICATOR TABLE**

Performance Indicator (# and name)	Definition of Indicator (Type of indicator)	Unit of Measure	Data Source & Collection Method	Reporting Frequency	Reporting Responsibility	Baseline 2016	Target				
							2017	2018	2019	2020	2021
Project Goal: Improved standards of living in community by infrastructure improvements											
PG 1: % of citizens' satisfied with quality of communal services delivery	This indicator measures percentage of citizens that are very satisfied and satisfied with communal serviced delivery	Percentage	Attitudinal Survey (Poll)	Annually	M&E Officer	TBD ¹	TBD	TBD	TBD	TBD	TBD
PG 2: Score on capacity index for communal services delivery	The indicator measures total score as determined by Communal Services Capacity Index Methodology	Score (Number)	Communal Services Capacity Index Survey	Annually	M&E Officer	TBD	TBD	TBD	TBD	TBD	TBD
Purpose 1: Improving local traffic infrastructure											
1.1 % of citizens satisfied with local traffic infrastructure	This indicator measures percentage of citizens that are very satisfied and satisfied with traffic infrastructure in community	Percentage	Attitudinal Survey (Poll)	Annually	M&E Officer	TBD	TBD	TBD	TBD	TBD	TBD
1.2 Score on capacity index for communal services – Dimension 1	The indicator measures total score as determined by Communal Services Capacity Index Methodology for Dimension 1 – Traffic Infrastructure	Score (Number)	Communal Services Capacity Index Survey	Annually	M&E Officer	TBD	TBD	TBD	TBD	TBD	TBD
Activity 1.1 Improve pedestrian streets											
1.1.1 % of pedestrian streets covered by stone or concrete tiles	The indicator measures percentage of length of pedestrian streets covered by stone or concrete tiles in community vs. total length of pedestrian streets in community	Percentage	Project records and annual reports by local community utility office – Data Collection	Annually	M&E Officer	TBD	TBD	TBD	TBD	TBD	TBD
1.1.2 % of pedestrian streets with tactile paving	The indicator measures percentage of length of pedestrian streets equipped with tactile paving in community vs. total length of pedestrian streets in community	Percentage	Project records and annual reports by local community utility office – Data Collection	Annually	M&E Officer	TBD	TBD	TBD	TBD	TBD	TBD

¹ TBD – To be determined



Source: Authors' construction

The Community Infrastructure Capacity Index has been developed for this imaginary project to provide a realistic and objective evaluation of the improvements in this community in infrastructure development throughout the life of the project. This index establishes and measures eight dimensions (one dimension for each project purpose), with total of twenty five elements. Each element relates to one project activity and is tied to specific outputs identified by the Project. Each element is graded on a five-point scale. Most of the grading, unless otherwise stated, follows the same scoring progression:

- zero points community is not in compliance minimal standards espoused by the project;
- one point community has reached a minimal standard;
- two points community takes over additional steps to improve above minimal standard:
- three points community takes over further steps toward improvements with a view towards longer term planning;
- four points community actively implements, adjusts, and tests steps for improvement in the desired direction;
- five points community has reached the optimal level, the impact is clearly recognized.

Scores for each element are progressive. A community must meet all the criteria assigned to points 1, 2, 3 and 4 before it can be considered for a 5 points rating. In this particular case, maximal number of points that community could earn is 125, while results would be reported in percentage of maximal available number of points.

Dimension 1- Status of the Community Traffic Infrastructure

Element 1.1 - Pedestrian Streets

- 0 points Community do not have pedestrian streets at all;
- 1 point Some community streets are declared as pedestrian for several hours a day;
- 2 points Community has designated pedestrian streets paved by asphalt pavement;
- 3 points Community has designated pedestrian streets and at least 40 percent of their length is covered by stone or concrete tiles;
- 4 points Community has designated pedestrian streets and et least 60 percent of their length is covered by stone or concrete tiles;
- 5 points Community has designated pedestrian streets and at least 80 percent of their length is covered by stone or concrete tiles.

Fig. 4. Excerpt from the Community Infrastructure Capacity Index

Source: Authors' construction



However, it would be advisable if possible to conduct annual survey on Community Infrastructure Capacity Index in community that conducts such program, but also in community that does not conduct such organized program at all. This other community can serve as “control community” for evaluation purposes and comparison. In that way, project results can be evaluated in comparison to control community and over time, what would enable application of evaluation tools like “difference in difference method” or “double difference method”.

It is suggested to set up an Evaluation Committee in the community that would grade every single element of the Index every year in observed and control communities. Evaluation Committee should have five members representing citizens, youth, representatives of governance and other stakeholders.

Third aspect of the Monitoring and Evaluation Plan is exploring citizens’ perception of the state of infrastructure in observed community. The findings from the Set of Performance Indicators and Community Infrastructure Capacity Index as objective tools should be complemented by findings from citizens’ perception on different aspects of community infrastructure. Design of the attitudinal survey (poll) should be developed as a team effort among project managers, citizens’ representatives, governance representatives, experts and NGOs, but not limited to them only. The main goal of the survey design is to analyse and identify the most efficient direction in obtaining comprehensive and reliable citizens’ perception data throughout duration of the project. In preparation phase, the population of the community should be defined and stratified sample should be determined, taking in consideration statistical significance and validity. Surveys should be conducted annually. There should be noted that poll conduct requires specific budget for its performance.

Such developed monitoring framework for the infrastructure development projects would set foundations for the project evaluation. Based upon data from the monitoring framework, evaluation could easily apply different evaluation methods to assess inputs and activities in identification of contribution to outcomes, as well as impact in terms of investment, substance and values to determine the effectiveness and efficiency of the project implementation process and satisfaction of beneficiaries. Through analyses of findings, evaluation could also identify further steps in infrastructure development in observed community and recommend focus to specific further directions in communal infrastructure development and new projects design.

Conclusions

The analyses presented in this paper highlighted advantages in application of monitoring and evaluation tools in the implementation of community infrastructure development projects. The findings can be summarized as follows:

- The application of monitoring and evaluation tools in implementation of community development infrastructure projects should be standardized practice;
- It assists in tracking the expected project results and achievements;
- It justifies the investment of public funds in transparent manner;
- It offers opportunity to change course of the project or its part during the implementation, if interim results have not been achieved;
- It brings together citizens, authorities, youth and non-governmental sector and other stakeholders in a common goal and gives the common ownership of the project and collaboration;



- Increases responsibility of the project managers and associates; and
- Provides the basis for the identification of future projects and interventions to real needs of the community.

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APPLICATION OF THE MONITORING TOOLS FOR UNIVERSITY DEPARTMENTS OF ARCHITECTURE DEVELOPMENT AND IMPROVEMENT PROJECTS

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Abstract

Projects aimed to improve education systems, especially at universities, are the best way to create the better future, but examples until recently showed that such projects were usually too slow in implementation and sometimes avoided. Recently, universities have become aware that trends and needs are changing almost on daily basis and that improvement of the system once in a few years is not sufficient, rather the improvement is continuous process. In that regard, departments' management should become more open to such improvements. Opening of the universities to more improvements brought number of issues regarding what exactly and how improvements should be implemented. Decision making in such project implementation should be made based upon clear evidences and trends. This paper assesses and focuses to the application of monitoring and evaluation tools in project management for tracking development of university department of architecture and will propose a set of activities and performance indicators in support to implementation of strategic objectives believed to contribute to better education process. In addition, the paper suggests how and which results in each phase of the project implementation should be monitored as a basis for assessment of the project goals in improvement of organizational effectiveness and efficiency, curriculum development, staffing, students participation, including stakeholders engagement, recognition of the department and market validation, taking quantitative, qualitative and psychological aspects into consideration.

Key words: *Monitoring and Evaluation, Department of Architecture, Education System*

JEL code: I23

Introduction

As it is widely known, education systems were sometimes reluctant and slow in their major development and changes. Traditionally, universities were particularly unprepared for major changes and were not willing to adapt to new challenges. All of this was true until recently, when the development of information technology enabled access to the information of interest worldwide.

Thus, the development of IT technology has enabled the academic staff to constantly upgrade their knowledge and continue their education and research even more in their specific fields of expertise and interest, but in the same time it had made it easier to do so. Students also have access to almost everything they need to increase their knowledge today, but also insight in organization, curriculums and specific novelties in education at the universities worldwide.

Universities today, and the education in general, have changed and developed a lot. A knowledge and new developments in science are not far away anymore, but easily accessible. The whole concept of the education changed and have switched from basic repetition and application of knowledge to creative and problem solving knowledge. It is now required from students not only to adopt the sound principles and knowledge, but to develop critical thinking on subject matter. In this regard, teaching staff should continuously expand their knowledge,



research, creativity and teaching methods. This process should be supported by development of laboratories and equipment. University administrative organization is supposed to provide quick and reliable services to employees and students. Cooperation with external stakeholders, especially future employers and companies needs to be established and properly addressed to modernize curriculums and fit them to the actual needs and trends in practice and science, student internships during the education included. Thus, the improvements of the university architectural departments to address mentioned challenges are continuous process. However, this approach must be organized and carefully designed. The goals need to be set up for specific period of time and taking in consideration resources available. Based upon such analyses, project and its activities can be designed, while inputs and outputs can be programmed.

Since such approach is a continuous process, special attention should be paid to project monitoring and evaluation. Monitoring and evaluation are important segments of the project implementation.

“Why Measure Performance?”

- ✓ *If you don't measure results, you can't tell success from failure*

- ✓ *If you can't reward success, you're probably rewarding failure”*

Osborne & Gaebler,

Reinventing Government (1992)

Monitoring and evaluation enable project managers and stakeholders to track project performance in time, to oversee results achieved during the project implementation and provide performance based decision making in project implementation and application of corrections in approach if needed.

Project description and theory of change

This paper discusses the guidelines for the development of monitoring framework for the improvement of imaginary department of architecture at imaginary university and it is not focused to any particular department of architecture, but it is based on the experience and insights from departments of architecture in Bosnia and Herzegovina. Most of departments of architecture in Bosnia and Herzegovina share the same or similar issues, problems and challenges.

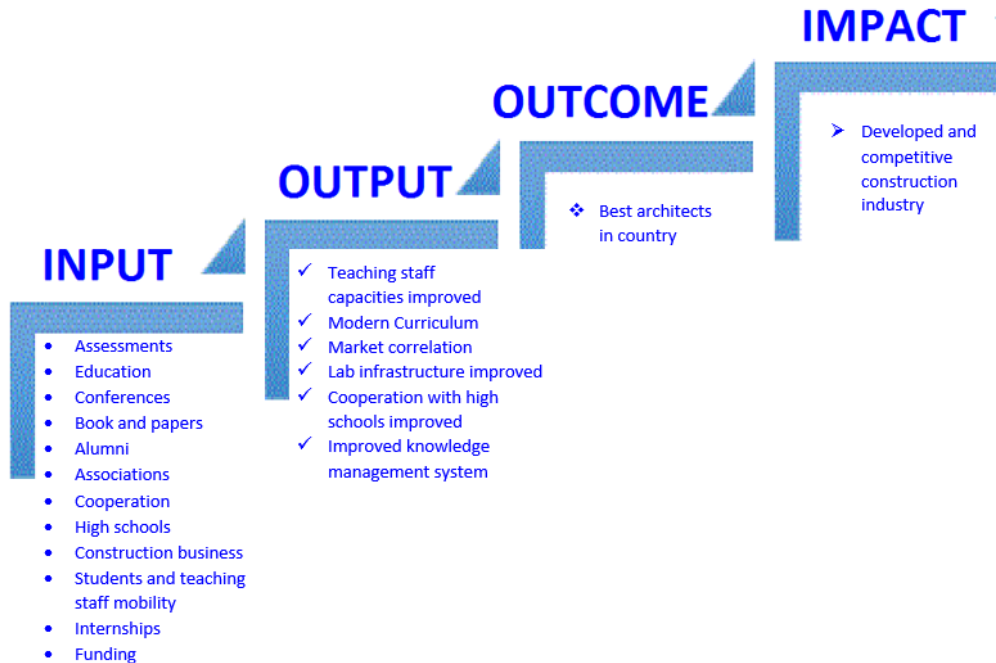


Fig. 1. Theory of Change

Source: Authors' construction

The theory of change, graphically illustrated above shows that by continuous improvement of capacities and referential teaching staff, continuous assessment, improvement and modernization of the curriculum, improvement of the labs infrastructure, cooperation with businesses, professionals and alumni associations, selection of freshmen through integrated cooperation with high schools and upgrade of additional students skills could generally lead to the development of most competent and recognized architects and professionals in the country which will have impact on more developed and competitive construction industry.

The project has six project purposes focusing to each topics mentioned in theory of change, with a set of activities believed to support each purpose output. Structure of the project is presented at Fig. 2.

The first project purpose is to continuously improve capacities of teaching staff as a foundation for any further development. The creation of surrounding and working environment in which academic staff can develop continuously and improve research, knowledge and expertise is mandatory precondition. Further, it would lead to the recognition by the wider scientific community and would increase to the individual, department and university visibility and reference.

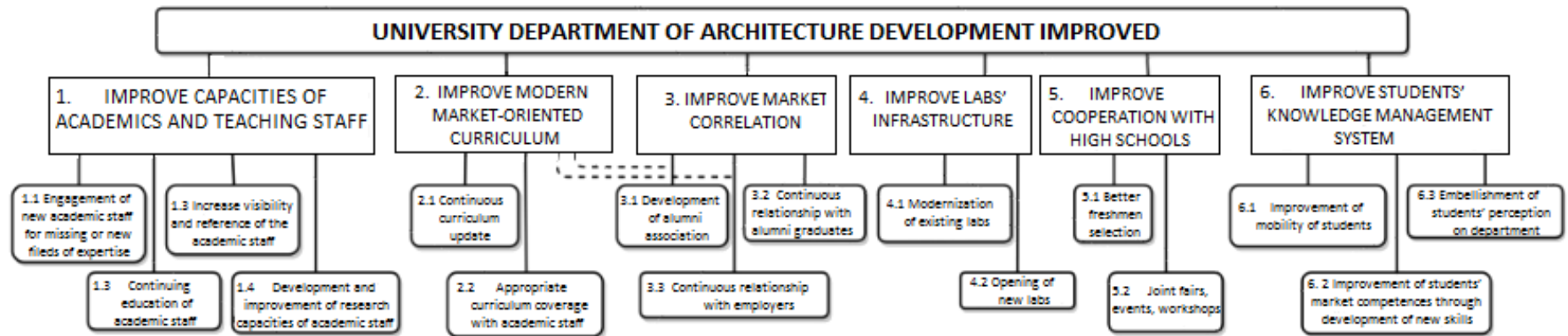


Fig. 2. Project Results' Framework

Source: Authors' construction



Curriculums at departments of architecture should be continuously assessed, updated and modernized to follow development and application of new materials, procedures and technologies, as well as new achievements in architecture. However, cooperation with domestic and international construction industry is absolutely necessary in the process of curriculum improvement.

Establishing and maintaining of relationship with construction and design industry as employer of the cadre graduated from the university is of outstanding importance to produce architects of their expectations. This approach should be complemented with maintaining of relationship with alumni association of the former students to get appropriate support, experience and opinion exchange in improvement of the department.

Significant role in implementation of the project plays the infrastructure and labs that should provide the working environment and a solid foundation for students work and knowledge gain. The existing laboratories should be evaluated and fitted with the modernised equipment according to the curriculum needs and new labs developed and opened.

As the department develops, the proper freshmen selection must be ensured. Through the high school cooperation and joint fairs, competitions, exhibitions and projects of academic staff and high school students, the insight to the freshman knowledge can be gained resulting in better freshman selection and better graduates at the final.

The extra curriculum tutoring classes for additional skills should be organized for students to provide an additional boost to them and to improve their market competences. It will make them more competitive at the employment market. Department will also cooperate with alumni association through university international relations office to enable and implement student exchanges and internships. Development and improvement of the relationship with alumni association is important task for further development of the external-internal department cooperation and feedback.

The project logframe is constructed for this intervention that establish relationship among resources, activities and processes that must be in place in order to achieve objectives and goals, through logic of this causal links, but it is not presented in the paper due to length.

Monitoring system

Monitoring system for this project is designed to get optimal triangularly approach. This system includes number of performance indicators for quantitative measures, capacity index for qualitative measures and perceptive standpoints of students, employers from construction and design businesses and alumni of ex-students of the university that are professional architects now. Such approach will provide findings from different perspectives in light of developments made by project implementation.

“Performance indicators are one of many tools to help answer the question: How do you know what you are achieving? One definition of a performance indicator from an NCOSS publication is: A numerical measure of the degree to which the objective is being achieved. Performance indicators are usually seen as numerical measures of achievement that are easy to collect and use. In theory, they can only be derived for things over which you have control, however in practice of people don't have absolute control over anything and so 'having control' is really a matter of whether there is enough control for your purpose.

A more sophisticated definition from the Office of Public Management is: A performance indicator defines the measurement of a piece of important and useful information



about the performance of a program expressed as a percentage, index, rate or other comparison which is monitored at regular intervals and is compared to one or more criterion.” (Bullen, P., 1991)

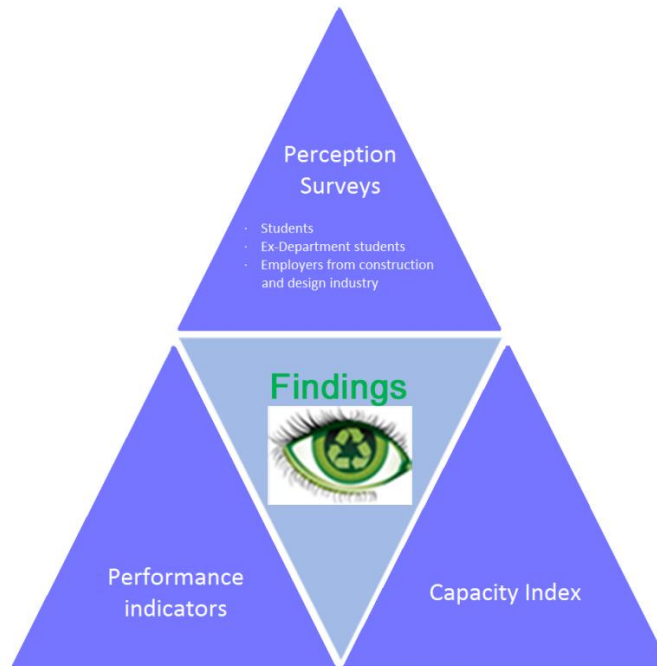


Fig. 3. **Monitoring System**^{†††}

In this particular project, performance indicators are designed to measure quantitative aspects of the outputs/outcomes of the project and need to be practical, feasible, cost-efficient, sensitive to detect change in desired outcome/outcome, distinct and with possibility for data disaggregation.

The proposed performance indicators for the Purpose 1 – Improve capacities of academics and teaching staff are as follows, but not limited to:

- Percentage of curriculum courses given by professors with closely related scientific field;
- Number of books published by department academics;
- Number of research papers by department academics published in indexed journals, magazines or conference proceedings in academic year;

^{†††} Authors' adaptation from <http://www.gefieo.org/event/s/webinar-systematic-triangulation-applied-identification-evaluation-findings>



- Number of citations of department academic staff in academic year;
- Number of research projects conducted at the department in academic year.

The appropriate performance indicators can also be developed for the other five project purposes.

The Architectural Department Development Capacity Index (ADDCI) could be developed for this imaginary project to provide a realistic and objective evaluation of the improvements at the department. This index could establish and measure six dimensions (one dimension for each project purpose), with total of sixteen considered elements (one for each activity from *Figure 2*). Suggestion is that each element is graded on a five-point scale, but not mandatory. In this particular case, maximal number of points that department could earn is 80, while results would be reported in number of points awarded and/or percentage of maximal available number of points. The example grading for the project element 5.2 of the Purpose 5 (see *Figure 2*) is suggested as follows:

- 0 points – The architectural department have no any type of cooperation with high schools at all;
- 1 point – The architectural department has occasional or ad-hoc cooperation with high schools;
- 2 points – The architectural department has periodical cooperation with high schools, but prepares annual cooperation plan with high schools;
- 3 points – The architectural department conducts annual cooperation plan with high schools at the local community level through organization of joint events, fairs, competitions, exhibitions, summer schools, projects, research and other types of events;
- 4 points – The Architectural department conducts annual cooperation plan with high schools at the national level through organization of joint events, fairs, competitions, exhibitions, summer schools, projects, research and other types of events;
- 5 points – The architectural department conducts annual cooperation plan with high schools at the national level and abroad through organization of joint events, fairs, competitions, exhibitions, summer schools, projects, research and other types of events.

The Evaluation Committee should be established to conduct ADDCI survey every year. The Evaluation Committee should be consisted, but not limited to the representatives of department, university, students, construction and design business, possibly representatives of the architectural and professional chambers and associations.

This tool can have extended application as well. It can also be used by ministries of education to assess rankings in capacities of departments of architecture within their authorities and to support decision making concerning new projects design, action plans or just to simply identify areas for specific interventions and based upon the findings from the assessments.

Complementing aspect of the Monitoring Plan is perception of students, employers from construction and design companies, as well as former students of the department that are professionals now. All of them can provide valuable information of interest for the department



to be used for continues development, upgrade and improvement. Such opinion explorations surveys could be conducted annually or biannually, subject of budget constraints. Such sound monitoring framework can further serve as a solid foundation for the different evaluation directions.

Conclusions

The designed and organized monitoring framework is valuable set of tools for tracking implementation of the project focused to development of university department of architecture. It enables:

- Tracking the project results and achievements, compare them to the expected ones, and ensure project fulfil the goal in full;
- Taking corrective directions of the project implementation, if interim results have not been achieved;
- Bringing together academic and administrative staff, university staff, students, alumni, professional architects, designers, engineers, construction and design industries and businesses and other stakeholders in a common goal and give the common ownership of the project and collaboration;
- Increased responsibility of the department and university management and associates;
- Solid foundations for future development and improvement projects;
- Opportunities for the authorities to identify gaps for future focused interventions — and internal department rankings and
- Application of the modified monitoring approach to other university departments of different affiliations.



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THE RELEVANCE OF INTERNAL AUDIT AND INTERNAL AUDITORS COMPETENCIES IN PROJECT MANAGEMENT -THEORETICAL APPROACH

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Abstract

A project management is important to all enterprises today in the context of highly and growing competitive environment, rapidly advanced technology or increasing complexity of operations. A vital project management is essential for many organizations that require substantial effort to achieve its substantial benefits: the proper project management may be leading to achieve greater profitability, more accurate budgeting or improved stakeholder relationships world-wide.

The project is attempting to achieve something new while relatively high level of risk and uncertainty. Here the role of the internal audit is to be seen especially that within the framework of modern business world, the role of an internal audit is more and more. One of the crucial aspects internal audits to be effective and function are the auditors competencies.

This paper describes how role internal audit may play in the context of project management covering the internal auditor's competencies. There is the lack of any similar paper from this perspective worldwide. This article aims, through a detailed presentation as to provide clarification for a better understanding of how role plays internal audit and the specific competences expected of internal auditors performing project. The research underlying the paper was based on the review of the relevant literature.

This paper may have a chance to make a positive contribution in the worldwide literature because it extends the literature devoted to internal auditing in the context of project management and conversely: project management in the context of internal audit. Auditors must possess special competencies, mainly the knowledge and skills of project management. It is also necessary for them to understand the special nature of projects. Auditors' social competencies are a vital vehicle for their efficient cooperation with the environment in which they work.

Key words: *competence of auditor, internal audit, project management,*

JEL code: M10, M42, M50

Introduction:

Increasingly competitive business environment, fast advancements in technology and growing complexity of operations cause that project management has been important or even crucial to all enterprises today. However, project management takes a lot of effort on the part of organisations to produce the expected results, such as increased profitability, more accurate budgeting or improved relationships with the stakeholders. Because projects are designed as a value-adding activity, they inevitably involve relatively high risks and uncertainty. An institutional response to these threats is internal audit, the effectiveness of which depends on auditors' skills and competencies.

This paper describes at length the role of internal audit in project management and the specific competences expected of internal auditors performing project audits. The research underlying the paper was based on the review of the relevant literature.



The paper has three parts. Part 1 gives an insight into the special nature of project management and describes factors behind project success or failure. Part 2 characterises internal audit in the context of project management and describes its role and goals that determine internal auditors' competences and qualifications. The latter are covered in detail in Part 3. The paper ends with conclusions and recommendations.

Projects management

Today's volatile business environment causes that companies increasingly have to undertake new and unique projects, while the number of situations that can be handled routinely is smaller and smaller. This lack of stability entails changes in management that lead to new developments in project management theory and practice. Project management is the core of project-oriented companies (Gareis R., 2001; Kelly E.V., 2010). More and more organizations have so-called PMOs (project management offices). They are established to boost the effectiveness of project management, especially in the multi-projects environment. ^{***} The definition of a project describes it as a new and unique activity that is undertaken to add value and has the elements of innovativeness, uncertainty and risk (Atkinson R. et al. 2006).

Project management is responsible for defining project's goals, securing the necessary resources and overseeing whether they are used in an effective and efficient manner (Pawlak M., 2008, p. 17). The field of project management has been developing for the last 30-40 years but expectations are still high (Meredith J.R., Mantel S.J. 2012) because project management has already proved to be more effective than traditional management methods, particularly in the case of innovative undertakings unrelated to companies' core business (Munns A.K., Bjeirmi B.F., 1996). Project management is a useful tool not only for the big affluent companies, because projects vary in sizes from large to small.

The focus of project management is on planning and controlling project tasks, as well as on making sure that the necessary resources are readily available. In other words, project management uses the human knowledge, qualifications and skills to enable a project to accomplish its goals and is comprehensive in nature (Kapczyński T., 2014). The Project Management Institute (PMI) ^{§§§} indicates that it should integrate different kinds of knowledge necessary to manage time, costs, quality, conflicts, communication, risk, deliveries, and human resources (Project Management Institute, 2000, p. 6-7). With well-designed project management, organisational changes are implemented quickly and effectively. A prerequisite for this is the preparation of detailed plan of action, organization, leadership and control (Jones R. 2007).

Projects differ from other activities in that they (Trocki M., 2012, p. 19-20):

- use many resources, including experts,
- are unique,

^{***} For more about PMO see P.F. Rad, G.L Levin (2002).

^{§§§} The two largest organisations associating the practitioners and enthusiasts for project management are the Project Management Institute (PMI) founded in the USA in 1969 and the International Project Management Association (IPMA). The PMI has more than 700.000 members in nearly 270 branches in almost all countries (pmi.org). The IPMA is an international non-profit organization associating national project management associations from 57 countries. The IPMA plays important role in promoting and developing project management expertise. It also sets standards and guidelines for the project management experts (ipma.world).



- complex,
- have predefined scope,
- are implemented by an interdisciplinary team of high-skilled staff
- have specific start and end dates,
- are assigned substantial but limited resources (funding, staff, materials, information),
- are relatively separate from repetitive activity (structurally independent),
- involve substantial risks (technical, organizational and economic),
- use special planning and implementation methods.

M. Pawlak (2008, p. 18) has observed that projects are interdisciplinary by nature, cross the lines dividing departments in traditionally structured organisations and require the involvement of different experts, all of which adds up to bigger challenges in communication and cooperation. These characteristics of projects make their management considerably different from traditional management. The distinctive features of project management include (Pawlak M., 2008, p. 21):

- focus on delivering change,
- responsibility for complex activities,
- the use of fuzzy structures that exist only as long as the project does.
- innovativeness,
- higher risk of conflicts,
- the need to tackle risks and uncertainty.

Risk must be effectively managed over the whole life of the project, starting with the planning phase through implementation and project closure. Both positive and adverse events^{****} can put a project at risk (European Commission, 2004, p. 145) and consequently may lead to its success^{††††} or failure. Table 1 presents factors that can determine the ultimate outcome of a project.

Table 1

Factors of project success and failure

Factors

Success	Failure
effective communication	competition within the project team
flexible and quick reactions	tight budget
monitoring of progress	insufficient analysis of the situation and low awareness of risks
realistic and clear aims, mission and	poor cooperation between the project

**** To learn more about risk in project management see, for instance, Carl L. Pritchard (2014).

†††† The success factors and their measurement are described, *inter alia*, in Pinto J.K., Slevin D.P. (1988)



vision	manager and the company board, ineffective project management
awareness of risks and risk management	poor motivation and communication between the project team members (the misinterpretation of project requirements)
quick decision making	failures in project management (duplicated efforts, incoherent activities, rigid rules)
good planning	
the use of proven project management methodology	
optimal project design and requirements, project management utilising iterative and adaptive processes	
expert support	

Source: developed by the authors based on: Munns A.K., Bjeirmi B.F. (1996), Dorsey P. (2005), Jones R. (2007, p. 21-30), Trocki M. (2012, p. 49).

A successful project is a one that accomplishes its goals while keeping its stakeholders satisfied. If a project is found to perform poorly, a range of tools can be employed to offset the negative impacts of different factors (Ruskin A.M., Estes W.E. 1985). One of them is internal audit, which is used in addition to formal planning and control techniques and reporting procedures. Its capability to improve the quality of project management stems from a comprehensive approach that encompasses the identification of loopholes in the system and the suggestion of appropriate solutions (internal audit is a value-adding activity). Project audits are a major tool that industry uses to assess project success and improve future performance (Larson E., Drexler J.A. 2010).

Studies show that while more and more organisations recognize the need for improvements in project management, they still have problems with creating corporate culture with mechanisms enabling project management to be used effectively (West J.L., Plumeri M., 2005).

Internal project audit and the role of internal auditor

The IIA^{****} defines internal audit as follows: *Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a*

^{****} IIA is the world's oldest and largest institution associating internal auditors.



systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes (The Institute of Internal Auditors, 2016).

Internal audit collects and analyses project data and monitors its processes on an ongoing basis. Its main focus is on risk management, compliance and governance. Depending on the area to be investigated, internal audit is called financial, operational, compliance or ethical. One of its variants is internal project auditing.

Project audit is defined by Project Management Institute as the monitoring of compliance with project management standards, procedures, and policies. Another definition used by Association for Project Management gives priority to the outcome of a project audit, i.e. to the delivery of an impartial assessment of project performance. (Levin G., Wyzalek J., 2015 p.134)

As the above definitions do not indicate whether a project audit should be performed by an external or internal auditor, both options are possible. The focus of this paper is on internal audit, but it is noteworthy that the professional requirements internal and external auditors are expected to meet are similar.

Internal audit seeks to produce an unbiased and objective assessment of project management and of the project itself. Its purpose is to identify potential problem areas, such as deviations from the plan, frauds and mistakes (Marnewick C., Erasmus W., 2014) and to propose corrective and preventive measures. Internal audit is also useful for controlling project costs (Gumz J., 2006).

In the literature, terms such as project audit, audit of project system management, and audit of the project implementation process are used interchangeably. Project audit has several variants, i.e. in-process quality assurance review, gateway review, project management audit and post-implementation audit (Gumz J., 2006).

Effective internal audit makes a comprehensive analysis of five areas encompassing technical objectives, costs and the budget, human resources, project termination, and technical and managerial implications. The phase of planning during which uncertainty and risk management have to be considered is a particularly demanding area for project management auditors (Marnewick C., Erasmus W., 2014).

An internal auditor seeks to establish whether an internal control system is in place, evaluates its effectiveness, and analyses risk management and governance. Internal audits aim to answer the following question: what may go wrong and what impact it will have on the organisation (Hutchins G., 2001; Roetzheim W.H., 2004).

G.M. Hill (2007) and C. F. Gray and E.W. Larson (2008) state that project auditing enables the following:

- monitoring of project management contributions to the achievement of the business objectives,
- identification and response to weak and troubled project performance,
- overseeing of quality management activities,
- maintaining of professional and best practices within the project management environment, and
- compliance with organizational policies, government regulations, and contractual obligations.

The main purpose of project management audits is to ensure that project management is strong enough to make the ongoing project successful (J. McDonald, 2002), but the lessons



from them are also useful in planning for other projects and improving the chances of their success.

Auditors often look into how changes are managed. They examine whether an impact assessment is made, if changes grouped and prioritized when feasible, if they are approved, and if they are implemented in an orderly and organized fashion (Gumz J., 2006). Project audits, on the other hand, investigate project governance, i.e. analyse whether the project is attaining its objectives and monitor its results (Marnewick C., Erasmus W., 2014).

Qualifications of project auditors

As a publicly trusted profession, internal auditors must comply with IIA's Code of Ethic and International Standards for the Professional Practice of Internal Auditing (hereafter Standards) (Institute of Internal Auditors, 2016). The Standards prohibit internal auditors from providing services other than those for the delivery of which they have the necessary knowledge, skills and experience. They also require them to improve their professional proficiency and the effectiveness and quality of services on an ongoing basis.

The Standards leave no doubt that internal audit must be an independent and objective process. Objectivity is defined as an unbiased mental attitude that allows internal auditors to perform engagements in such a manner that they believe in their work product and that no quality compromises are made. Objectivity requires that internal auditors do not subordinate their judgment on audit matters to the third party's opinions. Threats to objectivity must be managed at the individual auditor, engagement, functional, and organizational levels (Standards). Internal auditors are also required to be meticulous and proficient in their work. The requirement of proficiency means that "Internal auditors must possess the knowledge, skills, and other competencies needed to perform their individual responsibilities. The internal audit activity collectively must possess or obtain the knowledge, skills, and other competencies needed to perform its responsibilities" (Standards).

Internal auditors must possess the knowledge, skills, and other competencies needed to perform their individual responsibilities. They must have sufficient knowledge to evaluate the risk of fraud and the manner in which it is managed by the organization, but are not expected to have the expertise of a person whose primary responsibility is detecting and investigating fraud. Internal auditors must have sufficient knowledge of key information technology risks and controls and available technology-based audit techniques to perform their assigned work. However, not all internal auditors are expected to have the expertise of an internal auditor whose primary responsibility is information technology auditing.

In Poland, there is a difference between the professional requirements that internal auditors operating in the private sector and public sector have to meet. As regards the private sector, formal requirements have not been defined, but the IIA recommends the following certificates (*CPSA & CPEA ...*):

- CIA (**Certified Internal Auditor**)
- QIAL (Qualification in Internal Audit Leadership)
- CGAP (Certified Government Auditing Professional)
- CFSA (Certified Financial Services Auditor)
- CCSA (Certificate in Control Self-Assessment)
- CRMA (Certification in Risk Management Assurance)



- [CPSA](#) (Certified Process Safety Auditor) and [CPEA](#) (Certified Professional Environmental Auditor)

Each of these certificates requires its holder to take training and education to improve their knowledge and qualifications on an ongoing basis.

The situation of internal auditors providing services in the public sector is different, because their status is regulated by the Polish law. Consequently, the requirements they must satisfy are more complex (see table 2).

Table 2

Professional requirements for internal auditors in the public sector in Poland.

PUBLIC SECTOR	
FORMAL REQUIREMENTS	(a) tertiary education
	And
	b) no criminal record for intentional criminal offence or intentional tax offence
	And
	c) the citizenship of an EU member state or of a state the citizens of which can legally take employment in Poland under international agreements or Community laws
	And
	d) unlimited legal capacity and civic rights
AND	
PROFESSIONAL REQUIREMENTS	(1) one of the following certificates: CIA, CGAP, CISA, ACCA, CFE, CCSA, CFSA, CFA
	Or
	(2) an internal auditor exam passed before the Ministry of Finance Commission in the years 2003–2006
	Or
	(3) certification as an expert auditor
	Or
	(4) two years' experience in work as an internal auditor and post-graduate diploma in internal audit earned from educational institution authorised to award the doctor's degree in the field of economics or law

Source: developed by the authors based on the Public Financial Act (2009).

It is therefore the special character of project management presented in the previous part of this paper that determines the distinct professional requirements for project auditors.

K. Barac et al. (2016) indicate that project auditors need to have other competencies too, so that they can confront challenges and expectations in the constantly changing environment. These are in particular:



- marketing skills and relationship building skills to compete in a retendering environment;
- enhanced problem solving skills;
- data analytical skills to analyse and interpret big data;
- business acumen skills in line with broader business qualifications;
- in-depth industry knowledge;
- negotiation and relationship building skills to interact with various assurance providers;
- project management skills to manage audits in a globally regulated environment;
- forensic skills to unpick businesses.

As project environments are changeable and uncertain, auditors must be able to analyse all occurring interactions and relationships, which is not possible without social competencies. The competencies are important because in constantly seeking to improve the working methods (to add value) auditors frequently have to collaborate with other people. Effective communication is a major factor contributing to successful audit, particularly that it also allows its findings to be presented in a clear and comprehensible manner (Levin G. 1998). Communication is an important item of the three-part CIA exam syllabus consisting of internal audit basics, internal audit practice and internal audit knowledge elements (*CIA Exam ...*).

Conclusion

Today, projects are becoming increasingly complex because they are implemented in turbulent business environments. The pillars of a successful project are the budget, time and the availability of resources, but the transparency of activities is also important. Project auditing has been created to measure the performance of all these elements. Its focus extends beyond the financial records, including all aspects of a project: its objectives, plans, schedules, budgets and resources (Ruskin A.M., Estes W.E. 1985). The intangible assets such as human resources and knowledge management are also investigated, because they are becoming increasingly important as the project success factors. Accordingly, a project audit can be defined as comprehensive analysis of project management. An audit in any project management environment should measure project performance and identify factors contributing to it (Hill G.M., 2007).

Most studies on project management do not go beyond analysing the selected aspects of audits and even the PMI standards only briefly discuss project audits (Marnewick C., Erasmus W., 2014) and their role in projects. Project management audits are mentioned in the literature, but they are not widely understood, and it is worthwhile examining them in some detail (Ruskin A.M., Estes W.E., 1985). In none of the studies cited in this paper has the relationship between project success and the outcomes of an audit been discussed, even though it is intuitive that such a relationship must exist, likewise that between the qualifications of an auditor and the outcomes of internal audit.

The results of this research have revealed that the literature and empirical studies have gaps in defining and presenting the role and competencies of internal auditors with respect to project management. Thus, they provide a basis and an incentive for the authors to continue their empirical research in this field.

It is unfortunate that many project managers consider project audits a reactive activity and try to avoid them. A widespread practice is that project audits are not initiated unless fraud is



suspected or when they are required by the law. The probable source of this attitude is the traditional perception of the role of auditing, which ignores the special characteristics of projects defined as a non-standard activity characterised by high risks and uncertainty. It also goes unnoticed that projects create new knowledge, so having a formal document presenting the lessons learnt from the project team and independent auditor's perspectives can make it easier for the project-oriented companies to manage their knowledge resources in the future.

To add value to this process, auditors must possess special competencies, mainly the knowledge and skills of project management. It is also necessary for them to understand the special nature of projects. Auditors' social competencies are a vital vehicle for their efficient cooperation with the environment in which they work.

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CONTINUOUS IMPROVEMENT AND WASTE REDUCTION FOR LEANER IT ORGANIZATIONS – AN INTRODUCTION TO LEAN IT

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Abstract

The Information Technology (IT) sector has been seen as in need of optimization for the past decades, with practices that can be improved for an enhanced competitive advantage. In order to achieve an improved efficiency, not only coding activities should be optimized – the overall processes, methodologies, project management activities and practices should be reviewed, aiming for a leaner organization, orchestration and execution of activities. In this sense, the achievements from several manufacturing companies around the globe when applying Lean can be replicated to the IT sector, with equally promising results. The current paper, based on an unpublished research conducted in 2010 for a MsC Thesis dissertation, so far unpublished due to confidentiality reasons, aims to offer academics and practitioners an introduction to the concepts of Lean and its adaption to the Information Technologies sector by presenting a literature review, some quantitative data related to waste and risks in IT projects with a special interest in project management methodologies, terminating with the offering of some guidance for future research.

Key words: *Lean IT; Lean Manufacturing; Lean Transformation; Information Technologies; Project Management.*

JEL code: M0

Introduction and motivation

The use of Lean concepts is already widely used by the global industry, aiming to optimize costs, quality, and customer service constantly. These goals can be achieved by "engaging and equipping employees to focus on creating and delivering value in the eyes of the customer and eliminating whatever doesn't contribute to this goal" (Bhatia and Drew, 2006). In this sense, "manufacturing is no different from banks and insurance companies. It is therefore not surprising that financial services, healthcare, construction and even public services are all looking to manufacturing to learn about Lean thinking" (Jones, 2004), and information technologies are no exception. Lacking optimization, IT also has less promising performance indicators – A study conducted by the Standish Group (Hastie and Wojewonda, 2016) suggests that only 29% of IT projects are successful (on time, on budget with a satisfactory result), while 52% are challenged and 19% simply fail. Impressive to see that it has actually not improved much since the 90's, considering that the same study, published by the Standish Group (1995) shows that 29% of IT projects succeed, with 53% being completed with delays or budget increases and 18% simply failing, with 31.1% of projects being cancelled before they ever get completed. Further findings from the same study (Standish Group, 1995) indicate that 52.7% of projects will cost 189% of their original estimates, building up the picture of lack of efficiency on IT projects. These results are obviously translated in a very negative impact on organizations, as shown by the example of the Denver airport that costed the city \$1.1 million per day due to the failure to produce reliable software to handle baggage (Standish Group, 1995), reflecting the magnitude of the impact on businesses.



It is in this sense that continuous improvement and reduction of waste must be introduced in order to increase the efficiency of these activities. These processes are difficult to see and difficult to manage, but an adaptation of Lean Manufacturing concepts can be achieved, promising a considerable increase in competitive advantage. To be noted that it is suggested that the bridge to Lean IT might be fairly simple to cross since the “principles are the same, and many of the lessons about reconfiguring processes are too” (Jones, 2004). It is even more important to adopt these philosophies when we confirm that, at present, IT is not only a support function for business but in many sectors, such as banking, it supports and drives business itself. To be noted that software development is only one of the areas that can be optimized – All the surrounding processes, as well as the methodologies used, should also be analysed in a critical perspective of continuous improvement and reduction of waste.

Lean as a widespread management philosophy

The concept of Lean is already widely used by engineers and managers around the world and has become indispensable in any glossary of top performers. Since its generalization in 1990 by Womack, Jones and Roos (Womack et al., 1990), in the book "The Machine that Changed the World", its implementation became very clear to practitioners, being composed by a set of simple concepts and tools – unfortunately, these concepts are not so simple to implement and maintain. In fact, this is one of the secrets to a successful Lean Transformation - The maintenance of the principles implemented, requiring method and commitment from stakeholders, having continuous improvement always in sight. With this new philosophy shaping the world's industry, the same principles were adopted in other areas - Education, Health, Construction, Services, among others - and in all these cases efficiency and effectiveness gains were achieved, as well as a reduction in costs and defects. Little time passed until the information technologies surrendered to the benefits of Lean methodologies as well. But when has it all started, and what is Lean after all?

It can be considered that Lean concepts and the operational excellence developed by Toyota in the post-World War II period are closely linked. Lean Manufacturing is, by the end of the day, the result of an in-depth study of the famous Toyota Production System (TPS), which refuses mass production, focuses on flexibility and productivity, using a low volume strategy guided by pull systems. However, presenting a synthetic definition of Lean is not easy. Lean can be considered to be: A philosophy that rejects any action that does not increase value for the client, always seeking perfection; A Management style that asks the "why", thinks and acts quickly, involving and motivating the workforce in the "Gemba" (for example the use of the famous "Quality Circles"); An approach that encourages process reengineering and promotes change, towards continuous improvement; or even a tool that allows and promotes the visibility of performance. More concisely, Lean Manufacturing can be seen as a philosophy that reduces time from order to delivery to the customer, eliminating sources of waste in the production as suggested by Liker (1996). On the other hand, we can also define waste as something that "represents any excess interruption, misalignment, unnecessary work, or ingrained redundancies that add no value for customers" (Kleiner, 2005). By eliminating waste, we can achieve better levels of competitiveness and "when you make things flow in a smoother, more effective way, you can gain market share dramatically against your competitors" (Kleiner, 2005). This concept of constant detection and elimination of waste can be considered as the great motto of the Lean. There will certainly be several definitions of waste but according to several authors (Bhasin and Burcher, 2006), waste can be summarized in 7 types, also known as the 7 "MUDA":



- Excessive production;
- Waiting;
- Transport;
- Over-Processing;
- Inventory;
- Reprocessing;
- Defects.

A correct detection, correction and elimination of waste, framed in a successful adoption of this philosophy, can lead to several benefits. However, we can also consider that the real benefit of Lean is not simply waste reduction; it is in fact the overall strengthening of the system as suggested by Meier and Forrester (2002). The impact of these practices can be outstanding, as suggested by Lathin and Mitchell (2001), who reports that traditional production can expect a 90% reduction in Lead Time, 90% in inventory, 90% in cost of quality and a 50% in labour productivity. On the other hand, lean manufacturing can help to reduce waste by 40 per cent, cut costs by between 15 and 70 per cent, decrease space and inventory requirements by 60 per cent, push productivity up between 15 and 40 per cent whilst cutting process changeovers by 60 per cent, as pointed out by Ferch, alongside Claudius Consulting (Bhasin and Burcher, 2006). Benefits can also be considered in other areas, such as the benefits of implementing Lean on a commercial fishing vessel that has reduced workloads, improved the quality of work of fishermen, reduced the time needed on the high seas by 25 % for the same objectives, increased crew salaries by 75% and raised annual revenues per vessel by more than \$ 2 million as suggested by Bell (2006).

While these results are compelling and there is already a great amount of literature on Lean tools and methodologies, there is no such thing as a “cookbook” to explain each step of the lean process and exactly how to apply the tools and harvest the benefits (Bhasin and Burcher, 2006). It has to be adapted to each situation, structured specifically for each case and management has to be totally committed to change. More important, lean should be seen as a direction, rather than as a state to be reached after a certain time, as pointed out by Karlson and Ashlstrom (1996). Only in this perspective of continuous improvement, of personal and organizational change in a methodical and sustained way can the above results be achieved – As pointed out by Elliot (2001), the organization must live, breathe and teach Lean in all its aspects. This is actually one of the most important topics, without full commitment for the transformation; it will not be able to deliver its full potential.

Like all philosophies, there are also some more sceptical thinkers, especially about its viability and performance. First, Katayama and Bennett (1996) argue that when the study that originated *The Machine that Changed the World* was conducted, the market was in Bull and interest rates were down, suggesting that much of LEAN implementation was due to market conditions and not to the benefits of change. Other authors still suggest that the attempt to restructure and reengineer companies effectively makes them "Leaner" but also "meaner". This statement, widely used by opponents of the Lean, is based on the premise that resorting to these new forms of management will inevitably end up doing lay-offs of personnel leaving two groups of people - the victims and the survivors, where the victims were forced to leave the company and the survivors feel fortunate but also frightened about who will be the next one (Allen, 1997). Still, by not only taking Lean as a mean to reduce costs but mainly to increase



productivity, efficiency and competitiveness in the long run, managers around the world continue to orchestrate strategies based on the concepts of this philosophy and get positive results from its application. However, their implementation is also difficult and overcoming the resistance to change found in most cases proves to be a time consuming process. Additionally, "the major difficulties companies encounter in attempting to apply lean are a lack of direction, a lack of planning and a lack of adequate project sequencing" (Bhasin and Burcher, 2006). For its implementation to be successful it is "indispensable to see Lean as a long-term journey, to install a continuous improvement point of view and make numerous cultural changes embracing empowerment and sponsor the lean principles through-out the value chain" (Bhasin and Burcher, 2006). Still, it should be noted that there are several examples of organizations that have successfully implemented Lean, often exceeding expectations. It may be suggested that almost every major manufacturing company operating today owe at least part of its competitive advantage and efficiency to at least some concepts of this philosophy, but Toyota should be highlighted as a benchmark of excellence in Lean. Finally, it is also important to mention that these concepts have also been successfully adapted across cross-sectional areas, showing that all other subsystems have to change so that an organization can harvest the full benefits of Lean, increasing their competitive advantage, as suggested by Hancock and Zaycko (1998) - Information technologies should be no exception.

The information technology sector and the need for improvement

After reviewing Lean philosophy and its benefits in the industry, the same principles were quickly replicated in other sectors and the benefits were equally considerable. According to Pat Quinn, VP of information and technology systems at Acuity Brands Lightning, waste optimization does not just apply to scrap metal - It may also mean eliminating wastes of intellectual property, or human resources, or anything else (Overby, 2007). These process optimizations, waste reductions and increases in efficiency and competitive advantage have lured and captivated practitioners in one of the sectors with the highest rates of failure and waste - Information Technology.

According to the CHAOS report conducted by the Standish Group (1995) only 29% of IT projects succeed, with 53% being completed with delays or budget increases and 18% simply failing. These figures are already well above the 16% success rate in 1994, with 53% slippage and 31% failure. Impressive to validate that these numbers have not significantly improved, as confirmed by the latest CHAOS report (Hastie and Wojewonda, 2016) with data presented until 2015, in which we can confirm very similar values – 29% succeed, 52% challenged and 19% failed, with a poor evolution over the past 5 years as outlines on the Table 1:

Table 1

Project success evolution (Hastie and Wojewonda, 2016)					
	2011	2012	2013	2014	2015
Successful	29%	27%	31%	28%	29%
Challenged	49%	56%	50%	55%	52%
Failed	22%	17%	19%	19%	19%



To be noted that these numbers are alarming and represent a clear opportunity for improvement, with clear waste sources - poor application planning, for instance, can be considered as a source of inefficiency since, according to the same studies, 64% of applications developed are not used or are rarely used.

Another study published in 2001 indicates that only 5% of the code was useful or even used (Cohen and Ware, 2001). Note that each line of code developed has a cost, added to the cost of designing, implementing and maintaining it – these statistics should be raising concerns on the management teams across the globe.

Furthermore, some authors suggest that "origin of this low yield can be traced to massing the adoption of the waterfall model for software development" (Hibbs et al., 2009). This fairly simple methodology, attractive for its simplicity and functionality, never revises previous steps, allowing no changes or iterations during the project. It is therefore a rigid model, not flexible and with many restrictions, and it is rare that the projects follow the defined sequence. It is currently considered by many practitioners as inadequate for the extreme dynamism and rapid change required in some software development projects – meaning that the need for a more flexible and iterative model started to grow. In response to these limitations, the also simple V model emerges, an optimization of the cascade model that derives from the direct relationship of each phase with the associated tests, extending the verification and validation throughout the software life cycle.

Going even further in time, the AGILE methodologies, which allow iterations, adaptations and changes required by software development, appeared at the turn of the century. All of these methodologies, including SCRUM, XP, CRYSTAL, follow some basic principles (defined for instance in the "Manifesto for Agile Software Development"), allowing a more fit for purpose development and assisting in reducing waste. Obviously, using these principles, the inherent flaws and weaknesses presented in traditional methodologies have been substantially reduced but the current indicators will not deviate much from the trend presented by the CHAOS study (Hastie and Wojewonda, 2016), which also offers a breakdown per methodology – for projects of any size, Agile methodologies achieved a percentage of 39% successful, 52% challenged and 9% failed, while waterfall methodologies achieved 11% successful, 60% challenged and 29% failed. These advances, which are extremely relevant, are not sufficient because although the aim of AGILE is to increase the productivity of software development while increasing the quality of the product, its scope is limited - It focuses mainly on software development, often neglecting the environment as well as the business adjacent to IT. In order to achieve real optimization and reduction of waste, it is necessary to focus efforts on the entire structure and to question and challenge the environment in which software development takes place, as well as all support activities related to information technologies. Only with this broad vision will it be possible to achieve a relevant maturity on Lean IT, and it is important to question current practices as well as established practices. Based on this need, there were also evolutions from an IT service support perspective, being these major milestones in any Lean IT roadmap - Public domain libraries with best practices for IT support have emerged, with the Information Technology Infrastructure Library (ITIL) being the most well-known and used, developed in 1980 by the Central Computer and Telecommunications Agency (CCTA) for the Government of the United Kingdom. ITIL is essentially a set of best practices, synthesized in several documents, used to assist IT Service Management. Although extremely useful and of



great benefits, its implementation is also challenging. It should be noted that some studies indicate that although 60% of the companies studied are working with ITIL, only 10% consider themselves to be true practitioners (Curran et al., 2009), revealing that the process is still very much at risk. In addition to the weak indicators presented in this chapter, it should be considered that, regardless of the companies' strong investments in information technology, it is suggested that there is still a huge difference between what the business expects of IT and what IT can deliver (Raichura and Rao 2009). It is possible to track this poor performance to the poor involvement of top management in some organizations, one of the most common and at the same time more serious problems that can be found in most organizations. To be noted that as suggested by Dorgan and Dowdy (2004), companies with more powerful Information Technologies do not do better financially, but they achieve greater benefits by combining investments in IT with good Management. It is also added by the same authors that "Companies should first improve their Management practices and only then invest in Information Technologies" (Dorgan and Dowdy, 2004). It is suggested by this brief introduction to this paper that the Information Technology sector is a problematic sector, with high failure rates and a latent need for change in the processes and techniques being currently used. Even with the current efforts of outsourcing some development and maintenance activities to cheaper locations and to implement tighter project management " the costs of developing and maintaining applications now account for about half of the average IT budget and continue to rise" (Kindler et al., 2007). It is also suggested that our efforts to improve should not focus within a single scope or section, but the entire value chain should be considered. It is from this perspective that the need for the Lean philosophy for Information Technologies arises, a robust approach that can bring a new momentum to all stakeholders, "being able to increase productivity from 20% to 40%, while improving the quality and speed of execution" (Kindler et al., 2007). These indicators made clear that the use of Lean Management techniques highlighted the value of Information Technology in reducing waste and increasing productivity on organizations.

Lean concepts in the information technology sector – lean IT

Adapting Lean concepts to the Information Technologies may seem like a fuzzy concept. However, let us consider that IT processes can be mapped and, if they can be mapped, can be measured. If they can be measured, they can be managed. Finally, if they can be managed, they can be optimized. On the other hand, according to Peter Waterhouse (2008), "in a manner similar to manufacturing, service development involves demand management, prioritization of activities, resource mobilization (finite), and defect control". Having these principles been imported from manufacturing, there have been some efforts to adapt the Lean philosophy to Information Technologies all around the world, being seen for one of the first times in the work "Lean Software Development: An Agile Toolkit for Software Development Managers", by Mary and Tom Poppendieck (2003). This can be seen as the origins of Lean IT, being a set of leaner practices that "takes a broader view, preferring to focus on the entire business context in which software development is done" (Hibbs et al., 2009). Thus, the LEAN philosophy "describes the" what "- reduces waste, etc. AGILE, as an extension, is a way to get to the "how" - describing the ways to eliminate actions of little added value" (Curran et al., 2009). According to Mary Poppendieck (Abilla, 2006), the backlog problem from an AGILE point of view can be solved by having someone prioritizing the list and then having the development team select from the top of the list the amount of work it can reasonably expect to accomplish and deliver within an iteration, with the expected quality, leading to the common problem that the least



priority work will take a long time to be resolved. On the other hand, in a Lean environment the goal is to keep the work list by doing the shortest possible, treating the requests responsibly and not accepting work beyond the capacity that the team can offer or is able to deliver. Therefore, we can consider the 7 basic principles (Hibbs et al., 2009) defined for Lean Software development:

- **Build Quality in** - Do not allow continuity of defects, stopping production and correcting the defect immediately, as opposed to detection only in quality control. Note that this way, correcting the error as soon as detected, also corrects the problem, avoiding future errors on integration or regression impacts.
- **Creation of Knowledge** - Create knowledge and share it whenever there is a "lesson learned". In this way, not only does the same person not make the same mistake twice, as there is sharing of that experience for others not to make the same mistake. In this way it is possible to avoid errors and defects, as well as to contribute to a greater training of employees. In this sense, a continuous lessons learned culture, as opposed to the methodological approach of lessons learned by the end of each phase is advised.
- **Defer commitment** - Just adopt strategies when you have as much information as possible, avoiding wrong choices and consequent waste. This is a complicated balancing act but can be valuable for a sound and sustainable decision, avoiding fundamental problems on strategy or approach caused by impetus or emotional decisions. To be noted that Defer commitment is not synonymous of inability to act or take decisions.
- **Fast Delivery** - Deliver the complete work as soon as possible, even if it is not the end product. This software tranche delivery approach is valuable for the customer to closely monitor and test the functionalities developed, making it easier to get their opinion on the product and, as such, makes the requirements change process more flexible. In this way, the iterations are more dynamic and easy, making the development process more agile to respond to the extreme dynamism demanded by the function.
- **Respect for People** - Respect and involve employees. Motivation is a key factor in people's performance and the benefits of engaging them can be in many ways - higher productivity, greater pro activity and commitment, among others. On the other hand, the accountability of people can also be advantageous in detecting opportunities for improvement and in the quality of the product developed, as well as providing valuable inputs to management or business.
- **Optimize the Whole** - This is one of Lean's key ideas in any industry. Never forget the prospect of the entire value chain, avoiding independent ventures, only in one area, neglecting the surrounding and adjacent. It is very important not to focus just on IT, a holistic view of the organization is highly advised.
- **Eliminate Waste** - As well as in industry and other services, for a Lean change we need to focus on eliminating all types of waste in order to maximize efficiency and increase overall return on investment – in this regard, Information Technologies should be no exception.



All of these basic principles are important and, as mentioned earlier, for a successful and sustainable implementation it is necessary to channel continuous efforts in all of them. However, in the present paper a more detailed analysis will be done on the elimination of waste because it is less of an obvious adaptation to the information technologies, as well as being considered as the basic principle for a Leaner organization. Therefore, it can be considered that "IT organizations are no longer focused solely on managing technology, but on maintaining a continuous production line of services and, as on any production line, waste can arise anywhere" (Waterhouse, 2008). Thus, as in industry, "systematically eliminating these sources of waste improves the delivery time, quality, and efficiency" (Kindler et al., 2007). Based on these assumptions, and in opposition to the 7 MUDA considered in LEAN Manufacturing, eight types of wastes can be listed in IT operations that add no value to the final product or service, called DOWNTIME as suggested by Peter Waterhouse (2008) and as shown by Table 2:

Table 2

Waste factors in IT (DOWNTIME)		
Waste factors	Examples	Main Risks/Issues
D - Defects	Project execution miss-aligned with the defined requirements and standards, or technical errors	Lack of customer focus (considering internal and external customers in organizations) and increase in costs
O - Overproduction	Production of applications or systems that will not be used, will only be partially used or used incorrectly	Increase in costs, increase in complexity
W - Waiting	Extensive lead-times between activities, for instance between defect fixing and re-testing	Lower productivity, lack of customer focus, increase in costs, increase in employee frustration
N - Non-Value added processing	Applications that do not deliver relevant value to the organization	Miss-communication and increase in costs
T - Transportation	Transports for problem solving, environment structure and client strategy	Increase in costs, lower productivity, increase in employee frustration
I - Inventory	Licensing that is not used, excessive sizing of IT infrastructure	Increase in costs and lack of efficiency
M - Motion	The need to work on a re-active way, deviating from the plan – also known by practitioners as "firefighting"	Increase in costs, lower productivity, increase in employee frustration
E - Employee knowledge	Inability to capture ideas and to keep and share internal knowledge, increasing the overall performance of the team	Lowers employee engagement and satisfaction, risk of losing knowledge on the organization



This table can be seen as an approach to the types of defects or waste that can be found in IT. There will surely be many other mappings, and most authors consider only 7 types of Defects, grouping Transport and Motion into one. Even so, while some aspects of this Lean Manufacturing for Lean IT adaptation may seem to be forced, it can also be extremely useful for optimizing the processes and activities involved in IT-related activities. It is added that, according to a study by McKinze (Kindler et al., 2007), we can point out that the phases most conducive to waste are the phases of customer contact, prioritization, and testing, which can reach 50% of activity that adds no value. To be noted that identifying and analysing waste is not the only difference between Lean manufacturing and Lean IT – there are several other differences. First, the operations in the industry sector are repetitive unlike IT. This factor is important considering that in IT, with projects going through different phases many times and repeatedly, workers feel that there is no project equal to the other. In addition, teams are formed for each project, making each project really unique, making it difficult to perform continuous team-based learning. On the other hand, in the industry the definition of the product by the customer is usually very clear. This is not the case in IT, where very often, what the system should do remains vague until later stages and can be a source of many misunderstandings between customers and users. Therefore, the need to always validate the requirements in the initial phases of the project should be reinforced, and this validation must always be done with the final customer. Finally, the third and biggest difference is that in IT the work is almost invisible and very personal. Unlike the industry in which everything is visible, according to Lean concepts everything must become "even more visible" - in IT is very difficult to visualize the flows, and as such it is difficult to visualize problems related to quality. However, it may be noted that attempts to implement Lean to IT must "overcome 3 challenges that are difficult to answer: "changing behaviour, broadening the focus from specifics to general principles, and setting up the right incentives" (Kindler et al., 2007), suggesting that the difficulties would be similar to some of those felt in the industry. On the other hand, and in the opinion of the more IT-centric author, Mary Poppendieck, it is suggested that "the metrics imposed by traditional management methods are the major impediment to the implementation of Lean Software Development. In particular, instead of measuring the variation to the plan, we need to start measuring actual delivery of business value" (Abilla, 2006). Thus, we confirm that change efforts cannot be only in software development. Lean is more than that, and an approach that is capable and transversal is needed for a full business transformation. It can therefore be considered that "a lean transformation requires simultaneous changes in the technical system (changes to tools, methodologies, standards, and procedures), the behavioural system (convincing staff of the value of these changes), and the management system (new roles, metrics, and incentives to encourage the shift)" (Kindler et al., 2007). Note that these changes will only be possible if there is a strong commitment from the Top Management, being this a critical factor for the success of any transformation – and at the same time one of the most common issues, being most of the times a show-stopper for the full realization of the benefits that could derive from a lean IT transformation.

Conclusions - Lean IT maturity and further research

The application of these concepts can, as previously mentioned, bring great operational benefits to the information technologies, as well as massive savings. It can have a major impact



on an organization competitive advantage by creating a greater focus on core business and reducing overall lack of efficiency based on a continuous improvement and waste reduction mind set. Still there are not many success stories available due to the still reduced maturity level of lean IT, being the author of the opinion that this is a clear gap in the literature. Nevertheless, it can already be considered that, for example, British Airways has proposed to achieve savings of £100 million per year within two years, which it achieved and exceeded (Orlov, 2008) with an integration program called "Customer Enabled BA", with clear imports from a lean philosophy. Also on Fujitsu, according to a case study issued by the company, it is noted that "Lean is not a process, it is an attitude. It's not just tools and techniques, it's the way people think and work, culturally and philosophically. (...) What the Lean approach highlights are the peaks and gutters present in the workflow that are not always visible. It has also helped us (Fujitsu) to focus on what features are available so we can focus on more business easily since we know the flexibility to offer a wider range of services" (Cooley, 2007). These cases illustrate the importance of adopting the Lean philosophy in information technology but also stress that efforts are only just beginning - "The Information Technology world and the Lean have a lot to learn from each other" (Jones, 2013), being important for the academic and business community to continue its research on the real benefits of adapting Lean concepts to the information technology sector, gathering and sharing more comprehensive data that can assist in understanding and further developing Lean concepts. Also, a continuous review of project management methodologies and practices supported by empirical evidence and aligned with a lean philosophy would be very interesting. Additionally, the import of Lean concepts to areas related to Information Technologies such as Outsourcing, Change Management or User Training might be yet another interesting route for research since there is very limited literature available. Finally, studies on Leaner IT support organizations as well as in IT Environments and Infrastructures would also be valued by the academic and business communities, since this is also a clear gap in the literature.

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NEW DIRECTIONS IN PROJECT MANAGEMENT: THE RISE OF PROJECT GOVERNANCE

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Abstract

The purpose of this paper is to review and summarize current findings in project governance, a new direction of project management development. The review is based on the recent publications in the field of project management. The focus is on the International Journal of Project Management publications including “project governance”, “governance of projects” and “projectification” keywords. Discussed publications comprised of predominantly international, qualitative as well as quantitative researches and studies.

Summarization of approaches suitable for testing and further investigation within organizations with different levels of projectification is the main output of this paper. Moreover, this paper comprises the initial phase of authors’ research within the dissertation preparation and author’s research on testing the approaches will follow it.

The concept of project governance is relatively new as it was usually defined within the corporate governance framework. However, due to significant overall development of project management as well as increasing levels of projectification in organizations, it started developing as a separate concept. One of the key segments is the already mentioned level of projectification, a fundamental organizational transformation towards project-oriented structures that involves drastic changes within organizational processes and structures.

Project governance approaches are derived from a combination of the level of projectification of the organization and one of the three basic governmentality dimensions put into the domain of projects – the authoritarian, liberal, and neo-liberal governmentality. Furthermore, perspectives of the two main theories of corporate governance, the agent and stewardship theories represent the endpoints for framing project governance approaches.

According to the review, these approaches are not suitable for individual projects but for establishing a governance structure at the organizational level, within which individual projects can be conducted. Therefore, organizations with lower levels of projectification are more suitable for having governing structure designed to suit temporary context of projects. Such governing structure should be implemented within permanent organizational structure. Meanwhile, within the organizations with higher levels of projectification, governing structure can be established at the organizational level and can have long-term character.

The biggest advantage of approaches suitable for lower levels of projectification is less complicated and less time-consuming implementation as they adapt to already existing organizational structure. Accordingly, the biggest advantage of project governance approaches suitable for higher levels of projectification is higher effectiveness and unified, long-term concept governing whole organization.

However, further testing and implementation as well as potential implications in practice, other advantages and limitations are yet to be found. This is the direction in which project governance should further develop. Hence, this paper can also be used by organizations as introductory summary or guide as it present them possible options as well as outcomes of their implementation.

Key words: *project management, project governance, projectification, governance of the projects*

JEL code: M0



Introduction

In order to properly address specifics and current findings of project governance, it is important to thoroughly define it. Governance is generally perceived as a system of values, rules, principles and guidelines by which organizations are guided and controlled and at the same time, by which the managers are held liable for their actions and performance (OECD, 2001). This represents the framework of corporate governance within which the project governance coexist (Müller, 2009).

It is also very important to define and understand the influence of governmentality. According to (Barthes, 2013), governmentality is a connection between the governors who govern and people who are being governed. It can be perceived as a way the governors present themselves to people they govern and therefore, it represents the attitude of the governor.

If two terms defined above are to be combined, it can be said that governance represents the structure and governmentality represents the human side of that structure (Müller, et al., 2016).

Sovereignty is one of the main dimensions of the concept of governance and it should be understood and taken into consideration when addressing the governance in the realms of projects (Müller, et al., 2016). Today, sovereignty can be described as external autonomy and internal control (Müller, et al., 2016). Its main role lies in being one of the success factors for establishing the governance of projects in the project-oriented organizations as well as for easier and faster acceptance of governance structures by managers (Joslin & Müller, 2016).

Taking into consideration previously explained background, project governance, respectively governance of projects can be defined as a system of values, policies, procedures, processes as well as responsibilities that enable project to achieve organizational objectives and represent the best interests of corporation and all its stakeholders (Müller, 2009). It is important to mention the distinction between two relatively similar terms - project governance and governance of projects.

This paper follows the Morris's and Müller's definitions of above mentioned terms. Project governance is defined as governance of individual projects, which involves specific methodology suitable to the nature of the project (Morris, 1997). At the same time, governance of projects represents broader concept that focuses on governing groups of projects, portfolios or even on the projects at the level of whole organization (Müller & Lecoeuvre, 2014). The main focus will be on the latter term as it is more general, wider and could be applicable to more than one project/organization.

As project management has been significantly developing, the level of projectification in organization became important and has increased notably. The level of projectification can be defined as a fundamental organizational transformation towards project-oriented structures that involves drastic changes within organizational processes and structures (Lundin, et al., 2015). Together with the development of project management, governance of projects started developing as a separate concept too.

Projectification level is closely connected to governance approaches, more specifically, adjusted project governance approaches. They are derived from a combination of the level of projectification of the organization and one of the three basic governmentality dimensions put into the domain of projects – the authoritarian, liberal, and neo-liberal governmentality (Müller, et al., 2016). Furthermore, perspectives of the two main theories of corporate governance, the



agent and stewardship theories represent the endpoints for framing project governance approaches (Müller, et al., 2016).

This paper is focused on review of recently published publications in this field and summarization of their main findings. Primary research can then be based on the main conclusions of this literature review.

Literature review

As previously mentioned, this paper comprises the initial phase of authors’ research within the dissertation preparation and author’s research on testing the approaches will follow it.

The review is based on the recent publications in the field of project management. The focus is on the International Journal of Project Management publications including “project governance”, “governance of projects” and “projectification” keywords. Databases used for research were ProQuestCentral, EBSCO, Scopus and Web of Science. Publications discussed below comprised of predominantly international, qualitative as well as quantitative researches and studies.

Table 1

Publications Summary				
Authors	Title	Year	Journal	Research
Müller, R., Turner, R.J., Andersen, A.E., Kvalnes, Ø.	Governance and Ethics in Temporary Organizations: The Mediating Role of Corporate Governance	2016	PMJ ^{§§§§}	quantitative
Brunet, M., Aubry, M.	The three dimensions of a governance framework for major public projects	2016	IJPM ^{*****}	qualitative
Müller, R., Zhai, L., Wang, A., Shao, J.	A framework for governance of projects: Governmentality, governance structure and projectification	2016	IJPM	qualitative
Joslin, R., Müller, R.	The relationship between project governance and project success	2016	IJPM	quantitative

Source: author construction

Firstly, the number of publications has increased notably in the last few years as the interest for this field constantly grow. It is also notable that the main authors are able to address the topic more specifically and in depth. The publications shown in the Table 1 and their main findings are currently the main topics being investigated in the field of governance of projects and are in details presented further in this paper.

§§§§ Project Management Journal

***** International Journal of Project Management



Summarization of current findings

Since the very beginning of the development of the project management, project success and success factors were one of the most interesting subjects for discussion and research. Despite the fact the main framework and main success factors have been investigated and generally accepted, there are still differences in defining the project success or the success of the project respectively.

The relationship between project governance and project success is one of the most interesting topics in this field too. Project governance is perceived as a potential success factor that increases the possibility of a project success. The perspective of agency and stewardship theory were used when the relationship between project governance and project success were investigated (Joslin & Müller, 2016). In order to properly address the matter, project governance was defined in two dimensions. The first dimension was the extent to stakeholder versus shareholder orientation and the second one was the extent of control versus behaviour control (Joslin & Müller, 2016). Positive correlation of project success with increasing stakeholder orientation of the parent organization was indicated by the research (Joslin & Müller, 2016). However, it was also shown that control mechanisms do not correlate with the project success (Joslin & Müller, 2016). According to the results, authors concluded that the stewardship approach in the field governance has an important role in reaching the project success (Joslin & Müller, 2016).

In their paper, (Müller, et al., 2016) addressed the question of establishing a general-purpose framework for the governance of projects. The framework proposed is based on the results of cross-cultural qualitative research conducted in Scandinavia and China. Structure of the general-purpose framework is founded on the concepts of governance of projects and governmentality in the context of different levels of projectification in organizations (Müller, et al., 2016). Proposed framework should be able to enable the creation of organization-specific profiles. Establishing a general-purpose framework also identified the new dimension, called precept, which tackles the predominant theme in governmentality as being either organizational values, process compliance, or project well-being (Müller, et al., 2016). The most significant, revealing output of this research is the identification of organization specific profiles that can be used to establish generic profiles for different governance systems (Müller, et al., 2016). However, due to limited number of respondents, these results are indicative and their further testing is needed.

The governance of public projects has been recently an interesting topic in project management too. It is perceived as a tool in enhancing the performance of the public projects (Brunet & Aubry, 2016). Research in this area is mainly focused on public administration literature review aiming at advancement of a conceptualization for governance frameworks for major public projects (Brunet & Aubry, 2016). Investigating how relevant is the governance of framework for major public projects was done through three main dimensions - greater government efficiency, legitimacy and accountability (Brunet & Aubry, 2016). Until now, the results showed that governance framework leads to greater government efficiency. However, greater legitimacy and accountability were strongly argued.

The most recent topic investigated in the field of governance of projects is the impact of multilevel level governance on the frequency of ethical issues in temporary organizations (Müller, et al., 2016). Authors used structural equation model and came to significant results.



There was a reduction in the frequency of ethical issues if structural equation model was used as a governance mechanism at the temporary organization levels in the organizations (Müller, et al., 2016). Furthermore, a substitution effect was identified as micro level governance (represented by temporary organizations) substituted for gaps in the macro level governance (represented by corporate governance) (Müller, et al., 2016). These findings are significant for the field of governance of the projects development, but structural equation model should be tested further on the bigger sample. Broader, cross-cultural researches should follow in order to increase the general applicability of the results.

Conclusions

Researches and articles discussed in this paper showed the variety of topics that could be investigated as project governance is still a relatively new and yet to be discovered in depth concept.

Studies showed that there is significant correlation between project success and project governance. Further research could test the results in different contexts and environments and could be extended as it can investigate the relationship between project governance and main success factors in different types of projects.

Governance of public projects could be perceived as one of the most unknown directions of the project governance as the researches were mainly conceptual and based on the literature review. However, the findings of these researches showed enormous potential for further investigation that could involve testing the proposed governance framework and models. Comparison of the results could bring many new implications that could help the further development of the project governance.

As the interest for the project governance grows, the research moves towards establishing generally accepted framework and approaches (models) that could be used in different types of projects and be suitable in the organizations with the different levels of projectification. Revealing, significant models and framework have been proposed and the current results are very positive.

The project governance approaches are not suitable for individual projects but for establishing a governance structure at the organizational level, within which individual projects can be conducted. Therefore, organizations with lower levels of projectification are more suitable for having governing structure designed to suit temporary context of projects. Such governing structure should be implemented within permanent organizational structure. Meanwhile, within the organizations with higher levels of projectification, governing structure can be established at the organizational level and can have long-term character.

The biggest advantage of approaches suitable for lower levels of projectification is less complicated and less time-consuming implementation as they adapt to already existing organizational structure. Accordingly, the biggest advantage of project governance approaches suitable for higher levels of projectification is higher effectiveness and unified, long-term concept governing whole organization.

However, in order to establish generally accepted models that could be used in practice, they should be tested in different environments and in various types of projects. Author's own research will follow this direction and focus on establishing general framework of governance of projects supported by project governance approaches that could be used in practice.



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AN EMPIRICAL INVESTIGATION ON THE PROJECT PORTFOLIO RISKS CORRELATIONS

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Abstract

Project portfolio risk management is currently of interest to both researchers and practitioners. To be properly conducted, portfolio manager must take a holistic approach and have appropriate competencies. Although this subject is topical and important, there is a lack of available empirical studies, concerning the issues of project portfolio risk linkages. This paper revolves around searching for correlations between risk significance ratings in the hypothetical project portfolio. Based on literature analysis a list including risks characteristic for a project portfolio was developed. The listed risks were assessed by experts using the Delphi method. After the assessment procedure, when the expert consensus had been achieved thirty six project portfolio risks were selected. The applied research procedure assumed risk assessment, according to the approach suggested in the literature of the subject, including significance of a given risk. Significance of risks was assessed by respondents who had an experience in the portfolio management. During the research work, Spearman's rank correlation coefficient had been applied and calculated, as well as correlations between significance ratings for particular risks in the hypothetical project portfolio had been identified. The result of the conducted empirical research identified important correlations between risks in the project portfolio.

Key words: *project portfolio risk, project portfolio risk correlations*

JEL code: M2

Introduction

Key aspects of project risk management have been thoroughly covered in the available literature on the subject, both in terms of tools [Raz and Michael, 2001; Baccharini and Archerv, 2001] and interpersonal links [De Bakker et al., 2011]. The studies also define uncertainty and risks in terms of project management [Perminova et al., 2008]. On the other hand, project portfolio risk management is a relatively new issue [Patanakul and Milosevic 2009]. The available studies point to the considerable constraints of traditional, that is to say, single-project oriented risk management in the context of a multi-project environment [Olson, 2007]. Given the specificity of this environment, organizations that initiate projects in a changing environment implement them together, this increases their flexibility [Anavi-Isakov and Golany, 2003; Olson, 2008; Spalek, 2014].

Based on the work of Markowitz [Markowitz 1959], a portfolio can be defined as a collection of projects which facilitate the maximization of expected value if managed collectively, given the assumed level of risk [Sanchez et al., 2008, p. 97; Taroun, 2014]. The references to the literature on the subject demonstrate that portfolio risk management is a much broader issue than risk management of individual projects [Pellegrinelli, 1997] and requires a holistic view to be taken [Olsson, 2008; Lee et al., 2009]. This is due to new risks which are derived from relationships that develop between projects within the portfolio [PMI, 2008, p.85]. Identifying the risk level of projects implemented within the portfolio may be carried out in parallel; this has a positive impact on the effectiveness of these measures [Teller et al., 2012; Teller and Kock, 2013]. The question raised of the effectiveness of portfolio risk management



points to considerable expenditures involved in this operation, and refers them to the expected effects [Kutsch and Hall 2009]. Accordingly, properly conducted project portfolio risk management is conducive to minimizing the likelihood of errors and failures, which in turn has a positive impact on the success of a portfolio [De Reyck et al., 2005; Meskendahl, 2010; Teller, 2013]. On the other hand, with reference to the personal aspect, it should be noted that risk management requires a comprehensive perspective from a portfolio manager; otherwise problems with monitoring risk at the portfolio level may appear [Olson, 2007]. In other words, risk management requires unique competencies from a portfolio manager, that facilitate the development of the desired conduct of organization participants [Blomquist and Müller 2006; Jonas, 2010; Beringer et al., 2013].

Whereas the research conducted focused on the area of basic research, it was also decided to pose the following research question (PB1): which project portfolio risks will correlate with one another, on considering the significance of each of them? In order to answer the above questions, research was carried out, which involved the identification of a specific risk for a project portfolio, assessment of its significance and the calculation of correlation coefficients for individual risk pairs.

Research results

Risk identification

The studies in the literature on the subject facilitated the selection and identification of risks specific to a project portfolio [Fricke et al., 2000; Pender, 2001; Cooper et al., 2001; Pennypacker and Dye, 2002; Cooper et al., 2002; Elonen and Artto, 2003; Kendal and Rollins, 2003; Archer and Ghasemzadeh, 2004; De Reyck et al., 2005; Martinsuo and Lehtonen, 2007; Blomquist and Müller, 2006; Caron et al., 2007; Olson, 2007; Rajegopal et al., 2007; Blichfeldt and Eskerod, 2008; Müller et al., 2008; Olson, 2008; Sanchez et al., 2008; Payne, 2009; Meskendahl 2010; Jonas, 2010; Teller et al., 2012; Beringer et al., 2013; Teller et al., 2013]. All of the risks identified based on the literature on the subject were classified into one of three categories suggested in the literature (component, structural and general risk) [PMI, 2008]. The identified risks were evaluated by experts in accordance with the Delphi method [Linstone and Turoff, 2011; Von der Gracht, 2012; Hofman and Grella, 2015].



Table. 1.

Project portfolio risk list (names without descriptions)

Component risk	Structural risk	Overall risk
1.1 Significant changes in the project or program environment 1.2 Change in an approach of key project or program stakeholders 1.3 Significant change in the basic parameters of particular portfolio elements 1.4 Improperly defined priorities for particular portfolio elements 1.5 Disturbances of information flow and communication within the portfolio elements 1.6 Ignoring risks by portfolio element managers 1.7 Lack of developed methodical standards within the scope of portfolio element management 1.8 Improperly operating Steering Committees of projects, project groups and programs 1.9 Conflicts between project and program managers within the portfolio 1.10 Conflicts between portfolio element managers and the parent organization's decision-makers 1.11 Improper competencies of project and program managers 1.12 Risks arising from the application of innovative technical and material solutions in the portfolio elements	2.1 Too large portfolio from the point of view of the portfolio executors' capacity 2.2 Significant portfolio fragmentation 2.3 Overly complicated hierarchical structure of portfolio management 2.4 Significant portfolio homogeneousness 2.5 Portfolio diversity range too wide from the point of view of portfolio executors' applied capacity 2.6 Mismatch between the portfolio structure and the parent organization's strategy 2.7 Improper portfolio balance	3.1 Lack of transfer of information and knowledge among the portfolio elements 3.2 Improper control over life cycles of projects and programs 3.3 Unavailability of resources necessary to execute works within the portfolio 3.4 Lack of coordination of the involvement of key resources in the execution of the portfolio 3.5 Relationships among products created by the portfolio elements 3.6 Problems with access to the portfolio financing capital 3.7 Possibility of the lack of financial liquidity within the portfolio 3.8 Portfolio financing collapse 3.9 Non-compliance of a key element strategy with the portfolio's strategy 3.10 Conflicts among objectives of projects and programs executed within the portfolio 3.11 Conflicts between portfolio managers and portfolio element managers 3.12 Lack of involvement of top-level and middle-level managers in portfolio execution 3.13 Lack of appropriate competencies of the portfolio manager and of the portfolio support structures 3.14 Risks arising from the unknowns at the cost estimation of the execution of selected portfolio elements 3.15 Risks related to the personnel stability of the portfolio managing team and the possibility of losing key portfolio element managers 3.16 Lack of developed methodical standards within the scope of portfolio management 3.17 Formulation of fixed-price contracts for the portfolio elements

Source: Hofman M., Greła G., 2015, Project portfolio risk identification - application of the Delphi method, "Journal of Business and Economics", Vol. 6 (11), pp. 1857-1867.



Under this research phase, after reaching a consensus, experts recommended 36 risks specific to the project portfolio, that is to say, 12 risks of component risk category, 7 of structural risk category, and 17 of general risk category (see Table 1).

Research sample description

Under the next research phase, the likelihood and impact of each identified risk on the project portfolio was assessed. This assessment was made by respondents who hold professional experience in project program or portfolio management. A request for participation in the assessment of the above variables for each identified risk of the project portfolio was addressed to a group of 400 persons. 73 experts (that is to say, 18% of all respondents) assessed portfolio risk. In the group of respondents who made the assessment, 8% of respondents had amassed 16-25 years of professional experience in the management of multiple projects, 15% - 11-15 years, 47% - 5-10 years, while 30% - had less than 4 years of experience. Within the assessing group, 64% of experts worked for service companies, 21% - worked for manufacturing companies, while 11% - worked for mixed-profile companies. Based on the characteristics of the survey participants, it may be assumed that the sample included individuals with experience in the management of various project portfolios, both in terms of their size, type and industry. Respectively, it may be assumed that the results obtained may describe the materiality level and illustrate the relationships between risks for the full scope of the project portfolios.

Research procedure

As mentioned above, experts with experience in managing multiple projects assessed 36 risks identified in the formula of the Delphi method (see Table. 1). According to the approach suggested in the literature on the subject, the operationalization of each assessed risk included two variables: (1) risk likelihood, and (2) impact of the risk on portfolio goals [Baccarini and Archer, 2001; pp. 143-145; Jaafari, 2001; pp. 91-93; PMI, 2004; pp. 242-252; IPMA, 2006; pp. 47]. The variables studied were defined on an ordinal scale. A variable - risk likelihood - was shown on the following scale; 1 meant very low risk likelihood, 2 - low, 3 - average, 4 - high, 5 - very high risk likelihood. A variable – risk impact - was assessed on a scale, where 1 meant very low impact of risk on portfolio goals, 2 - low impact, 3 - average impact, 4 - high impact, 5 - very high impact of risk on portfolio goals. Respondents assessed individual risks in a special questionnaire, which was posted on the website (CASI method was applied). It contained all the risks from the list, along with their names and description. Risks from the list were distributed in the questionnaire at random, in order to avoid suggesting their categorization referred to in the literature on the subject (structural and general components) to respondents [PMI, 2008]. While assessing these variables based on the experience of the last programme or portfolio managed (*ex post* approach), the respondents anticipated their likelihood and the impact of individual risks on the goals of a hypothetical portfolio (*ex ante* approach).

Research results

Due to the ordinal scale where the examined variables were measured, the pattern proposed by Ch. Spearman [Fieller, Hartly and Pearson, 1957; Zar, 1972] was used to determine



their correlation. Tables 3a, 3b, 3c and 3d attached hereto show Spearman's rank correlation coefficients defining correlations between respondents' assessments concerning the significance of project portfolio risk. In order to assess the statistical significance, the threshold of $p < 0.05$ was adopted. To interpret the correlation level, the approach suggested by J. D. Evans was applied, where correlation in the range of 0.4 - 0.59 is referred to as moderate, and that of 0.6-0.79 - as strong [Evans, 1996]. The analysis omitted correlations below 0.4, determined by Evans as weak and very weak.

After rejecting the values below 0.4, following the analysis of the obtained results, correlations between 0.4-0.59 and 0.6-0.79 were identified. 0.69 was the highest correlation level, and it was posted as a risk significance between 3.13 (lack of appropriate competencies of the portfolio manager and of the portfolio support structures) and 1.7 (lack of developed methodical standards within the scope of portfolio element management). Two more correlations were identified in the strong section, that is to say:

- 3.16 (lack of developed methodical standards within the scope of portfolio management) and 1.7 correlation of 0.61,
- 3.11 (conflicts between portfolio managers and portfolio element managers) and 1.9 (conflicts between project and program managers within the portfolio) correlation of 0.67.

Lack of appropriate competencies of the portfolio manager and of the portfolio support structures directly translates into methodological standards for the management of both portfolio elements and the entire portfolio. Employing a relevant manager at the position responsible for project portfolio management in an organization is a key determinant of the possibility of attaining goals set by the parent organization. Consequently, this person should be particularly verified for their skills and experience in project portfolio management upon selection.

In the range 0.4-0.59, the correlations between the following variables were identified: 1.2 and 3.15, 3.1, and 1.3, 2.6 and 1.3, 1.4 and 1.1, 1.4 and 2.7, 1.5 and 3.1, 3.1 and 1.6, 1.7 and 1.9, 1.7 and 1.10, 1.7 and 2.3, 1.7 and 3.2, 1.7, and 3.11, 3.16 and 1.8, 3.13, and 1.8, 1.10, and 1.8, 1.9 and 1.10, 1.9, and 3.4, 1.10, and 3.16, 3.13, and 1.10, 1.10, and 3.11, 1.10, and 3.9, 3.2 and 1.10, 2.3, and 1.10, 3.14 and 1.12, 2.2 and 3.11, 2.3, and 3.9, 2.3 and 3.10, 2.3 and 3.11, 2.3, and 3.13, 3.16, and 2.3, 2.6 and 3.9, 3.2 and 3.3, 3.2 and 3.14, 3.4 and 3.11, 3.6 and 3.7, 3.7 and 3.8, 3.7 and 3.16, 3.9 and 3.10, 3.9 and 3.16, 3.10, and 3.11, 3.11, and 3.13, 3.16, and 3.11, 3.13, and 3.16, 3.14, and 3.17, 3.16 and 3.17 (see Table 3a, 3b, 3c, 3d attached hereto. The most interesting correlations between risks in this range include:

- correlation between risk 1.4 (improperly defined priorities for particular portfolio elements) and risk 2.7 (improper portfolio balance) of 0.49,
- correlation between risk 3.4 (lack of coordination of the involvement of key resources in the execution of the portfolio) and risk 1.9 (conflicts between project and program managers within the portfolio) of 0.52,
- correlation between risk 3.1 (lack of transfer of information and knowledge among the portfolio elements) and risk 1.5 (disturbances of information flow and communication within the portfolio elements) of 0.58,
- correlation between risk 1.7 (lack of developed methodical standards within the scope of portfolio element management) and risk 3.2 (improper control over life cycles of projects and programs) of 0.51,



- correlation between risk 3.13 (lack of appropriate competencies of the portfolio manager and of the portfolio support structures) and risk 3.11 (conflicts between portfolio managers and portfolio element managers) of 0.50.

Table 2 shows the number of instances of significance of individual risks in correlation with strength of at least 0.4.

Table 2

Number of instances of significance of individual risks in correlations with strength of at least 0.4 (Source: own studies)

Risk number	Number of instances
1.10	9
3.11	9
3.16	9
1.7	7
2.3	7
3.13	6
3.9	5
1.9	4
3.2	4
1.8	3
3.1	3
3.10	3
3.14	3
3.7	3
1.3	2
1.4	2
2.6	2
3.17	2
3.4	2
1.1	1
1.12	1
1.2	1
1.5	1
1.6	1
2.2	1
2.7	1
3.15	1
3.3	1
3.6	1
3.8	1



The following three types of risks were most common (occurred 9 times):

- Conflicts between managers of portfolio elements and policy makers of the parent organization.
- Conflicts between a portfolio manager and managers of portfolio elements.
- Lack of developed methodological standards within the scope of management of portfolio elements.

Personal conflicts between key persons within the scope of project portfolio management are a key determinant affecting the assessment of potential success for the entire project portfolio. Efficient conflict management and identification of its causes may - by conflict resolution - contribute to improving portfolio management quality, and consequently may be conducive to increasing the efficiency of the entire project portfolio. If a conflict may not be resolved or is ignored, this situation could adversely affect both the effectiveness and efficiency of the entire project portfolio, and thus may challenge the whole parent organization. Developing methodological standards for project portfolio management is a prerequisite for the implementation of organizational learning and evasion of the same mistakes by both portfolio managers and their rank and file members. While developing standards of conduct, processing management competencies may be useful, in particular process mapping and modeling.

Conclusions

The research conducted identified a number of interesting correlations between project portfolio risks. Analysis of values of Spearman's rank correlation coefficients for risk pairs identified for a project portfolio (listed in Tables 3a, 3b, 3c, 3d) yielded correlations from the range between 0.4-0.59 (moderate) and 0.6-0.79 (strong). 0.69 was the peak level of correlation, posted between a risk significance of 3.13 (inadequate portfolio manager competence and no portfolio support structures) and a risk significance of 1.7 (lack of developed methodological standards for portfolio management). Two more correlations were identified in the strong section, that is to say: 3.16 and 1.7 correlation of 0.61, 3.11 and 1.9 correlation of 0.67. A number of correlations at a moderate level were identified in the range of 0.4-0.59, of which the most interesting correlation was found between the risk 1.4 (improperly defined priorities for particular portfolio elements) and the risk of 2.7 (incorrect portfolio balance) of 0.49, correlation between a risk of 3.4 (no coordination of involvement of key resources in the portfolio) and of 1.9 (conflicts between project and program managers within the portfolio) of 0.52.

The research conducted yielded an answer to the research question PB1, that is to say, it demonstrated project portfolio risks which are either strongly or moderately correlated with one another. This finding warrants a better understanding of the correlations between risks in the project portfolio.

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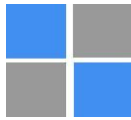


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Appendix 1. Correlation tables for the project portfolio risks

Table 3a

Correlation coefficients for rating the significance of individual risks from the component risk and structural risk categories

	1.1.	1.2.	1.3.	1.4	1.5.	1.6.	1.7.	1.8.	1.9 .	1.10.	1.11.	1.12.
1.1.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1.2	0.3415*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1.3	0.0746	0.2455*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1.4.	0.4805*	0.3270*	0.3196*	NA	NA	NA	NA	NA	NA	NA	NA	NA
1.5.	0.1084	0.2796*	0.2471*	0.2097	NA	NA	NA	NA	NA	NA	NA	NA
1.6 .	0.1001	0.3473*	0.3525*	0.197	0.4072*	NA	NA	NA	NA	NA	NA	NA
1.7.	0.2648*	0.2561*	0.2149	0.2913*	0.3498*	0.3320*	NA	NA	NA	NA	NA	NA
1.8.	0.3201*	0.4060*	0.2669*	0.3949*	0.3403*	0.4406*	0.4231*	NA	NA	NA	NA	NA
1.9.	0.2188	0.3899*	0.259*	0.3254*	0.4270*	0.3577*	0.4575*	0.3623*	NA	NA	NA	NA
1.10.	0.2386*	0.3714*	0.1481	0.2554*	0.4027*	0.4397*	0.5720*	0.4757*	0.4698*	NA	NA	NA
1.11.	0.0572	0.1538	0.1375	0.05	0.2949*	0.3641*	0.2358*	0.0183	0.2035	0.3328*	NA	NA
1.12.	0.1941	0.2796*	0.0528	0.1247	0.3065*	0.3223*	0.3600*	0.2347*	0.4385*	0.3324*	0.2963*	NA
2.1.	0.1932	0.3397*	0.3695*	0.2294	0.2885*	0.2588*	0.2226	0.1893	0.1903	0.2762*	0.0692	0.1675
2.2.	0.437*	0.2740*	0.1016	0.4159*	0.3001*	0.108	0.2842*	0.2953*	0.4351*	0.2903*	0.0386	0.4253*
2.3.	0.309*	0.3694*	0.0805	0.3398*	0.3358*	0.3857*	0.5140*	0.3891*	0.3632*	0.5261*	0.3232*	0.2333*
2.4.	0.2227	0.1634	-0.1642	0.141	-0.0813	-0.1054	0.2671*	0.1756	0.1064	0.2686*	-0.0208	0.2643*
2.5	0.1710	0.2779*	0.3035*	0.2643*	0.1846	0.2261	0.2990*	0.1606	0.3264*	0.2644*	0.0411	0.3322*
2.6.	0.1630	0.2464*	0.4658*	0.4376*	0.1560	0.2965*	0.2973*	0.2669*	0.1254	0.4132*	0.1879	-0.0044
2.7.	0.1464	0.1055	0.2856*	0.4886*	0.2380*	0.3176*	0.1380	0.2823*	0.2323*	0.1599	0.0855	0.3460*

Source: own studies

* risks which feature statistically significant differences ($p < 0.05$)



Table 3b

Correlation coefficients for rating the significance of individual risks from the structural risk and overall risk categories

	2.1.	2.2.	2.3.	2.4.	2.5.	2.6.	2.7.
2.1.	NA	NA	NA	NA	NA	NA	NA
2.2.	0.1297	NA	NA	NA	NA	NA	NA
2.3.	0.1915	0.3264*	NA	NA	NA	NA	NA
2.4.	-0.023	0.3762*	0.3046*	NA	NA	NA	NA
2.5.	0.3834*	0.3198*	0.3352*	0.2133	NA	NA	NA
2.6.	0.1530	0.1842	0.2647*	0.0909	0.2878*	NA	NA
2.7.	0.2446*	0.2458*	0.1121	0.0461	0.0983	0.2164	NA
3.1.	0.3847*	0.2772*	0.1835	-0.0868	0.2401*	0.2231	0.2609*
3.2.	0.3502*	0.2452*	0.3993*	0.1837	0.3453*	0.2348*	0.1559
3.3.	0.3936*	0.3163*	0.1883	0.1456	0.3071*	0.0519	0.1588
3.4.	0.3712*	0.3729*	0.3870*	0.2644*	0.2917*	0.0923	0.2041
3.5.	0.1840	0.4354*	0.2692*	0.2757*	0.3173*	0.011	0.0411
3.6.	0.2361*	0.2447*	0.1189	0.0466	0.3169*	0.0072	0.1931
3.7.	0.0438	0.1306	0.2479*	0.1157	0.2720*	0.0381	0.0168
3.8.	0.1740	0.1442	0.2204	0.137	0.3613*	0.2218	0.1513
3.9.	0.1794	0.1444	0.4911*	0.138	0.3365*	0.5341*	0.1819
3.10.	0.1883	0.1975	0.4734*	0.1213	0.3650*	0.2545*	0.1795
3.11.	0.1928	0.5072*	0.4609*	0.1812	0.2407*	0.2236	0.2493*
3.12.	0.1142	0.0713	0.0816	-0.0981	0.0953	0.0953	0.2693*
3.13.	0.1375	0.3459*	0.5093*	0.2837*	0.3760*	0.3506*	0.2209
3.14.	0.3697*	0.2810*	0.4119*	0.1251	0.3737*	0.191	0.1901
3.15.	0.1593	0.2861*	0.3285*	0.3070*	0.2742*	0.1402	-0.0558
3.16.	0.1997	0.2550*	0.5768*	0.2413*	0.2190	0.2600*	0.3114*
3.17.	0.1761	0.165	0.3187*	0.1051	0.1630	0.1605	0.1939

Source: own studies

* risks which feature statistically significant differences ($p < 0.05$)



Table 3c

Correlation coefficients for rating the significance of individual risks from the component risk and overall risk categories

	1.1	1.2.	1.3	1.4 .	1.5.	1.6 .	1.7.	1.8.	1.9.	1.10.	1.11.	1.12.
3.1.	0.1577	0.3255*	0.4782*	0.1895	0.5772*	0.5069*	0.2657*	0.3073*	0.3219*	0.2539*	0.2128	0.2815*
3.2.	0.2220	0.3237*	0.0969	0.1966	0.3506*	0.3116*	0.5066*	0.2948*	0.3049*	0.4953*	0.3079*	0.4020*
3.3.	0.1868	0.3976*	0.1957	0.2825*	0.3037*	0.0883	0.145	0.2151	0.1973	0.1639	0.1108	0.1349
3.4.	0.2613*	0.2617*	0.1964	0.3802*	0.3179*	0.2762*	0.2558*	0.2594*	0.5212*	0.3662*	0.1066	0.2866*
3.5.	0.3361*	0.2044	-0.1034	0.2135	0.2896*	0.023	0.2123	0.1853	0.3358*	0.1891	-0.0465	0.2311*
3.6.	0.1697	0.1619	-0.0271	0.1709	0.2367*	0.1272	0.1326	0.1716	0.2472*	0.1023	-0.0079	0.0931
3.7.	0.1642	0.0743	-0.1091	0.1135	0.3022*	0.1044	0.4200*	0.2633*	0.1638	0.2555*	0.1218	0.0508
3.8.	0.1150	0.1006	0.1549	0.2238	0.319*	0.2308*	0.2875*	0.1524	0.2505*	0.4162*	0.2059	0.1991
3.9.	0.2692*	0.4041*	0.3527*	0.4163*	0.2717*	0.3669*	0.2629*	0.4249*	0.3032*	0.4604*	0.3042*	0.0673
3.10.	0.2536*	0.3786*	0.2047	0.4097*	0.1348	0.2378*	0.2745*	0.1423	0.3346*	0.3879*	0.0884	0.2197
3.11.	0.2953*	0.3130	0.1334	0.3666*	0.3354*	0.3576*	0.4607*	0.2960*	0.6728*	0.5517*	0.2241	0.2774*
3.12.	0.0464	0.1689	0.3558*	0.2007	0.2033	0.3396*	0.0649	0.2862*	0.1655	0.1443	0.2553*	0.0856
3.13.	0.2691*	0.3042*	0.2248	0.3077*	0.2694*	0.4195*	0.6914*	0.4636*	0.3206*	0.5486*	0.2837*	0.4003*
3.14.	0.1989	0.2226	0.1327	0.2557*	0.2789*	0.2627*	0.3912*	0.3108*	0.2834*	0.4348*	0.0690	0.5072*
3.15.	0.3918*	0.4752*	0.0033	0.1724	0.2695*	0.0510	0.2645*	0.1211	0.2889*	0.3405*	0.1552	0.2156
3.16.	0.3142*	0.394*	0.2399*	0.3664*	0.389*	0.4151*	0.6153*	0.5594*	0.4466*	0.4836*	0.2179	0.2438*
3.17.	0.2546*	0.2241	0.2709*	0.1936	0.2469*	0.2536*	0.4278*	0.2334*	0.2252	0.3051*	0.3140*	0.3587*

Source: own studies

* risks which feature statistically significant differences ($p < 0.05$)



Table 3d

Correlation coefficients for rating the significance of individual risks from the overall risk category

	3.1.	3.2.	3.3.	3.4.	3.5.	3.6.	3.7.	3.8.	3.9.	3.10.	3.11.	3.12.	3.13.	3.14.	3.15.	3.16.	3.17.
3.1.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.2.	0.2382*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.3.	0.1021	0.5286*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.4.	0.2052	0.3038*	0.3423*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.5.	0.1919	0.3492*	0.2777*	0.3612*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.6.	0.0427	0.0851	0.2786*	0.0229	0.2734*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.7.	0.1210	0.3241*	0.2787*	0.0555	0.3544*	0.4934*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.8.	0.2074	0.3309*	0.2196	0.1809	0.3269*	0.3572*	0.4643*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.9.	0.2186	0.3434*	0.2953*	0.2562*	0.2874*	0.2576*	0.2505*	0.3950*	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.10.	0.0872	0.2543*	0.2689*	0.3899*	0.1599	0.1518	0.0266	0.2663*	0.5173*	NA	NA	NA	NA	NA	NA	NA	NA
3.11.	0.2640*	0.2433*	0.2050	0.5041*	0.3160*	0.1650	0.2791*	0.1676	0.3928*	0.4601*	NA	NA	NA	NA	NA	NA	NA
3.12.	0.3349*	0.0379	0.2715*	0.0897	0.0679	0.2155	0.1259	0.2035	0.2243	0.1136	0.0881	NA	NA	NA	NA	NA	NA
3.13.	0.2836*	0.3738*	0.1516	0.2439*	0.0648	0.1159	0.3075*	0.2760*	0.3160*	0.2701*	0.5013*	0.1646	NA	NA	NA	NA	NA
3.14.	0.2613*	0.5074*	0.1509	0.2847*	0.3287*	0.1779	0.2364*	0.3008*	0.2461*	0.301*	0.1864	0.0250	0.3983*	NA	NA	NA	NA
3.15.	0.1773	0.1916	0.1229	0.1577	0.4302*	0.1852	0.2408*	0.3144*	0.4033*	0.3016*	0.3366*	-0.0480	0.3007*	0.3780*	NA	NA	NA
3.16.	0.3298*	0.4029*	0.1554	0.3487*	0.2871*	0.2613*	0.4503*	0.2677*	0.5038*	0.3772*	0.5303*	0.1732	0.5859*	0.3920*	0.3388*	NA	NA
3.17.	0.3870*	0.3612*	0.0293	-0.0403	0.2247	0.2354*	0.2196	0.2892*	0.3682*	0.2126	0.1709	0.0944	0.2903*	0.4631*	0.4015*	0.4557*	NA

Source: own studies

* risks which feature statistically significant differences ($p < 0.05$)



CRITICAL SUCCESS FACTORS OF DEFENCE EQUIPMENT PROJECTS

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Abstract

The objective of this study is to define the critical success factors of defence equipment projects in Finnish Defence Forces. The main critical success factors are identified in the literature and empirical data is collected by conducting interviews. Therefore, the critical success factors are determined by theory, SWOT-analysis and findings of the interview process.

The results of this study show that the most important critical success factors of defence equipment projects are the following: personnel involved in the project, flexible working environment, well-defined project demands, detailed and updated project plans, documentation, a good project manager, realistic and clear objectives and support from superiors, sufficient resources and efficient use of resources.

Key words: *critical success factors, success criteria, project, defence.*

JEL code: L30

Introduction

Since the 1960s, researchers have been trying to identify which factors lead to project failure or success (Cooke-Davies 2002). Most of the literature has focused on the private sector, whereas studies on the public sector have been limited. Identifying and examining a project's success factors is important for the evaluation and effectiveness of different projects in the private and public sectors (Neilomo & Uusi-Rauva 2005).

Since the 1980s, the public sector has used various measurements of performance regarding organisations and projects. The reason behind this was the need for reduction in project expenses and increase in quantity and quality of services (Arnaboldi et al. 2004). Since the end of the cold war, the European Defence Forces have been changing compared to other departments of the public sector. The defence budgets have been declining and the recent era of austerity together with the unrest in Ukraine have not changed this trend (Lehtonen & Isojärvi 2015). Finland has launched the biggest defence equipment project that will replace the F/A-18 Hornet multirole combat aircraft in the next decade. Likewise, the Finnish Navy has started a project named "Fleet 2020" that will include four new frigates. The estimated cost of these two defence projects is 7-11 billion euros. Consequently, the defence equipment projects can worth billions of euros; therefore successful management is the key for delivering efficient and cost-effective projects, especially when budgets are declining but performance demands are increasing. The defence equipment projects' success is crucial in an era of decreasing budgets, where nations and governments carefully decide on the allocation of financial resources.

Objectives

This paper focuses on the critical success factors of the Finnish Defence Forces' equipment projects. Identifying a project's critical success factors is vital for the understanding of why defence equipment projects may fail or succeed. The critical success factors are also important for the management of project-related performance. Effective management depends on the comprehension of these fundamental factors that can be responsible for the success or failure of a project. The main research question is: which are the critical success factors of the

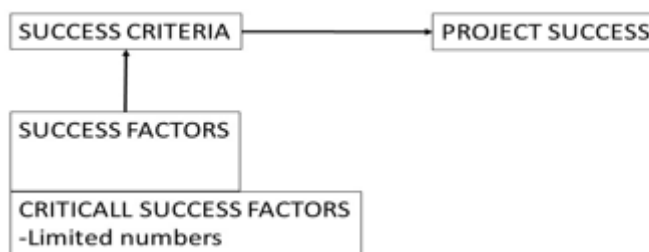


Finnish Defence Forces' equipment projects? The secondary research questions are: 1) which factors of equipment projects lead to failure or success? 2) What is the overall situation of the defence equipment projects?

Critical success factors

Early research on the success criteria suggests that the main success factors are based on the so-called 'iron triangle or golden triangle of time, cost and quality' (Atkinson 1999; Westerveld 2003). However, more recently, researchers have found that a project's success is far more complex. There are more potential factors that can be identified. Project management research indicates that it is impossible to have a universal checklist of success criteria. Success factors will be variable in every project (Westerveld 2003; Wateridge 1998). Each project has a number of variables and each project is unique.

There is often some confusion in relation to the terms: *success criteria*, *success factors* and *critical success factors*. *Success criteria* are used to measure the success, whilst *success factors* are the set of circumstances or facts that contribute to a project's outcome. Success factors are the influential forces responsible for failure or success. *Critical success factors* are part of the success factors (Belassi & Tukel 1996). The number of critical success factors should be limited (Fortune & White 2006). Critical success factors include various areas where good performance and skilled management are necessary to ensure the achievement of a project's goals (Fortune & White 2006).



Source: author's construction based on literature (Lim & Mohamed 1999 and Belassi & Tukel 1996).

Figure 1. Modified presentation of critical success factors, success factors and success criteria.

There is a long tradition of measuring and observing financial success factors such as profitability and cost. However, some studies on critical factors have also identified several non-financial aspects (Kaplan & Norton 1996; Neely et al. 2000; Toivanen 2001). Many of these critical factors are tangible and physical, like amounts and volumes, whereas non-financial factors like employee satisfaction, a skilled manager and support from superiors can be described as intangible and non-physical (Lönqvist 2004). The literature on project management and success, such as success factors and critical success factors is extensive. Fortune and White



(2004) identified 63 publications on critical success factors and outlined 27 different critical success factors in their research. Other scholars found 10 different critical success factors (Wateridge 1998), whereas Pinto & Slevin (1989) identified 12 and Gunathilaka et al. (2013) 21 critical success factors.

Table 1.

Critical success factors in literature			
Fortune and White 2004*	Wateridge 1998	Pinto and Slevin 1989	Gunathilaka 2013*
Support from senior management	Meets user requirements	Top management support	Effective project team formation
Clear realistic objectives	Achieves purpose	Client consultation	Effective communication
Strong/detailed plan kept up to date	Meets time	Personnel recruitment	Top management support
Good communication/feedback	Meets budget	Technical tasks	Allocation of sufficient resources
User involvement	Meets quality	Client acceptance	Clearly defined goals and objectives
Skilled/suitable qualified team	Happy users	Monitoring and feedback	The level of technology
Effective change management	Commercial success	Communication	Financial stability & adequate funding
Competent project manager	Happy sponsor	Trouble-shooting	Projects manager competence
Sound basis for project	Happy team	Characteristics of the project leader	Project monitor and feedback
Well allocated resources	Others	Power and politics	Motivation and incentives
Good leadership		Environment events	Established budget and monitoring
Realistic schedule		Urgency	Clients consultation and involvement

*12 most common critical success factors

Source: Author construction

Methods

In-depth interviews of participants who have worked in different levels of defence equipment projects were conducted. All twelve interviews were representative of the Finnish Defence Forces. Seven of the participants were working as project officers on three different equipment projects. These project officers were using at least 50% of their overall work time on equipment projects. Some of them were having 80 days of annual traveling associated with equipment projects. Five participants were either managers or project owners. Project managers and owners were using 70% of their work time on projects. Interviews were conducted during the summer of 2006. Due to the Finnish Defence Forces security rules, the interviews and results could not be published earlier. Likewise, due to confidentiality, the names or positions of the respondents were anonymised. The interviews were semi-structured and this enabled the



interviewer to pursue interesting comments and themes as they emerged during the interview. All interviews were recorded, transcripts were coded and then analysed.

Results

The data derived from the interviews contributed to the formulation of the SWOT matrix. SWOT is an acronym for “Strengths, Weaknesses, Opportunities and Threats.” The purpose of the SWOT matrix is to gather, analyze and evaluate information (Piercy, N. & Giles, W. 1989). A matrix, in this paper, is produced in order to get a better understanding of the overall situation of defence equipment projects in Finnish Defence Forces.

Table 2

SWOT matrix of defence equipment projects

<p style="text-align: center;">Strengths</p> <ul style="list-style-type: none"> Commitment of personnel Limited key personnel Mutual understanding of project goals Capable project manager Meaningful project Operational user requirements Project group cohesion Freedom of work 	<p style="text-align: center;">Weaknesses</p> <ul style="list-style-type: none"> Schedule Purchasing a product in an “under development” phase Funding Email management Unrealistic expectations Project manager becomes negotiator
<p style="text-align: center;">Opportunities</p> <ul style="list-style-type: none"> Co-operation with participants Organizational support (defence forces) Recognized risks Fast and solid decisions Improved working technics 	<p style="text-align: center;">Threats</p> <ul style="list-style-type: none"> Project does not fulfil the requirements Change of requirements Change of funding Changing personnel Political guidance Collaboration among team members

Source: Author construction

Several interviewees mentioned that the operational user requirements and the successful definition of demands were vital factors of a projects’ success. In practice this means that the operational user is taking part in field tests where requirements and demands can be identified, discussed and improved. Additionally, the involvement of limited key personnel was thought more appropriate for flexible project management and less bureaucracy. According to the interviewees this contributed to a better project performance. Participants considered defence equipment projects as an opportunity to improve both individual and team level project-related techniques and processes. The reason was that the nature of defence projects is distinctive and pre-existing success factors need to adapt to new projects. According to the interviewees the main limitations were restricted resources and time requirements. In particular, due to limited resources, in some cases it is not possible to conduct all the steps of the assessment process. Consequently, the project may not fulfil all the necessary requirements. Likewise, in relation to time, in some cases a product is bought prematurely. This may result in operational problems that may hamper the performance of its operational use and therefore it may not be suitable for



future operational tasks. In some other cases, the main cause of failure is the fluctuating requirements during the formulation of a project.

Another factor that emerged during the interview process was political agenda. Political agenda may favour the selection of certain products over others, for example due to budget limitations in public spending, even if they do not meet all the necessary criteria. This was an interesting finding that has not been frequently identified in the prevailing literature (Pinto and Slevin, 1989; Morris and Hugh, 1986). This could be due to the fact that it is a characteristic of defence equipment and public projects.

Table 3.

Success and failure of defence equipment projects

Successful equipment project	Failed equipment project
Balanced financial resources Realistic user requirements Good project management Good co-operation among project officers and clear responsibilities Core project group with personal responsibilities Documentation Clear and realistic schedule Identified risks and preparation Updated project plans Meaningful project Systematic project evaluation and guidance	Alternating project officers Too many experts in a project group Political guidance Not using official documents for management Inflexible project management Bureaucracy Lack of support from superiors Project officer's passive working attitude Project not fulfilling operational user requirements Schedule and budget determine the project

Source: Author construction

Several participants suggested that a balanced budget and a tailored timetable are necessary elements for the successful completion of a project. Lack of time and budget limitations can cause a tenuous testing phase, whereas a frequent turnover of personnel, such as project officers and project managers, can delay the completion of a project. Likewise, a large project team can cause further delays due to the lack of necessary progress. A skilled project manager with leadership and management skills is important in creating a productive atmosphere with well-defined responsibilities. During the interviews, project managers and owners also mentioned email management. In practice this means that management is done by emails instead of official documents. If people change work, the project team cannot have access to individual email accounts that contain information on work orders or project-related documentation. This can cause difficulties in relation to information management as important information may be lost or delayed.

A framework of critical success factors of defence equipment projects

This section outlines a framework of critical success factors derived from the literature. These factors correspond to the findings of the interviews and offer further insights of success factors in relation to defence equipment projects. In the previous section the SWOT-matrix identified various potential success or failure factors. In this framework, the aim is to outline the most important critical success factors. Therefore, ten critical success factors are chosen. These



are divided into four different categories: project team, quality performance, leadership and resources (Figure 2).

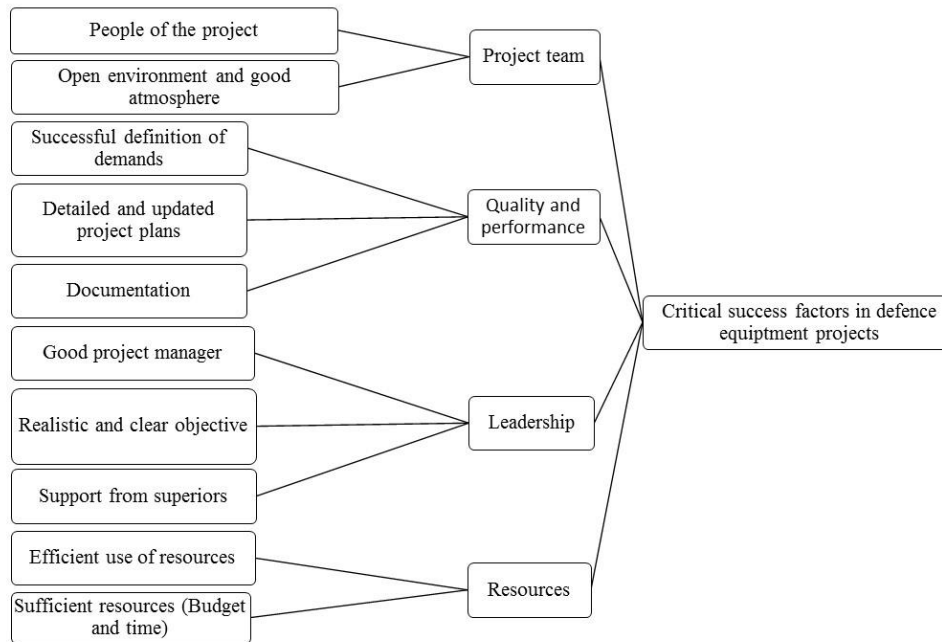


Figure 2. Critical success factors of defence equipment projects

Source: Author construction

For example, the project team is the category responsible for the completion of a project. Sink (1985) refers to the quality of the working environment as the main determining factor of a company’s performance, whereas Belassi and Tukul (1996) together with other scholars (Lönnqvist 2004; Fortune & White 2005; Collins & Baccarini 2004) recognize that a team’s performance determines a project’s success or failure. Every participant in the interview process has identified the importance of the project team within a good working environment. Furthermore, well-defined project demands together with detailed and updated project planning and documentation are important elements of the quality and performance category (Sink 1985, Fortune & White 2004 and Cooke-Davies 2002). The successful identification of project-related demands is in line with the customer needs, since the main objective of every project is to satisfy the requirements of the customer (Pinto & Slevin 1989; Fortune & White 2005; Lönnqvist 2004). In terms of leadership, identifying realistic goals (Lönnqvist 2004), having support from superiors and high-level project performance are recognized as factors of success (Fortune & White 2004; Collins et al 2004; Belassi & Tukul 1996). Finally, the resources category is divided into sufficient resources (time and money) and efficient use of resources, which are well documented in project management studies (Kaplan & Norton 1996; Atkinson 1999; Wateridge 1998; Fortune and White 2005).



Conclusions

This study, conducted in 2006, examined the critical success factors of Finnish Defence Forces' equipment projects. The qualitative findings derived from the participation of project officers, project managers and project owners indicate that factors such as: project personnel, open working environment with good atmosphere, a successful definition of demands, detailed and updated project plans, documentation, a good project manager, realistic and clear objectives, support from superiors, efficient use of resources and sufficient resources are critical success factors of defence equipment projects. Critical success factors can be divided into four main categories: project team, quality and performance, leadership and resources.

The overall situation of equipment projects in Finnish Defence Forces is satisfactory. The main strengths of these projects are intangible like project team cohesion and commitment, whereas the main weaknesses are tangible like budget and schedule. Potential improvements are primarily intangible like co-operation among the team members and improvement of work-related technics. Possible threats to success are both tangible and intangible. Possible threats involve a change in budget and project requirements as well as frequent personnel turnover together with intervention of third parties.

In conclusion, future research should develop the reported findings into a more sophisticated model adapted to defence equipment projects. Furthermore, a ten year follow-up study could explore the current situation of Finnish Defence Forces' equipment projects. Finally, additional studies need to focus on the assessment and improvement of the performance of defence equipment projects.

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MANAGEMENT OF CREATIVE PROJECTS – CHALLENGES AND PARADOXES

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Abstract

Nowadays, the importance of creativity for social and economic development, including the development of individuals, organizations as well as sectors or regions, is taken for granted. So called creative industries (e.g. media, advertisement, video-games), seem to play more and more important role in the development of the economy (Banks et al., 2002; Seidel, 2011). What is to be underlined, all these creative industries are project-oriented as projects are the main way of carrying on the activities of enterprises (Simon, 2006; DeFillipi et al., 2007). Moreover, in traditional project-oriented industries, such as construction or IT, the growing expectations as to the novelty and originality of products and management processes seem to increase the interests in creativity of employees and teams (Dawson & Andriopoulos, 2014).

The aim of this paper is to discuss the significance of the creativity in contemporary project management and to indicate the challenges and paradoxes rising from creative ideas and actions. On the basis of literature review the main attributes of creative projects will be demonstrated. In the next part, the most important pressures, challenges and paradoxes of creative project will be presented and discussed.

Key words: *project management, creativity, paradoxes*

JEL code: M10

Introduction

Although the creativity of an individual or an organization has started to attract attention of the scientists in the beginning of the twentieth century, it seems to be accurate to underline that recently in the management research this interest has been developed into a remarkable phenomenon. Inquiries on creativity, typical for philosophy or psychology, have become the domain of the researchers in the field of management, and consequently, in a vast number of papers, creativity is demonstrated and analyzed as a source of the growth and success of contemporary enterprises, a key for improving the work environment, and as the basis of R&D and innovativeness (Oldham & Cummings, 1996; Amabile, 1996; Dawson & Andriopoulos, 2014). Moreover, it is noted that creative sectors, such as fashion, advertising, media or computer games, influence in more and more important way the economy of many countries (Banks et al., 2002; Seidel, 2011; Florida, 2005). Their share in the gross domestic product of many European countries grows constantly, resulting in the efforts of many governments to offer the conditions supporting the development of such industries. However, it should be emphasized that a huge diversity in the scope of research on creativity could be observed – the levels of concern include individual and organizational creativity, the creative projects and teams, as well as creative classes, cities, regions or sectors.

Unquestionably, project management does not remain indifferent to the matter of creativity: its significance, sources or paradoxes (Kozarkiewicz, 2016). A project – by its definition – consists in creating the unique product or service. Thus, it results in the lack of the routine and repetitiveness, but in the search of new, original ideas instead. The creative sectors are project-oriented; they carry out their activities through projects. What is equally important, in traditional project industries, such as construction industry, more and more expectations



appear in relation to the originality and the innovation, both with the reference to applied technologies or offered products, as well as management processes. It might be stated, consequently, that the management of creative projects constitutes nowadays a meaningful and current research topic.

This article should be regarded as a voice in the discussion described above. The aim of this paper is to make a contribution to the knowledge on creative project by exploiting simultaneously pressures, challenges and paradoxes related to the peculiarity of managing such projects. The paper is structured as follows. After a brief introduction, in the first part of the paper, the characteristics of creative projects are delineated concisely. Thereafter, on the basis of existing literature, the results of the analysis of diverse contingencies, especially the pressures for managers, are demonstrated. These pressures, for example new technological solutions or customers' expectations, might be considered as the drivers of creativity. Some other pressures, for example the expectations as to the financial effectiveness of the project, however, could also form barriers for creativity in projects. In the next section of the paper, the analysis of creative projects is focused around the concept of the paradox. The research investigates the primary categories of paradoxes of creative projects resulting from the ambiguous expectations towards the product, the management process, or the team composition. As research reveals, in creative projects paradoxes concerning exacting choices between art and business, product functionality or design, schedule or innovation, raise a substantial question not only for the practice of project management, but also for the scientific research focused on description and understanding the phenomenon of creativity.

What should be outlined in the introduction to this paper, the diversity of creative projects frames the complexity of issues connected with managing of such projects. Thus, the description and discussion require some simplifications, synthesis or even brachylogy. In this paper, the systematizing assumption was made deliberately—seven most important pressures, challenges and paradoxes were identified.

Creative projects and their categories

Indisputably, when defining the concept of creative project it would be impossible to omit even short discussion about the understanding of the term 'creativity' and delineating the contexts of some definitions.

In the literature, the existence of many explanations of creativity is being emphasized. The most repeated and quoted definition of creativity is the one introduced by Amabile (1996): creativity is the production of ideas and outcomes that are both novel and appropriate for the goal. Numerous authors pointed at two basic features of the creativity: the originality of solutions and their effectiveness in the sense of the efficiency and influence. Creativity is defined from a perspective of creating the positive effect (Amabile, 1996; Suh & Shin, 2008), and such attributes as originality and lateral thinking, novelty, innovation, exploration, experimentation and the imagination are repeated (Dawson & Andriopoulos, 2014). Moreover, defining creativity refers to the realms such as intuition or self-expression (Banks et al., 2002). The attention is being drawn to the potential and mental abilities (Whitfield, 1975), processes (mental) involving emotions, especially focused on the original and innovative results (Drazin et al., 1999), as well as the ingenuity and the originality of thinking, noticing and creating new involvements and associations, the openness to the new experiences (Weick, 1979). As a



consequence of such approving approach and the positive view of creativity, in many research papers creativity is presented as a source of growth and success of contemporary enterprises (Oldham & Cummings, 1996). Creativity is not only a key for improvements in the workplace, but also is described as one of the crucial resources of the organization (Dawson & Andriopoulos, 2014); it is the basis for research and development activities as well as for new products or technological and organizational innovations (Politis, 2005; Napier & Nilson, 2006).

However, what should be also underlined, nowadays researchers notice not only the advantages, but also weaknesses of creativity. It is argued that the relations between creativity and the effectiveness, competitive advantage or market success are not based on straight cause-and-effect relationships. It is pointed out that creativity might be the source of chaos, conflicts, frustration and rebellion, or perhaps even promotes some actions against organizational norms (Prichard, 2002; Sundgren & Styhre, 2003; Blomberg, 2014). From the company's perspective, creativity and flexibility could be seen as the sources of effectiveness, as well as the causes of costs and risk.

In spite of the ambiguity and controversy over the notion and the role of creativity, the interest in creativity has impact on the field of project management—certainly it is associated with the fact that new, creative or high-tech sectors are more explicitly project-oriented; in so-called traditional sectors, both the technology development and the increase of customer's expectations constitute the context for the creativity of products and processes.

The most direct way of defining a creative project is to refer to the term of creativity. Relating to the quoted definitions of creativity, it could be stated that in a creative project some new, original ideas and innovative solutions are produced, and their foundations result from the potential of project team—their creative and cognitive (mental) abilities and advantageous organizational conditions. While defining creative projects the focus could be put on characteristics of products or processes. Creative project is about creating valuable, useful, but primarily new and original products or services. And these products are outcomes of various creative processes, exploiting the improvisation and mutual comparisons of ideas by the members of a project team.

Creative projects could be also defined with the reference to the definition of creative sectors proposed by World Intellectual Property Organization or UNCTAD (*United Nations Conference on Trade and Development*). Creative projects include those creating products or services which require contribution of human creativity and from customer's perspective, are mediums of symbolic value, including for instance, intellectual property and are based on knowledge and orientated (not exclusively) on art. Moreover, creative projects are also conducted in various sectors such as advertising, architecture, art, design, fashion, film, music, publishing, computer games or software. Projects which are implemented by enterprises of indicated sectors, in the majority are creative projects although the remaining problem concerns both the affiliation in the creative sector and its limits, as well as the degree of repetitiveness of defined actions taken in these sectors.

A better understanding of the concept of creative projects could be achieved and communicated by the attempt of their categorization. At first, two most important categories of creative projects are:

- projects in creative sectors (e.g. in media, computer games production),
- creative projects in traditional sectors (e.g. in construction, consulting).



Next, as a part of further categorization it is possible to suggest the division of creative projects depending on roots of required creativity:

- projects in which the creativity is being determined through external factors (e.g. technology development),
- projects in which the creativity is being determined through internal sources (e.g. creative attitudes and new ideas of executives).

Other possible proposition of creative project's categorization is the classification based on the level of required creativity: requiring the considerable originality or relying on the previous experience.

The literature review allows to indicate some specific categories of creative projects. The peculiar categories are:

- market-based project MBP, typical for recording industry or film production, which are based upon contracts, external resources, freelancers, relationships networks and frequently on the specific geographical location (Lorenzen & Fredriksen, 2005),
- Large Scale Creative Collaborations, LSCC (Adler & Chen, 2011), comprehensive, complex projects implemented by a number of independent units, covering a number of interrelated sub-projects, (e.g. in airline industry, medicine-creating new medicines) or in large film productions.

The variety of creative projects, as demonstrated above, causes the multidimensionality of research and complexity of managing such projects. Only taking into consideration unavoidable assumptions and simplifications, it is possible to explore the subject as well as to create a synthesis and to indicate some general properties of processes of managing such projects. As it was recalled earlier, some systematic simplifications were intentionally assumed, as seven major pressures, challenges and paradoxes were deliberately identified in the next part of this paper.

Seven pressures in managing creative projects

From the perspective of the debates around creative projects, the question about the sources of creativity appears to be one of the significant. What factors do determine the creativity of the project and its level? Which of these conditions, relating to individuals, team or the entire organization should be considered as essential? Or even more: which do have the greatest positive and negative impact?

It is commonly accepted that the pressures on creativity are two-sided—internal and external. Actions and attitudes of the customer or the development of new technologies are changing the requirements or characteristics of the products. Similarly important are the internal pressures that arise from the attitudes of the project team members or their need for experimentation and creative actions. In terms of outcomes, external and internal pressures could not only stimulate the project team to increase their creativity, but might create barriers or more passive and conservative attitudes.

The literature review (e.g. Lorenzen & Fredriksen, 2005; Simon, 2006; Sundstrom & Zika-Viktorsson, 2009) and the results of the previous authors' analyzes indicate that seven major drivers of creativity (positive pressures) in projects include the following characteristics and conditions:



- 1) art constituting the essence of the project (e.g. composing music under the creative inspiration of the artist, irrespective of the expectations of the audience or the director);
- 2) product per se (e.g. creating new, original product such as piece of art, marketing product, a book, or a computer game);
- 3) innovation and technological development (e.g. products of new technology, such as e-medical systems which are combining IT and the medical knowledge);
- 4) time or other limited resources enforcing the usage of new solutions, possible with the existing restrictions;
- 5) the principles of management, employee's autonomy, empowerment and the independence in actions;
- 6) participants in the project team, their potential, attitude, their need for freedom of actions, creativity and originality of thought, new options and solutions;
- 7) customer expectations for aesthetics, functionality, application of new technological solutions, etc.

In a similar manner, the analysis of negative pressures could be completed, i.e. the factors and conditions that limit the creativity of the team can be listed. By identifying seven major negative pressures, the following remarks are to be pointed out:

- 1) financial orientation, expectations as to the financial efficiency of the project, profit (margin), the objectives of creating value for shareholders;
- 2) client and his expectations for the financial effectiveness, restrictions imposed not only about the budget, but also to the product (e.g. the usage of the technology which is already known for client);
- 3) repeatability concerning the similarity of technology, design, functionality, etc., leading to the homogeneity of groups and taken actions;
- 4) formalization, rigidity of structures and management systems, top-down imposition of specific solutions concerning not only organizational matters, but also the project team composition, etc.;
- 5) supervision and control of actions and effects, imposing specific solutions as a response to the expectations of controllers;
- 6) risk aversion and, as a result, restrictions in experimentation and in search for innovative solutions;
- 7) continuity, regularity of actions, the focus on the exploitation of knowledge, experience, resources and ideas that have already been approved by other customers.

As it was discussed above, there is compatibility between factors causing the pressures—both the drivers and the limits of creativity. The activities conducted under these different pressures causes peculiar challenges for managing creative projects.

Seven challenges in managing creative projects

The complexity of the management of creative projects affects many challenges, i.e. questions or problems, which have to be solved; the difficulties and obstacles managers have to cope with, as well as confusions and dilemmas that require appropriate decisions. The literature review, analysis of topics of the research undertaken, as well as author's observations allowed to formulate seven key areas which present challenges for managing creative projects (Table 1).



Table 1

Seven challenges in the management of creative project

No.	Challenges	Characteristics	References
1.	The process of the management of creative projects	The required flexibility in the engaged activities and gathered resources due to the lack of predictability and the possibility of scheduling a number of activities based on creativity; the necessity for experimentation and prototyping, associated with the inability to characterize the product design (e.g. a piece of music); the need for acceptance of the attitudes of creative people, whose creativity goes simultaneously for instance with the lack of acceptance of the principles of cooperation; the necessity to combine different personalities, routine activities and creativity, efficiency and innovation, schedule and artistic license, etc.	Simon (2006), Sundstrom& Zika-Viktorsson (2009), Seidel (2011)
2.	Project management methodology	The lack of or the limited possibility of applying well-known project management methodologies (e.g. in culture or entertainment).	Hartman et al. (1998)
3.	Experimentation	As the basis for project implementation and product development, for example in music projects or graphic design, etc.; a response to the inability to formulate clear expectations of the client or the project manager (or supervisors).	Banks et al. (2002), Perretti& Negro (2007)
4.	Leadership (roles and competences of project managers)	Management of creative projects requires a common understanding; identifying and supporting individual creative talents and predispositions; creating various inspiring challenges for project team.	Politis (2005), Simon (2006)
5.	Acquiring and developing resources and competences	Key resources are intangible in the form of the potential of people, their experience and the relationships between individuals. In a large number of creative projects (in advertising, media, computer games), the most important resources come from independent developers (freelancers), working with many organizations. Issues in managing creative individuals result from other connotations such as eccentricity, self-admiration, lack of control, etc.	Lorenzen& Fredriksen (2005), Banks et al. (2002)
6.	Performance measurement	The measurement should combine the economic efficiency, customer satisfaction and the originality or novelty of the product, which in	Adler&Chen (2011), Kozarkiewicz



		itself, constitutes the mutually excluding triad. Measuring the performance of the individual team members is also very difficult due to the dependencies (e.g. between the results of work of graphics and IT specialists) and the reciprocal inspirations of individuals. Subjectivity in the evaluation of the performance, different perception of innovative products and original are also very relevant.	(2015)
7.	Inter-organizational cooperation and relationships	The cooperation in creative sectors is particularly significant as demonstrate the established ecosystems and clusters, such as Hollywood or the Association of Italian Artists from the Turin area. The feature of the groups participating in the creative project is the creation of guilds or communities of practice (CoP), as well as the cooperation within the creative environments based on relations resulting from the necessity of continuous development and inspiration.	Grabher (2004), Bettiol& Sedita (2011)

Source: Author's construction based on the analyzed articles.

Obviously, beside the major challenges listed in the Table 1, the others could be taken into consideration, especially in the case of specific categories of projects. For instance, in the live entertainment sector or in the music sector (the organization of the concert), the time is this element of project triangle that is absolutely not negotiable and cannot be changed regardless of other considerations—the concert has to start at a set time. Similarly, different challenges arise from the role of the client—some creative projects must be implemented in accordance with the requirements of the customer (e.g. advertisement campaigns) and others (e.g. creating a new album in the music industry) are carried out without the participation of the customer, who finally, after completion of the project, makes the decision as to the compatibility of the product with his or her expectations (by buying or not buying the CD).

Moreover, one of the challenges is the need to deal with paradoxes or situations of tension resulting from the existence of two equivalent alternative decisions. This specific challenge will be presented in the next part of the paper.

Seven paradoxes of managing creative projects

As the literature review reveals the concept of paradox has been more and more often used by researchers in the field of the management. The roots of growing interest in paradoxes have been placed in the increasing complexity of processes effecting contemporary organizations (Smith & Lewis, 2011). The paradox has become an important element of research in management since the Cameron and Quinn; they saw the paradoxes as a way to get around the simplified view of reality and the ability to perceive the complexity of organizational phenomena (cf. Lewis, 2000). The review of the management literature indicates that the paradox is defined as two opposing, but related elements, that exist simultaneously and



continuously in time; they seem to be logical if they are considered separately, but irrational and inconsistent, even absurd, when they are compiled and examined together (Smith & Lewis, 2011). According to De Wit and Meyer (1999), the paradox is a situation in which two seemingly contradictory or mutually exclusive solutions turns out to be correct at the same time. The problem that is seen as a paradox has no real solution, because there is no logical possibility of merging the two opposites in a consistent, unambiguous manner. According to many authors (e.g. Smith & Lewis, 2011), paradox is a response to the tensions arising in situations of coexisting alternatives and possible solutions which are at the opposite edges: cooperate or compete, work individually or in teams, provide organizational flexibility or the productivity processes. It is important to note that the multiplicity of paradigms in management leads to the lack of unity of views in the study of paradoxes, as to whether paradoxes are an inherent feature of the organization or rather they are socially constructed.

The managers of creative project have to confront a number of confusions associated with the possibilities of extreme decisions–situations, when the alternative choices lead to solutions that do not have a clear advantage. Firstly, they result from the characteristics of the project: the teamwork (collectively or individually), temporality of projects (project success or long-term development), implementation of inter-organizational projects (objectives of the organization or the objectives of the consortium), and the standardization of the project’s management (according to the methodology or to a new idea). Secondly, individual and team creativity might be the source of subsequent paradoxes: the effectiveness of creative activities (new design or costs), innovation (original or based on previous solutions) and motivation for creative work (the passion of employees or the objectives of the organization).

In Table 2, on the basis of the literature review, seven major paradoxes of creative project management are identified and presented.

Table2

Seven paradoxes of managing creative projects

No.	Paradox	Characteristics	References
1.	The objectives paradox: art vs. business	The necessity of simultaneous implementation of conflicting and equally important financial and non-financial objectives (e.g. design, aesthetics, innovation, realization of customer expectations, etc.).	DeFillipii et al. (2007), Chang&Birkett(2004), Eikof&Haunschild (2007)
2.	The project team paradox: similar vs. diversified	Achieving a high level of originality requires the diversity of the team, including the acceptance of new employees and their original ideas, while management practice prefers experienced teams, often homogeneous due to the attitudes and expectations or decisions: „new” (juvenility, experiments, originality) vs. „old” (experience, knowledge but	Andriopulous (2003), Perretti&Negro (2007)



		also the resistance against changes), „normal” vs. „eccentrics”.	
3.	The organizational ambidexterity paradox: exploration vs. exploitation	The requirement of combining exploration (seeking for new ideas, models, technologies, customers, etc.), and at the same time, efficiency resulting from the gathered experience.	DeFillipii et al. (2007)
4.	The team architecture (structure) paradox: formal vs. informal	The team’s architecture should be both "rigid", based on a formal project teams and "soft", based on informal relationships, sharing ideas and experiences, creating the so-called communities of practice.	Chang&Birkett(2004), Bettiol&Sedita(2011)
5.	The product paradox: practicality vs. aesthetics	The product of the project (e.g. IT or architectural), should combine conflicting expectations for functionality and technological innovation, aesthetics and operating costs.	DeFillipii et al. (2007), Chang&Birkett (2004)
6.	The learning paradox: collecting experience vs. risking by entering new areas	The typical paradox for mass creative production (e.g. video games). There is a need to manage the artistic expression and the originality of the product, but also the need for accumulation of knowledge and experience resulting from the fulfillment of economic expectations.	Bakker et al.(2011), Cohendet&Simon (2007)
7.	The creativity and control paradox: to control or to allow the creative freedom	Ensuring the realization of the tasks according to a plan, but at the same time, not reducing the required creative freedom of team members.	Adler & Chen (2011)

Source: Author’s construction based on the analyzed articles.

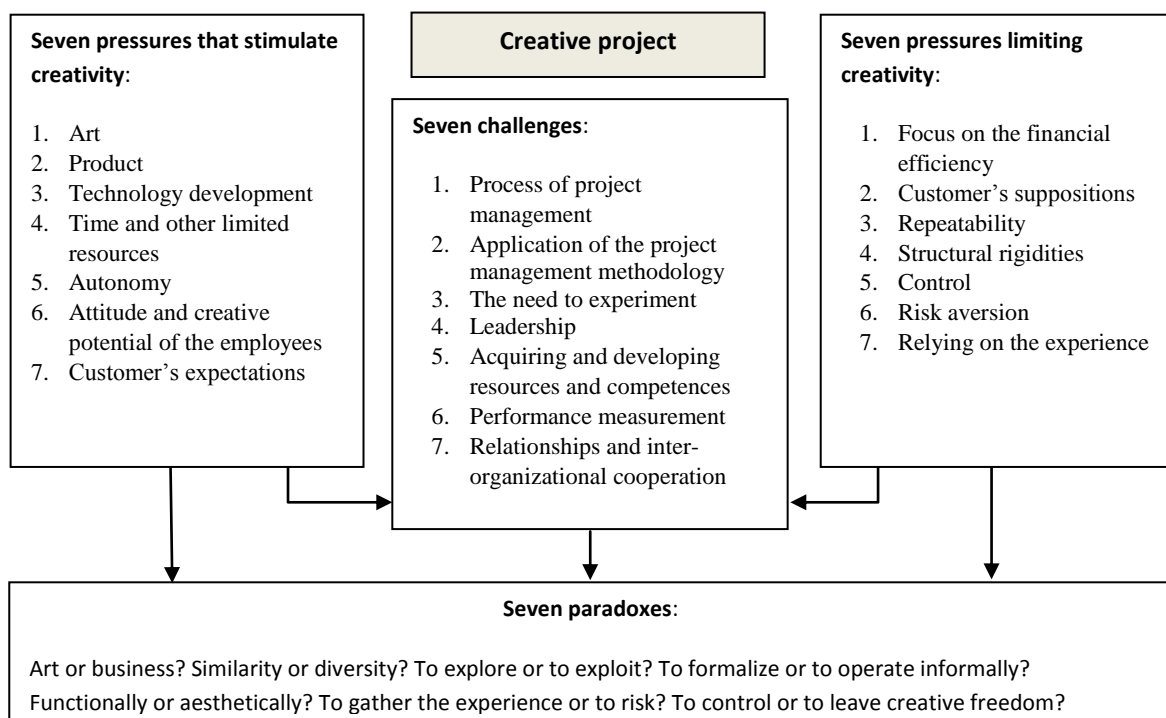
It is beyond question that in the management of creative project some other paradoxes resulting from the peculiarity of specific project category could be indicated. One good example are inter-organizational projects. The implementation of such joint creative projects is associated with tensions including project’s implementation performed by enterprises which have their own objectives and which operate in different economic, social and organizational conditions (Brensen, 2007; Van Marrewijk et al., 2008). Further example could be the paradox of functioning in the conditions of crisis when companies restrain their creative collaborations with other partners, which in turn, limit the originality of the product and causes further decline deepening the crisis (Von Bernuth & Bathelt, 2007). In the case of co-operation there is a paradox of resources in strategic alliances: they are commonly established because of the complementarity of resources, providing the ability to co-create synergies and value, though on



the other hand, the cooperation based on the resources could lead to the erosion of the specific resources, which were the principal source of the competitive advantage (Gander et al., 2007).

Discussion

The investigation presented above has indicated the multiplicity of challenges and paradoxes in creative projects management. The research pointed, among others, at the sources of these challenges and paradoxes which are generated due to the pressures caused by internal and external conditions. These pressures could have a stimulating effect, however, they might limit the creativity of individuals and teams. Therefore, they require proper identification and response. Figure 1 presents the summarizing model of the deliberations demonstrated in the paper. As it was previously mentioned, a respective number – seven, was intentionally assumed to systematize and simplify the complex nature of creative projects.



Source: Author's construction.

Fig.1. Seven pressures, challenges and paradoxes in the management of creative projects

The managers of creative projects are regularly faced with various tensions associated with the need to answer to numerous challenges, and are required to make decisions in terms of paradoxes, simultaneously recognizing alternatives of their decisions on the opposite directions. The focal point, thus, is to find the answer to the difficult question: how to deal with the



paradox? In the existing literature (Lewis, 2000; Smith & Lewis, 2011; De Wit & Meyer, 1999) some solutions as to dealing with paradoxes have been suggested. However, it is easy to predict that these suggestions have a very general nature. Proponents of the contingency theory indicate the need to adapt to specific internal and external conditions by choosing alternatives with a certain advantage over the others in these instances. According to Smith and Lewis (2011), the manager's response to the paradox situations is the accommodation, and it could be understood as the ability of continuous, dynamic, iterative movement between alternatives. What is equally important, and what has also been highlighted in Table 2, various paradoxes of creative project management occur at the same time and require the integration and the cope with tension resulting from their simultaneous existence. As it was pointed out by many authors (e.g. Bloodgood & Chae, 2010; Smith & Lewis, 2011), the acceptance of the existence of paradoxes and the ability to function flexibly in this situation is also very important.

What is noteworthy, the reflection about paradoxes, their understanding and the acceptance, their creative usage in the dynamically changing conditions, as well as their division or integration, constitute a very complex issue that requires from the managers the appropriate cognitive abilities (Lewis, 2000). On the other hand, tension and attempts to cope with paradoxes stimulate processes of learning, the search for new solutions, creative problem solving and, as a result—the development of the organization.

Conclusions

The scholars interested in the field of management have been searching for the answers to a crucial question about the sources of the enterprise's success. Creativity has been one of the categories that gained particular interests in recent years. Project management increasingly refers to the importance of creativity, thus researchers are frequently willing to dedicate their studies to various aspects of creative projects.

The aim of this article was to review and present the most important issues of creative project management: the pressures, challenges and paradoxes. The paper certainly have not discussed all of the threads of this vast research area, it indicated only the most important, potential challenges for both theorists wishing to explore and discover new research issues, as well as practitioners, who face these problems on a regular basis. The research undertaken had a number of limitations resulting from the scale and the approach of the study. However, it is demonstrated that the subject matter is highly interesting and inspiring and it is worth to take next steps of research, which will extend the range of identified pressures, challenges and paradoxes, confirming or denying their occurrence, and importantly, will improve the accuracy and reliability of the results.

Unquestionably, the management of creative project requires the creativity from managers of such projects. Apparently the research on the creative projects requires creativity from researchers—regardless of the subject or scope. And it makes the research on creativity even more inspiring.

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SIX ETHICAL LEADERSHIP STRATEGIES FOR PROJECT MANAGEMENT SUCCESS

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Abstract

The success of any project is a team oriented, goal focused activity under the direction/guidance of a highly competent, ethical leader. Project management success is enhanced by the positive guidance, influence, and integrity of a team leader who sets high personal standards in their actions and in making ethical decisions that are followed by all others. These standards lead to trust and stronger decision making in the best interest of all stakeholder groups. This will enhance the chance of project success and reduces the risk of project failure.

Adhering to the Project Management Institute's (PMI) Code of Ethics and Professional Conduct will enhance the strength of the process and lead to successful project outcomes.

Six ethical strategies are articulated to assist leaders in project success. These include strategies in respect, responsibility, fairness, honesty, courage, and kindness.

Key words: *project management, ethical leadership*

JEL code: L14, L29, M14

Introduction:

A project manager today lives in interesting times. A leader in project management must face a variety of situations and challenges on an ongoing basis. The success of any project is based on a team oriented, goal focused activities under the direction/guidance of a highly competent, ethical leader. Project management success is enhanced by the positive guidance, influence, and integrity of a team leader who sets high personal standards in their actions and in making ethical decisions that are followed by all others. These standards lead to trust and stronger decision making in the best interest of all stakeholder groups. This will enhance the chance of project success and reduces the risk of project failure.

Adhering to the Project Management Institute's (PMI) Code of Ethics and Professional Conduct will enhance the strength of the process and lead to successful outcomes. A second valuable tool in creating and supporting ethical leadership practices is the PMI Ethical Decision-Making Framework which can guide the project management professional through a 5 step decision making process when faced with an ethical problem.

In supporting the ideas of Reusch and Reusch (2016), gaps must be taken into account when looking at the challenges project managers face in the completion of their tasks. Ethics and leadership are part of those tasks and a gap that the project manager must fill.

Business Ethics

Ferrell, Fraedrich, Ferrell (2017) defined business ethics as comprising organizational principles, values, and norms that may originate from individuals, organizations or from the legal system that primarily guide individual and group behavior in business. Business ethics is a concept that guides the individual and the organization to make the best choices for all.

According to the PMI (2017),



“Responsibility, respect, fairness, and honesty are the values that drive ethical behavior for the project management profession as reflected in the PMI Code of Ethics and Professional Conduct. Project managers face decisions and ethical dilemmas every day. While project managers often know what to do, how to do it can become a challenge, and when stakeholder interests conflict, ethics enters the picture. Ethics is the discipline of how to do it best.”

Ethics can be a valuable tool in the decision making process providing structure and guidance in project methods. Godbold cited in Turner (2016) stated that ethics in project and business need not be a threat but an opportunity to differentiate yourself from the competition and exploit some form of competitive advantage. The idea of competitive advantage is valuable in the business environment faced by organizations today.

Leadership

Dubrin (2016) defined leadership as the ability to inspire support and confidence among the people who are needed to achieve organizational goals. Daft (2015) clarified leadership as an influence relationship among leaders and followers who intent real changes and outcomes that reflect their shared purpose.

Leadership involves the 4 I's; intentions (goals of the project), influence (on other people, organization, society) impact (outcome of the project), and integrity (honest dealings in the project). These are the ideals that leaders should model.

As Bandura (1986) noted, employees learn the behaviors expected, rewarded, and punished via role models. In this case, the role model is the leader, the leader directs the project team through goal setting and actions to a successful project conclusion.

Ethical Leadership

Brown et al (2006) stated that ethical leadership is the demonstration of normatively appropriate conduct through personal actions and interpersonal; relationships, and the promotion of such conduct to followers thought two-way communications, reinforcement, and decision making. Thus, a leader is a role model of ethical behavior.

Clarifying ethical leadership is important. Ethical leadership is the continuous practice of having a positive influence on decisions that will be the right and appropriate decision that supports the proper actions in any situation that impacts the greatest good. This practice must be supported by a strong leader's moral character and communication skills.

Schaubroeck et al (2012) found limited support for a trickle down mechanisms of ethical leadership but broader support for a multilevel model that takes into account how leaders imbed shared understanding through their influence on ethical units, which will in turn influence follower's ethical cognition and behavior. This research supports a positive influence of an ethical leader on project member's actions.

According to Bello (2012), leaders must create an ethically friendly work environment for all employees, communicate ethical issues, serve as role models, and put mechanisms in place for the development of responsible employees. It is expected that leaders who exhibit ethical behavior would be more likely to consider needs and rights of their employees and treat them fairly.

The Importance of ethical leadership: Ethical leadership is vital to any organization, all people, and project success. Some of the key areas that ethical leadership supports as to 1) attract and retain high quality employees (human resources); 2) attract and retain high quality



projects (financial resources); and 3) earn good will from the community, competitors, and the government.

Ethical leadership is a critical form of leadership action. These actions lead to higher levels of productivity, stronger service quality, better quality decision-making, more trusting environment, better communications, and increased flexibility from stakeholders. The leader's actions and the methods in which they are communicated are the stepping stones on the project path to success. Without these actions, any project is more likely to have problems and issues on the path to completion.

Ethical Leadership: Internal Factors

A leader's personal beliefs and values are the clear determination of their character leading to their actions. The key values most important to an ethical leader are honesty, fairness, responsibility, respect, courage, and kindness. The first four are ethical values from the PMI Code of Conduct and Professional Conduct (2013). The last two are important considerations that an ethical leader should follow. (Littman, 2013)

Responsibility is our duty to take ownership of the decisions and actions we make or fail to make and their resulting consequences. This concept highlights the accountability and decision making authority of leaders over the resources necessary to complete a project. Without taking ownership, the task will not be carried out to its successful conclusion.

Respect is our duty to show a high regard for ourselves, others, and the resources entrusted to us that include people, money, reputation, the safety of others and natural or environmental resources. This concept highlights the support we provide and the credit we give as leaders over the resources necessary to complete a project. It allows leaders to place a value and importance on the tasks and responsibility of project members. It allows project members to feel valued and appreciated in their contributions to a project's success.

Fairness is our duty to make decision transparently and act objectively without any partiality, bias, self-interest, or prejudice. This concept highlights the importance of valuing each group members input in any decision. This would be done to reduce conflicts and resolve issues in an impartial manner. It allows project members to know their contributions are considered equally with others when completing the project task.

Honesty is our duty to understand the truth and act in a truthful manner. This concept highlights the using and sharing of information as well as how that information is shared and communicated with relevant groups. Providing timely and accurate information is critical to project success. Honesty is the key driver of any action and decision as without honesty, nothing else matters.

Courage is the ability to stand up for what is right. This concept highlights the ability and follow thought of having strength of convictions and passion for doing the right thing. Courage is an important factor in making the right decision given a variety of sometime difficult situations. It allows the ethical leader to complete their responsibilities consistently.

Kindness is the way we treat others, our concern for others, and the belief in the goodness of all. This concept highlights the best strategy to get people together and feel as a contributor to the process necessary to complete the project. A leader's belief in the competency of their team member and their concern for the team member's well-being is critical for strong team performance.



Ethical Leadership: External Factors

A leader and members of an organization are strongly influenced by the corporate culture. The corporate culture is clearly defined by a detailed Code of Conduct or Code of Ethics. These Codes specify actions that are considered acceptable or unacceptable in practice. A thorough knowledge of these Codes and then disseminating them to all team members is a requirement of the US Government as well as the human resource leadership of an organization. All team members must be well versed and follow all components of corporate ethics.

A second external force impacting ethical leaders is government mandates or policies that guide decision within the confines of societal norms and legal regulations. These policies specify the actions which are considered as standard business behavior. This is another knowledge area that all team members must have as part of a successful project team. Ethical leaders clearly follow these guidelines in their daily personal and project actions. They serve as the role model of ethical actions.

The Importance of Ethical Leadership Decision Making on Project Management Success

It is critical that ethical leaders follow universally accepted four principle values of the PMI Ethics Framework. These values guide appropriate decisions from the start to the finish of a project.

In addition to the four principles of respect, responsibility, fairness, and honesty, an ethical leader must exhibit courage, and kindness. Leaders are accountable for making appropriate decisions that move the profession and project forward. Their use of strong two-way communication skills is vital in sharing the message and providing the support for project success.

According to Demirtas (2015), ethical leadership has both a direct and indirect influence on work engagement as well as organizational misbehavior. This reinforces the key role that the leader plays in sending the message of the importance of honesty and fairness in dealing with employees and in dealing with work-related situations.

Six Ethical Leadership Strategies

There are six leadership strategies that will lead to a successful project. The following information includes these six strategies with some action items to consider.

- 1) Exhibit Honesty: Speak and act in a truthful manner in all situations
 Follow through with commitments
 Build trust within the organization
 Build trust in the community
 Be clear in the direction of the project
 Share important information

- 2) Demonstrate Fairness: Treat all people equally
 Be objective in decision making
 Do not show favoritism
 Give credit for positive contributions
 Value varied points of view

- 3) Model Respect: Respect the viewpoints of others



- Empower others
 - Foster collaboration
 - Respect the property rights of others
 - Respect the privacy of information
 - Listen and respond in a tactful manner.
 - Act as a professional
- 4) Take Responsibility: Be accountable for decisions
Be accountable for human resources
Be accountable for financial resources
Make decisions that benefit all stakeholders
Follow the PMI Code of Ethics and Professional Conduct
Follow all laws and regulations
Take ownership of the process and the outcome
- 5) Exhibit Courage: Lead the ethical charge
Follow ideals
Take risks
Have passion
Encourage discussion
Deal with low performers
- 6) Display Kindness: Display compassion
Show appreciation
Be empathetic
Be considerate of other's feelings

Finally, two way-communications is vital to project and leader success. Open channels between leaders and project managers are mandatory to develop project goals and accomplish the task. The ability to share the project vision and ideas, listen, and provide feedback is necessary in the achievement of project team goals success.

Conclusions

As O'Brochta (2016) stated,

“project ethics matter and this year's 10th anniversary of the PMI Code of ethics and Professional Conduct is a time to reflect on that. Not only do ethics allow us to act in a way consistent with our beliefs, they are the key to executing projects successfully. This is because ethics lead to trust, which leads to leadership, which, in turn, leads to project success.”

The actions of project managers need to be consistently professional and ethical in behavior and actions. O'Brochta's points are well taken as the process and practice of leadership ethics while modeling appropriate behavior leads to trust in relationships. The trust factor is the key leadership trait which has the desired outcome of project success.



Project management success is enhanced by the positive guidance, influence, and integrity of a team leader who sets high personal standards in their actions and in their decisions that are followed by all others. These standards lead to trust and stronger decision making in the best interest of all stakeholder groups. This will enhance the chance of project success and reduces the risk of project failure.

It is clear and professionally appropriate that a successful leader in project management must exhibit ethics in decision making and actions. In dealing with people, ethics is critical to success. In dealing with projects, ethics is critical to success. There also is a necessity for organizations to have an ethical culture. This corporate culture contributes to project success.

Ethical leadership is a necessary requirement to meet professional and project goals. When a leader follows the above mentioned six strategies routinely, the project outcome will be guided to success. This is a win-win strategy for all shareholders.

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COMMUNICATION MANAGEMENT TOOLS FOR MANAGING PROJECTS IN AN INTERCULTURAL ENVIRONMENT

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Abstract

Insufficient communication and the lack of stakeholder integration are among the most common drivers for unattended change causes and uncontrolled change impacts in a project (Zhao *et al.*, 2010) (Ochieng and Price, 2010). Especially in case of international projects, where different cultures are present and teams are often only virtually connected, projects teams face even more communication problems that can affect the outcome of a project. Intercultural differences influence the way each team member gets engaged into interaction with other stakeholders of the project.

In the main project management standards, there are tools and methods for managing communication and stakeholders, but their application has to be analyzed from an intercultural perspective. Besides a project communication plan, we address such tools as the mission breakdown structure (MBS) in order to give this perspective (Andersen, 2014). It is suggested that the MBS can be used as one of the tools enhancing the engagement of stakeholders (SH) (Andersen *et al.*, 2009) and increasing communication effectiveness through a shared vision (Lee *et al.*, 2015). In this article, we categorize and describe the main communication issues and tools for managing international projects within an intercultural environment.

Key words: *Intercultural differences, international projects, communication management, stakeholders*
JEL code: Z00

Introduction

“Communication has been identified as one of the single biggest reasons for project success or failure” (PMBOK 5, 2013, p. 515). Good communication, which is needed for project success, is structured in a way that helps to minimize or even avoid unexpected delays and misunderstandings, prevent duplication of efforts, discover issues, implement preventive measures and deal with all mentioned above in an effective way. In addition, stakeholder management is a crucial point in managing international projects as stakeholders are “individuals, groups or organizations who affect or can be affected by, or interested in the execution or the result of the project” (ICB 4, 2015, p. 145). That is why, in this article, various approaches (in standards of project management, such as ICB 4, PMBOK 5, Prince2, etc.) on communication and stakeholder management are analyzed from the intercultural point of view.

In order to analyze existing issues and tools, the literature review was conducted using key words such as communication, international, intercultural, skills, competencies, and stakeholders. The following databases were used: Science Direct, Google Scholar, and Web of Science. The goal was to explore and analyze issues and tools applied for managing communication in international and intercultural projects. The authors assumed that issues are



also discussed in the literature as challenges, threats, barriers, and sometimes as risks. Although it may seem to be quite a big area of research, this approach allowed the discovery of different facets of issues in managing communication. High attention was specifically paid to studies devoted to intercultural skills and stakeholder management in international projects as these aspects help to shed light on the so-called ‘human’ side of communication issues.

As international communication (= people speaking in a language other than their native) occurs in an intercultural environment, it is more challenging to communicate effectively and it causes a higher rate of misunderstandings. Hence, more efforts are required to ensure common goals and values among project stakeholders. One of the main tools in managing the project stakeholders is the stakeholder analysis (PMBOK 5, 2013, p. 292). In the initiation phase in any international project, the stakeholder analysis is of outstanding importance and high complexity as stakeholders often are not well-known and sometimes difficult to be identified and analyzed. When it comes to stakeholders in an intercultural project, Lückmann and Färber advise that due to complexity reasons, it is reasonable to initially focus on those stakeholders that define the requirements of the project (Lückmann and Färber, 2016, p. 86).

However, the literature review has not revealed very much information and studies particularly on stakeholder communication issues in international projects. That is why, additionally, the authors explored how a mission breakdown structure can be applied for stakeholder engagement and communication using an example of the case study done by Andersen (Andersen, 2014).

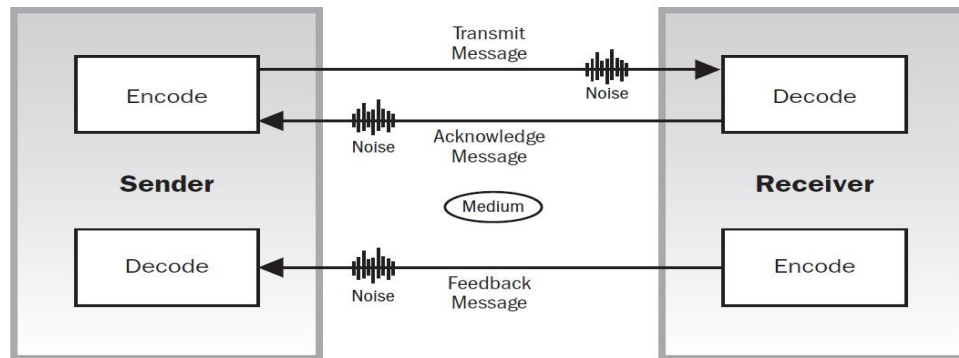
Research results and discussion

Intercultural aspect of communication and communication plan in project management standards

The term ‘communication’ comes from Latin *commūnicāre*, meaning "to share" (Etymonline). The initial purpose of communication in a cross-cultural environment is to seek common ground, to exchange ideas and information, gain customers, and sometimes establish partnerships between several parties (Rothlauf J., 2015, p. 145). Zakaria suggests that “intercultural communication is defined as interaction between people of diverse cultural backgrounds with distinct communication patterns, preferences, and styles” (Zakaria, 2016, p. 3).

In the Guide to the Project Management Body of Knowledge (PMBOK®), a basic communication model (figure 1) is presented containing elements such as the sender, the receiver, the medium and noise. It is mentioned that the medium is the technology medium, including the mode of communication, while noise means any interference or barriers that might compromise the delivery of the message. (PMBOK 5, 2013, p. 292).

The elements of this basic communication model introduce places where potential issues can take place and consequently where methods and tools should be applied. Senders and receivers face mostly issues of linguistic, cultural, and psychological character, while media cause mainly issues in the respect of which and how technology is used.



Source: PMBOK 5, 2013, p. 293

Figure 1: **Basic communication model**

In the IPMA “Individual Competence Baseline” version 4 (ICB 4), it is suggested that a communication plan is used as a method to plan the stakeholder strategy. According to ICB 4, the communication plan “describes for each stakeholder (group) the why, what, when, how often, how (through which communication channel), who (should communicate), and the level of detail of the communication” (ICB 4, 2015, p. 147). ICB 4 outlines the importance of culture and language for a modern project manager, stating that “in a multi-cultural project, an individual may need to navigate multiple cultural and value norms (ICB 4, 2015, p. 58)”. Furthermore, the ICB 4 competence element “Culture and values” contains despite of being related mostly to the organizational culture and values, some points on the multi-cultural environment. For example, one of the knowledge elements is “theories about culture” and the skill elements include the following items (ICB 4, 2015, p. 59):

- Cultural awareness
- Respect for other cultures and values
- Aligning to and working with different cultural environments
- Bridging different cultures and values to achieve the project, program and portfolio objectives

PMBOK® defines the communication management as part of the project management plan. It consists of several elements that standardize the flow of communication, such as a reason for the distribution of information, the responsible person, people who receive the information, and technologies that are used (PMBOK 5, 2013, p. 296). However, the communication management according to PMBOK® does not pay any close attention to cultural differences in particular. Only a few sentences in the appendix are dedicated to cultural awareness in communication although communication is mentioned as one of the biggest factors to affect project success according to PMBOK® (see the introduction of this article).

PRINCE2® guidance presents the communication management strategy as an approach for managing communication in projects (PRINCE2, 2009). In PRINCE2® it is clearly stated that a description of means and frequency of communication has to be developed for both, external and internal parties of the project. Stakeholder engagement is considered as part of the communication management strategy (PRINCE2, 2009, p. 42). In PRINCE2®, the so-called



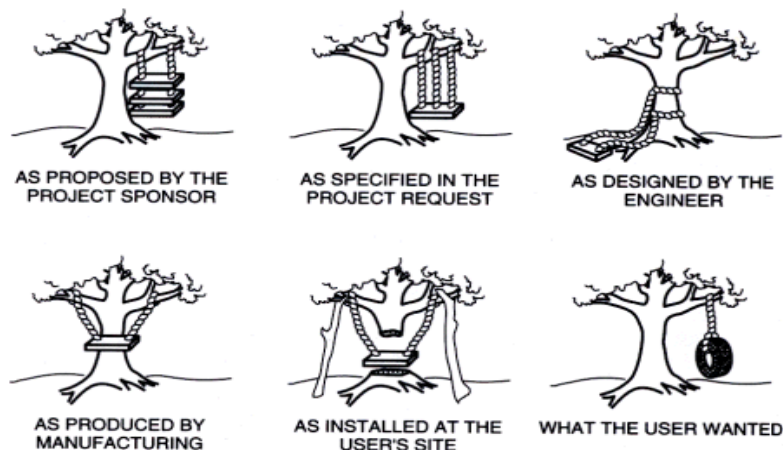
composition of the communication management strategy does not specify any international or intercultural features. Nevertheless, in the composition, these specific features can be embedded in sub-areas such as ‘tools and techniques’, ‘reporting’, ‘timing of communication activities’, ‘stakeholder analysis’. The sub-area ‘information needs for each interested party’ consists of the following elements (PRINCE2, 2009, p. 239):

- Information required to be provided from the project
- Information required to be provided to the project
- Information provider and recipient
- Frequency of communication
- Means of communication
- Format of the communication

Overall, it can be summarized that the communication plan is a key tool in managing communication. It can contain different information fields but mainly includes the following elements: the type of communication, its content and objectives, participants, schedule and location. However, the standards mentioned above contain instructions how to manage communication, still just a few or only general hints on how to deal with communication issues in the intercultural environment are included.

The mission breakdown structure for addressing values and issues in international projects

The most expansive description of communications in projects with some references to culture was found in Kerzner’s “Project Management: A systems approach to planning, scheduling, and controlling” (Kerzner, 2013). Kerzner clearly addresses a breakdown of communications using a figure where different visions of the project stakeholders are illustrated (figure 2). Thus, it can be assumed that communication issues are directly connected with different types of stakeholders and their visions.



Source: Kerzner, 2013, p. 265

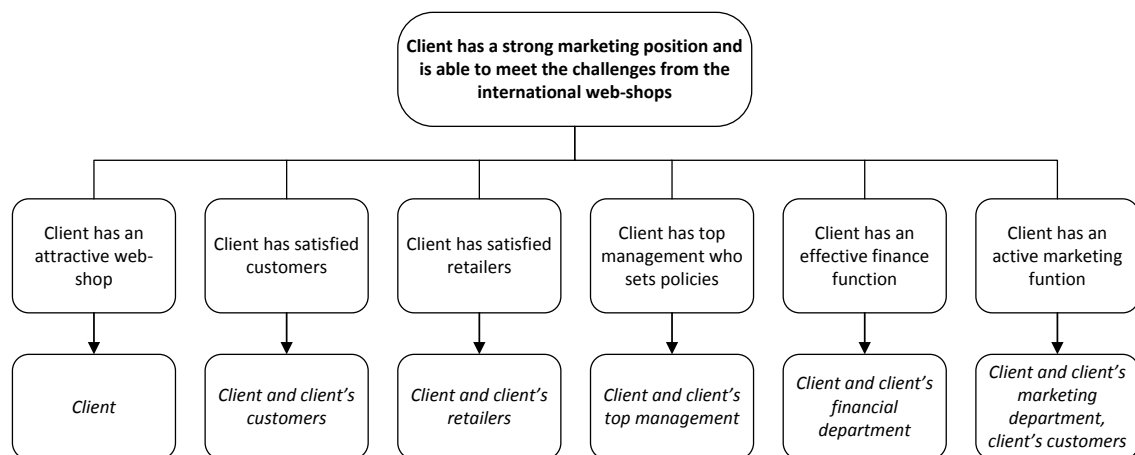
Figure 2: A breakdown of communications

In ICB 4, it is clearly stated that it is necessary to align the project goals with the project mission and vision (ICB 4, 2015, p. 41). In addition, culture and value alignment is crucial for a



project that extends across different societies, organizations or groups (ICB 4, 2015, p. 58). It means that differences in the stakeholders' needs and expectations should be taken into account.

In the study conducted by Andersen, the mission breakdown structure (MBS) was used to ensure an effective interplay between the project and all involved stakeholders (Andersen, 2014, p. 885). The illustrative case used by Andersen contained the development of the MBS for the project conducted by a consultancy firm for a client. The client was a wholesaler of international products, who was acting through local retailers and decided to set up its own web-shop. In the initiating phase of the project, the MBS was developed with the involvement of the project owner, the top management of the client, and future users. (Andersen, 2014, p. 888). In the figure 3, adopted from Andersen, the authors suggest that the MBS is helpful for the categorization of stakeholder groups and the development of communication based on mission itemization. Each mission itemization (for example, "Client has satisfied retailers") is connected with the respective stakeholders. Hence, specific communication tools can be developed based on the mission framed according to the known cultural aspects and communication issues.



Source: Adopted from Andersen, 2014

Figure 3: The mission breakdown structure for managing communication with stakeholders

For example, while engaging local retailers, the project manager promotes the itemization of the mission, called "Client has satisfied retailers", taking the cultural differences of local retailers into account and involving the client itself. This approach can also be used in order to store lessons learned in relation to the type of stakeholder group, communication issues, and cultural differences.

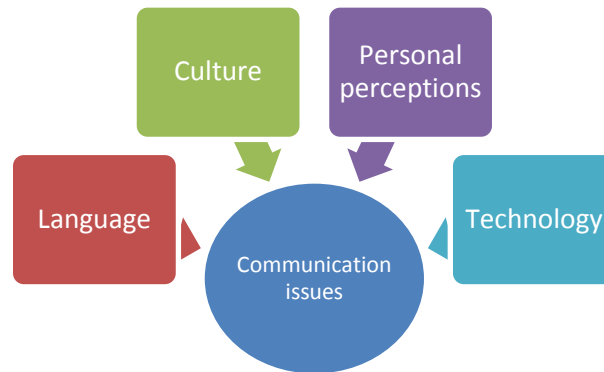
Communication issues and tools

The awareness of potential issues and tools will allow a more effective management of communication which has to be performed as early as possible (PMBOK 5, 2013, p. 290). In this part the results of the literature review on communication issues and tools are presented.

Many authors discuss issues in communication in respect with its modes such as verbal, para-verbal, and non-verbal (Gudykunst and Mody, 2002) (Mruk-Badiane, 2007) (Rothlauf J.,



2015). Nevertheless, the authors have defined four categories of issues in terms of communication in international projects (figure 4). This categorization allowed to group corresponding tools found in the literature.



Source: Authors' representation

Figure 4: **Intercultural Communication Issues**

Taking the scope of the paper into account, only linguistic, cultural and personal issues are presented in details. However, the sub-part with the technology issues is included as well to foster the discussion and further studies.

Language

It is generally agreed that the most issues in intercultural communication arise due to language (Rothlauf J., 2015). Tools and methods used to deal with linguistic misunderstandings are directly connected with the different modes of communication: verbal, para-verbal, non-verbal.

It is important to remember that in case of non-native speakers, foreign language skills vary. Only due to the weak speaking skills, people might prefer another mode of communication (Shachaf, 2008, p.136). Thus, spoken verbal communication, although face-to-face meetings are considered as the best tool for communication (Daim *et al.*, 2012, p. 205), may need to be supported by written verbal communication.

As language and culture are interconnected, insufficient language skills of the team members might not be evident in the beginning of a project. A mentality of some nationalities, especially in case of English, assumes that the trial-and-error method works best at work. In other words, people prefer to hide insufficient language skills. Also, it is important to know a value of language certificates in a specific country.

Planning language skills required for a project, one should also distinguish between colloquial and professional speeches. If the colloquial speech is essential for a project role, unless a full-time interpreter is provided, the respective language skills have to be proved.

The issues that appear due to the language issues and the respective tools are presented in table 1.

Table 2

Issues and tools connected to the language

Issues	Tools	Sources
Spoken verbal communication:	✓ Explain things in simple words	(Rothlauf J., 2015)
• Difficult accent	✓ Use an interpreter who is an expert in the field	(Kerzner,
	✓ Using redundancy (i.e., saying in two different	



<ul style="list-style-type: none"> • Difficult pronunciation • Insufficient skills in language • Poor choice of vocabulary 	<p>ways) whenever possible</p> <ul style="list-style-type: none"> ✓ Using visual aids, when presenting <p>Listening skills:</p> <ul style="list-style-type: none"> ✓ Stay focused on the speaker’s main point ✓ Tune out all potential distractions ✓ Offer the fullest possible attention ✓ Give signals that you are listening as objectively as possible ✓ Be flexible and open-minded when new topics or ideas are raised ✓ Ask for clarification if anything is unclear ✓ Validate the speaker’s main points 	<p>2013)</p> <p>(Arent, 2009)</p>
<p>Written verbal communication:</p> <ul style="list-style-type: none"> • Misunderstanding or misinterpretation of the message communicated • Insufficient skills in language (poor choice of vocabulary, grammar mistakes, typos) • Not self-explaining abbreviations and slang words 	<ul style="list-style-type: none"> ✓ Avoid ambiguity ✓ Check the spelling ✓ Keep your message short to make sure it will soon be read and easily understood ✓ Pay attention to the “subject” and the first sentence of your message ✓ The attention of the receiver must be raised and he/she should be able to quickly grasp your intention ✓ Try to avoid negative verbalizations ✓ Keep in contact with business partners, (congratulatory notes, thank you emails etc.) ✓ Always double-check your message before sending it off 	<p>(Rothlauf J., 2015) (PMBOK 5, 2013) (Kerzner, 2013)</p>
<p>Interpretation and translation:</p> <ul style="list-style-type: none"> • Terminology • Metaphors • Accent • Unclear pronunciation 	<ul style="list-style-type: none"> ✓ Create and maintain project terminology ✓ Get familiar with metaphors and other connotative meanings to avoid confusion and anxiety ✓ Invite an interpreter or translator with expertise in the corresponding field ✓ Ensure that an interpreter gets familiar with particularly difficult counterparts (incl. using audio or video recordings) 	<p>(Own source) (Rothlauf J., 2015)</p>

Culture

Cultural differences often causes misunderstandings in communication. The main issue is that messages are composed or ‘coded’ in one cultural context, sent, and then received or ‘decoded’ in another cultural context. (Rothlauf J., 2015, p. 2). In some studies, it is argued that the cultural dimensions were reflected in the following beliefs and behaviors: trust and fears, lack of participation and commitment, and insufficient information sharing (Lückmann and Färber, 2016, p. 89).

There are two main points that are essential to improve and progress while working in an intercultural environment, namely, intercultural awareness and intercultural resilience.



Intercultural awareness includes the abilities to respect others, being able to shift temporarily into another perspective, building long-lasting cross-cultural personal bonds (Leeds-Hurwitz, W., Stenou, K., 2013, p. 24)

Intercultural resilience refers to the ability to confront and adapt to new situations within a different culture than your own (Simonsen, 2008, p. 36)

These skills and others mainly can be developed through practical experience abroad, which helps to understand cultural aspects and working in an international environment. Thus, for an international company, it is important to send its employees to other countries giving them the opportunity to understand not only differences, but also the strengths and opportunities of each cultural group. Regarding projects itself, when a project starts, a one-week face-to-face meeting is a great tool to facilitate social interaction and create mutual understanding relationships among team members. During such meetings, the project team members get informed about roles and responsibilities, assignments, the communication plan, media used and ground rules of the project. Different issues and tools in this area are summarized in the table 2.

Table 3

Issues and tools connected to the culture

Issues	Tools	Sources
Cultural misunderstandings: <ul style="list-style-type: none"> • Yes-saying pattern • Tendency to please • Saving-face principle • Different cultural perception • Ideological differences • Religious beliefs and rules • Missing or excluding informal communication due to cultural habits • Space behavior (abusing close or distant patterns) • Touch behavior • Eye behavior 	<ul style="list-style-type: none"> ✓ Do not judge the behavior of others on the basis of one's own culture ✓ Nullify own beliefs ✓ Ability to read behind the lines and signs based on own experience and knowledge about the particular (sub-) culture ✓ Ability to anticipate misreading and miscommunication ✓ Intercultural resilience ✓ Initial face-to-face meeting: ✓ Issues embedded in communication plan ✓ Ground rules (can be translated and adjusted to a culture) ✓ Social activities/events ✓ Informal collaboration platforms 	(Rothlauf J., 2015) (Gudykunst and Mody, 2002) (Kerzner, 2013) (Gray and Larson, 2014) (Stawnicza, 2015)
Incompatible style of communication: <ul style="list-style-type: none"> • direct vs. indirect • (in)tolerance to direct confrontation 	<ul style="list-style-type: none"> ✓ Subtle speaking ✓ Explain things in simple words ✓ Avoid offending others ✓ Consult with others before responding ✓ Get familiar with characteristics inherent in the cultural environment ✓ Be aware of strong beliefs and superstitions ✓ Be careful with laughs, intonation, voice volume, mimic and gestures expressed 	(Rothlauf J., 2015)

Personal perceptions

“By understanding and capitalizing on cultural differences, the project management team is more likely to create an environment of mutual trust and a win-win atmosphere”. (PMBOK 5, 2013, p. 515). Thus, intercultural and personal aspects in communication are interrelated.



According to Kerzner, noise in communication (figure 1) results from our own perception screens, which dictate the way we present or perceive the message and from personal interpretations, attitudes, biases and prejudices that lead to ineffective communication (Kerzner, 2013, p. 269). Personal perceptions is a category that includes issues connected with peoples' perceptions, attitudes, beliefs, and psychology. For example, relationship-focused people are less comfortable to discuss important issues in writing or by phone, which is called avoidance of a specific type of communication due to personal preferences (Gesteland, 1999).

Human and behavioral competencies, or so-called 'soft skills', allow innovating in circumstances where people already have solutions for their problems. Soft skills are, according to the literature review, the most important ones for international project managers (the other categories of a project manager's skills are: organizational, technical and project management skills). The soft skills are most relevant for managing people in an intercultural environment according to ICB (ICB 4, 2015) and studies of Brière *et al.*, 2013, Abbot *et al.* 2005, Pheng and Leong, 1999. In table 3, the issues and tools connected to the personal perceptions are summarized.

Table 4

Issues and tools connected to the personal perceptions

Issues	Tools	Sources
Affecting the decoding process, when message received is different from the message sent: <ul style="list-style-type: none"> • evaluative tendency • preconceived ideas • attitudes, emotions, and self-interest • position and status • existing relationships with the sender • lack of responsive feedback • selective listening 	<ul style="list-style-type: none"> ✓ Kick-off meeting followed by creation of chats in social platforms or networks ✓ Make sure that the receiver's reaction to the message corresponds to the sender's purpose ✓ Obtain feedback, possibly in more than one form 	(Kerzner, 2013, p. 268) (Rothlauf J., 2015)
Inappropriate para-verbal communication: <ul style="list-style-type: none"> • the voice • the speech melody • the speaking tempo • the pitch of your voice • the emphasis of different words in a sentence 	<ul style="list-style-type: none"> ✓ Try to get feedback ✓ Questionnaires to reveal these issues ✓ Make sure that the receiver's reaction to the message corresponds to the sender's purpose 	(Mruk-Badiane, 2007)
Written verbal communication: <ul style="list-style-type: none"> • absence of emotions may make a letter sound too dry, impolite, or demanding 	<ul style="list-style-type: none"> ✓ Use polite expression as much as possible ✓ Follow up on important tasks via skype or any other mean of virtual communication 	
Mistrust based on: <ul style="list-style-type: none"> • competency gap – different qualification of employees from different countries or companies 	Soft skills such as: <ul style="list-style-type: none"> ✓ Cross-cultural sensitivity ✓ Problem solving ✓ Adaptability and flexibility 	(ICB 4, 2015) (Arent, 2009) (Daim <i>et al.</i> , 2012)



<ul style="list-style-type: none"> • different salaries/contracts for the activities • hidden expectations of stakeholders • racism and prejudice • negative previous experiences with counterparts or others from same culture • absence of face-to-face communication • missing informal communication 	<ul style="list-style-type: none"> ✓ Seek commitment of a wide range of stakeholders ✓ Empowerment of local population ✓ Sustainable development ✓ Dynamic leadership ✓ Respectfulness and patience ✓ Cultural open-mindedness ✓ Managing virtual teams and projects ✓ Active listening 	
Avoidance of a specific type of communication due to personal preferences	<ul style="list-style-type: none"> ✓ Maintain and update communication plan ✓ Questionnaires to reveal these issues ✓ Motivation techniques ✓ Personal approach 	(Gudykunst and Mody, 2002)

Technology

Issues connected to technology are related to how and which technology is used. How technology is used depends on how project communications are planned and if project participants have got or obtained the relevant skills to use the technology. Thus, it is essential to create ground rules and specific instructions that are well structured and well-known by all project participants.

Technology issues related to its type (which technology is used) are also called physical barriers. According to Carvalho's summary on communication issues in project management, they include: the speed necessary to distribute information, the type of technology available and the levels of security (passwords, privacy clauses, etc.), project duration, size and other project characteristics that have to correlate with the dimensions of the project (Carvalho, 2008, p. 1280)

The examples of studied issues and tools are shown in table 4, still further studies have to reveal more connections between culture and technology issues.

Table 5

Issues and tools connected with the technology

Issues	Tools	Sources
Issues due to the misuse: <ul style="list-style-type: none"> • differences in communication protocols • inaccuracy in project documents updates • delay in message delivery 	<ul style="list-style-type: none"> ✓ “The methods of storage, retrieval, and ultimate disposition of the project information need to be considered, appropriately documented and controlled”. 	(PMBOK 5, 2013, p. 290)
Insufficient communication to the stakeholders or communication of information to the wrong audience	<ul style="list-style-type: none"> ✓ Maintain and update the project communication plan ✓ Maintain and update the stakeholder register ✓ Both tools mentioned above have to be revised when changes in the project plan or issues in communication occur 	(PMBOK 5, 2013)



Conclusions

In projects conducted in an intercultural environment, tools and methods used for managing communication are strongly connected to the stakeholders. As stakeholders, particularly in international projects, are often not well known, it may cause higher risks for a project. During the initiating phase of a project, the stakeholder analysis has to be performed carefully to reveal all stakeholders and develop tools and methods that consider intercultural communication issues.

The mission breakdown structure is a method to engage each group of stakeholders, using a specific itemization of the mission, where each element is tailored according to the stakeholders' visions, needs and expectations. Such a mission itemization does not only engage stakeholders through motivation, but it can also be used to adjust communication methods and tools to the mission and intercultural specifics of the respective stakeholder group.

Soft skills are crucial for project managers in order to manage projects successfully and deal with intercultural issues. Among the most important soft skills defined in the article, it can be said that the following two are of major importance: cultural sensitivity and intercultural resilience.

The article presented the main issues in international projects that occur due to differences in language, culture, personal perceptions, and technology as the most mentioned in the literature and studies. The respective issues and tools summarized by the authors can be extended and additional studies on this matter will benefit the development of international project management.

Further studies have to explore appropriate communication tools in depth to thoroughly address intercultural communication issues. Additionally, it is necessary to prove the usefulness of stakeholder categorization and mission itemization based on linguistic and cultural aspects.

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AUTHORING INDUSTRIAL AUGMENTED REALITY APPLICATIONS

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Abstract

With the rapidly advancing technologies in the time of the fourth industrial revolution, it becomes more and more important for companies that want to maintain a competitive edge, to develop, implement or to the least adopt innovative solutions that provide business and technical value to the company itself and to its customers. SMEs aiming to position themselves or maintain their market share face this challenge in an aggravated manner.

The aim of this paper is to discuss the added value of creating, authoring and implementing augmented reality applications for maintenance of machines in the context of manufacturing SMEs. The paper is structured in a way that combines a literature review of the different concepts relating to authoring and augmented reality within the context of the fourth industrial revolution and the business value created through the use of augmented reality applications. This is followed by an introduction and discussion of the project “InMachine” in which this work is embedded. Then a concept to simplify the authoring of maintenance augmented reality applications in manufacturing SMEs. This is done based on the authors’ experience, who are affiliated to one of the partners in this project. The paper concludes with reflections from the findings of the literature review and the progress of the project and a look into the future prospects of this field.

Key words: *Augmented Reality, Industrial Applications, Maintenance, SMEs, Project Management*
JEL code: O14, O31, O32, M15, L86

Introduction

While during the fourth industrial revolution, which is currently arriving at big enterprises and now making its way towards small and medium sized companies, the production environment itself with all involved machine and transportation mechanisms is getting “smart”, the way humans interact with it did not change much. On the other hand, Augmented Reality (AR) has grown out of the research labs into the mass market with first successful applications like Pokémon Go. The real-time overlay of digital information on the real world surrounding us, which is the key element of Augmented Reality, allows the creation of completely new ways to interact with the digital world. While many, even quite early, research prototypes could show the high potential AR featured digital maintenance manuals offer, they are still not really used in productive environments, as the creation of such AR maintenance applications is not yet paying off due to its high costs/effort.

This paper will present an approach to simplify the creation process of AR maintenance applications as used in the InMachine project allowing the economic authoring of such applications to tap into their big potential and simplify the interactions of humans with the next generation of industrial “smart” machines.



Introducing Industrial Augmented Reality

The term “Augmented Reality” originated in the 1960s upon the creation of the first 3D head-mounted display by Ivan Sutherland (Sutherland, 1968). However, it is first actual industrial AR was realized by Boeing in the beginning of the 1990s, when a head-mounted display was used “to superimpose a computer-generated diagram of the manufacturing process with a real-time world registration and the user’s head position calculation” (Caudell & Mizell, 1992) (Nassir, 2004) (Tetland, 2016). There was however no consistent definition for the term and it was interchangeably used with the term “Virtual Reality”. In 1994, Milgram et al.’s attempted to bring all related terminology into a single publication to draw the line between the different terms and their respective definitions. Milgram et al. oppose the view that reality and virtuality are “antitheses”, but rather see them “as lying at opposite ends of a continuum” – the so-called “Reality-Virtuality (RV) continuum” (Milgram, et al., 1994) (See Figure 1).

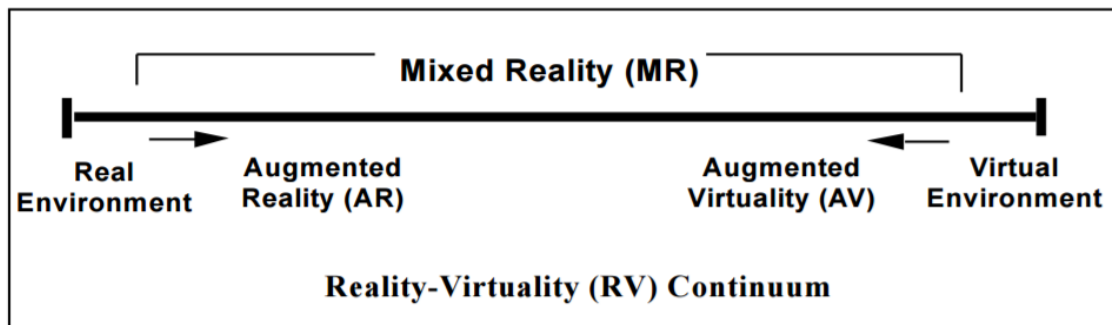


Figure 1: **Simplified representation of a RV Continuum** (Milgram, et al., 1994)

Within this framework, Milgram et al. define a Mixed Reality (MR) environment “as one in which real world and virtual world objects are presented together within a single display, that is, anywhere between the extrema of the RV continuum” (Milgram, et al., 1994) (Milgram & Kishino, 1994).

Application and Value-added of Industrial AR Technologies

Although AR technologies have been present in our world since the 1990s, their industrial use is relatively still at an early stage, concentrated in R&D and piloting phases. Some of the main contributors and implementers of these technologies include Boeing, Airbus, Bosch (Tetland, 2016).

According to Digi-Capital and AugmentedReality.Org, “augmented reality market is going to hit \$120 billion by 2020” (Digi-Capital©, 2015) and Smart Glasses market will arrive at 50 -100 million shipments by 2018 (AugmentedReality.Org, 2015) (Viscopic, 2016). The major areas where the application of AR technologies brings significant improvement to the processes and their business value are:

- **Training:** The use of AR in industrial training facilitates skill transfer in several areas, including training for assembly and maintenances of machines. Through capturing and rendering technologies, the trainee can “interact with the real-world objects and simultaneously access the virtual information for guidance”, thus reducing errors and time consumed to complete a task (Webel, et al., 2011). In a study conducted in Iowa State University to compare AR training with more traditional training methods, students were



given instructions and the task to put together a mock airplane wing. The group that received instructions converted to an AR built as an overlay on the assembly “experienced a 90% reduction in the number of errors during the assembly” and 35% reduction in the time built to the wing, in comparison to the group using instructions on the desktop computer (Price, 2015).

- **Operations & Error Prevention:** It is easier to obtain data about the functioning of the machines, to track and monitor operations and detect errors through use of AR technologies, such as glasses, cameras and depth and motion sensors. Aside from the study above, research shows that “the accuracy of engineers can go up to 96% and they are able to work 30% faster” (Robinson, 2017) (Tetland, 2016).
- **Maintenance:** the combination of MR technologies and wearable devices enables technicians to implement preventative and corrective maintenance through real-time data, thus reducing production down-time and increasing the longevity of the machines. According to Columbia University, maintenance comes as a “natural” application for MR technologies; as maintenance tasks usually demand “maximum preservation of a user’s focus on a specific area of interest” and “the need to synthesize additional information, such as delicate and complex sequences, obtuse component identification, and lengthy textual data” which is burdensome, time-consuming and costly (Henderson & Feiner, 2007).

As the work described here is part of a funded project, the following paragraph will give an introduction and overview of the project. This will provide the necessary context for the later described concepts.

InMachine Project

The InMachine project is a funded research project using local intelligence and networked planning in order to increase the efficiency of technical production machines in collaborative production networks of SMEs. The aim of the project is to mitigate such innovation risks in SMEs and to support them with high-tech services.

The development of finely tuned production and control requires that the machines act as autonomous planning instances. The smart machines will be connected with each other and with a central planning unit to form a collaborative production system. The machines will be able to evaluate its local sensor and operating data and to identify critical system conditions such as defects or required maintenance work. They will be able to solve the problem locally for example by moving the jobs or scheduling them to other production machines. This reassignment can be negotiated among the machines in the networked machine network with appropriate planning priorities. (University of Applied Sciences and Arts, 2016)

In addition to making the production process more efficient, machines also need to undergo constant repair and maintenance processes. Usually those procedures require specially trained workforce, since there are certain steps to be followed and other concerns to take into consideration. This makes those procedures comparatively expensive and time consuming, especially if the specialized worker is not available at the moment or doing another maintenance job.



A solution for this problem will be to guide a worker without any prior specialized training in the maintenance or repair process step by step presenting all necessary information and precautions that should be considered at the moment when they become relevant. This can be done by an Augmented Reality application that will guide any worker through the process of maintaining and repairing of small and medium complexity tasks. This solution offers a more practical and economic way to hold such tasks, and can be done more quickly and smoothly.

The workflow of the solution in Manufacturing SMEs will be as the following: The smart machines send signals to the AR mobile application notifying the need for maintenance or repair, and stating the required task to be done, for example, replace a certain part. These processes can be requested regularly or occasionally depending on the machine and the type of the process. This also allows the machine to take real-time sensor values into account, which might show an upcoming need for repair. Then, any worker can go to the machine and perform the task with the help of the AR application that will guide her/him through the whole process from start to end.

The maintenance and repair processes differs from one machine to another, which can be taken from the machine's technical description, user manuals, etc. These processes consist of many steps, and every step should be held differently and have different precautions that should be considered. Thus, we are dealing with varied types of machines, processes and steps. Which means that if an ad-hoc implementation solution is to be used, every process would have to be built from start to end from scratch, and the solution will be tailored just for a specific process with little possibility of reuse, in addition of not being time and cost efficient. Moreover, the employees creating the AR application need to have good technical programming skills, since they are going to build every process from start to finish, which will draw their attention from the contents and the process design to the underlying technology. (Geiger, et al., 2003)

Hence, there is a strong need for a rapid prototyping environment for rapid application development, to quickly design and test the AR application with the underlying processes for each machine.

Overview of the Authoring System

As shown before the main goal is to simplify the development process to allow content experts to create the application instead of requiring technology experts. For this a web application is being developed which will enable the author to create a prototype for the AR application. For this the author describes the steps in the repair or maintenance procedure. Each such step is composed of the displayed elements, their animations and so on. The logical flow from step to step is specified by simply connecting those steps and adding conditions, when to go into which following step. Technically this is then mapped to state machines; every process has a state machine that will be extracted at run time from the instruction set of the process, which was entered to the application by the author. The state machine represents the steps (states) that the worker should follow in order to do a certain task, and the events that may occur and change the flow of the execution. These events might be user events, like a button click, or a received signal from the smart machine. As the overall workflow includes a number of different software tools, the complete authoring solution can be described briefly with the following steps:

- Content Creation

Content creation is an important activities in developing an AR application. For that purpose, Autodesk Maya or Blender computer graphics software can be used for 3D modelling



and animation. Blender offers the ability to create add-on's using Python language (Blender, n.a.). Hence, an add-on can be created to allow direct export of the contents created in Blender to the web application server. Likewise, Maya also offers a scripting language (MEL) which can be used to create an extension for the same purpose. The export function will include exporting static and animated contents (Paelke, et al., 2004).

- **Application Logic Creation (State Machine Creation)**

The flow of scenes in the AR application is sequential, the application executes from start, going from one state to another till it reaches the end. However, some events might occur that may change the flow of execution. Moreover, every process has different steps, where each can be affected by different events that will change the flow of execution in a different manner. Thus, every process has its unique attributes and workflow. A state machine performs actions in response to external events. The action, to be performed, depends both on the received event and on the internal state of the machine (Calsavara, 2003).

The content author enters the process to be held as an instruction set, which will be interpreted and converted to a state machine as an SCXML (State Chart XML) file, then parsers will be used to access the data of the created state machine file. Hence, each process will be designed automatically depending on the provided state machine (Paelke, et al., 2004).

- **Composition (Linking Content and Logic)**

There are many elements in the state machine; each state represents an AR scene, which consists of graphical contents that illustrate the specific step to be held in the form of animated 3D objects and other helping multimedia information. Events can also be represented by animated objects to notify the user. Hence, it is important to link each element of the state machine with the suitable corresponding graphical content.

Applications are represented by actors based on the theatre model by Laurel (1991), they are classified to the following categories: (Geiger, et al., 2003)

- **Real actors:** they are the real world objects, they are created for the purpose of testing as an input for the AR application. The designer cannot control their geometry and behavior.
- **Virtual actors:** they are the virtual objects added to the real world in the AR application. Their geometry and behavior is controlled by the designer, and they must be referenced to a real world object, and they should be laid out in a way that insures the user's understanding of what should be done.
- **Meta actors:** they are visual or any multimedia information that is supplemented to the real world, but does not have a real world reference.

- **Runtime Execution (incl. Tracking)**

At this stage, we have the contents, and the design plan for the AR application. The runtime environment, in the form of an app for Android Phones and Tablets uses then a tracking system like the ARToolKit SDK to execute the formerly created logic and show the content, practically creating a new application. (Paelke, et al., 2004)

ARToolKit is an open source tracking library to create Augmented Reality applications, in which virtual objects overlay real world objects. Tracking is important in AR applications, which means to determine and follow the position and orientation of an object with respect to



the user's viewpoint in order to know from which viewpoint to show the virtual objects. ARToolKit offers tracking libraries that makes developing an Augmented Reality application easier. The tracking libraries depends on real time comparison between the camera's position and orientation and the trackable (usually as a marker on the real-world object) position and orientation (HIT Lab Washington, n.a.).

Conclusions

In this paper we discussed the added value of creating augmented reality applications for maintenance and repair tasks within manufacturing SMEs. For this we presented a literature review and over view of the different involved aspects from a technical viewpoint as well as from an economical one. After an introduction to the InMachine project which provides the current context for this work, we presented the concept for an Authoring Environment enabling content experts to create AR maintenance and repair manual, instead of requiring in depth technical knowledge. To abstract the technical details from the author a number of different approaches is being used. While relying on established tools for creating the content itself, a mapping of step in a manual to State Machines was used to allow easy authoring of the application logic and at the same time efficient execution during runtime.

The next steps will be to complete the implementation of all shown concepts and conduct intensive tests with content creators from the InMachine project. This way a number of AR repair and maintenance manuals will be created, allowing to fine-tune the features of the runtime system (e.g. interaction techniques or tracking methods) but also to improve the authoring environment and finally verify the targeted efficiency in the authoring process.

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COMMONALITIES OF PROJECT AND PROCESS MANAGEMENT FROM AN ORGANIZATIONAL VIEWPOINT

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Abstract

Project and process management are already established and standardized management disciplines of organizations. Entrepreneurial thinking and acting are corporate goals and a basis for the economic success of a company. Effectiveness and efficiency support the competitiveness of organizational units. Buzzwords like internationalisation, short product life cycles, networking or digitalisation are drivers and must be fitted into rising customer expectations organizations are facing. We handle such organizational challenges by using existing business processes or initiating projects. Under which organizational and staffing conditions does it make sense to start a project or to choose existing processes? The aim of this document is to elaborate existing similarities and differences of project and process management. Relevant literature on the combination of both disciplines is rare. Two particularly important issues are the perspective of the corporate structure and the topic of human resources. These two aspects have special importance to give organizations a decision aid for choosing the appropriate discipline. To answer this question appropriately, operational and organizational models, leadership styles, management approaches and roles in project and process management are considered on the basis of available literature and related to each other. As a result of the document the similarities and differences will be pointed out in order to enable executive managers to decide which management discipline is a suitable option.

Key words: *process management, project management, operational and organizational models*

JEL code: A1, A3, J5, J8

Introduction

Effective and efficient process management is vital for the continuous development of an organization to remain compatible on the market. This is similar to project management as competition and improvement animate to run through innovation behaviour that should be executed in a structured project-oriented way. Nordsiecks corporate doctrine with its concept of organisational and operational structure forms the basis of process and project management (Osterloh & Frost, 2006).

Projects are operated in parallel to already implemented processes, but under which conditions and constraints the decision between establishing a process or starting a project has to be made? In companies the setting of the organization plays a decisive role and can be divided into the following aspects: in operational and organizational structure, and in personnel aspects (Straub, 2015). The aim of this paper is to examine the commonalities and differences between project and process management. At the same time, the organizational and personnel issues are of particular importance in order to provide decision-making support to organizations, how to handle the upcoming tasks. Since process as well as project management are complex management concepts and already well researched, the present paper considers only the organizational and personnel perspectives.

Organizational Aspects

Looking at an organization from a holistic point of view, different aspects have to be considered. Taking over the external perspective, the outside environment of the organization is relevant. Things like possible competitors on the market, customer segmentation and growth



opportunities are essential features for the wealth of an organization. The internal view, on the other hand, is taking organizational development into account. The founding of an enterprise, the different growth phases with all their challenges and decisions made the organization up to what it is at present. Aspects such as the practices of organizing the entrepreneurial activity, the systemic treatment of an organization with the obvious action of individuals, and the view of an organization as an institution with its structural and procedural organization are equally important. All these facets help to make an organization comprehensible and controllable in its complexity.

Structural and Procedural Organization

Organizations need structured and well defined elements to work properly. These are the structural and procedural organization. As early as 1932 Nordsieck stressed out a separation of organizational structure and process organization within his work of intensive examination of the organizational theory. On one hand, the structural organization subdivides the company into task-specific sub-areas. The procedural organization, on the other hand, structures the process of business operations from the point of view of content, location and time (Osterloh & Frost, 2006), (Vahs, 2009).

The structural organization deals with patterns, units, hierarchies, principles of leadership and underlying positions and assigned tasks. The organizational chart is a useful tool for the graphical representation of a structural organization. Numerous different forms have been evolved over the years and are mentioned in this paper only by listing them: simple, functional, divisional or matrix organizations as well as tensor, process-oriented, project-oriented and project organizations. Table 1 will address these organizational forms in relation to their influence on project and process activities.

The core idea of the procedural organization is the question of the chronological order, taking into account the dependencies and the places where tasks have to be performed. Principles of adherence to specified deadlines, optimization of throughput times and consideration of capacity utilization are within the focus of this discipline. The processes of the organization are managed holistically and traversed across the structural organization (Kreidl, et al., 2006), (Krüger, 2009), (Link, 2011).

Project Management

Why consider project management? A simple answer is: It is necessary to deal with complex tasks, which can only be solved efficiently by project management. On the one hand, these are challenges for which the existing organizational and decision-making structures are too difficult to handle, on the other hand, project management is necessary to cope with cross-departmental, complex tasks in a structured manner (Heintel & Krainz, 2001), (Kraus & Westermann, 2010).

Projects are useful if the line organization reaches its limits with the predefined procedures because the tasks have become too fast, too new or the requirements have become too complex. A decisive added value of the project work is the flexible handling of procedures, which were created for this project at short notice. As a result, project management is not clearly assigned to the structural or procedural organization, since it combines disciplines from both worlds. (Lüschow & Zitzke, 2004)

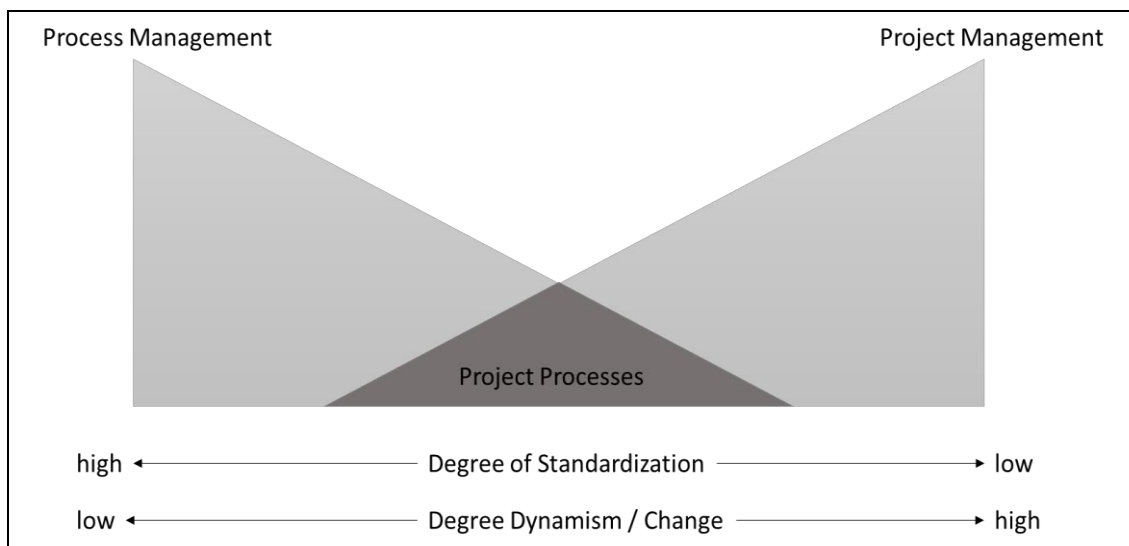


The methodology of project management is only used to the full extent when it is integrated into the overall organization and is also accepted by the workforce. The issue of project management must be anchored in the collective awareness of the organization so that it can be used for project-worthy activities. Various processes, such as planning, controlling and communication processes, are carried out during the project processing of tasks. This fact makes it clear that the disciplines of project and process management are, in a sense, Siamese twins that have strong interactions with one another.

Process Management

In the last decade, the procedural organization has become increasingly important under the key word of process management. The management often focuses on processes because the following objectives can be achieved more easily by consistently managing the processes (Gareis & Stummer , 2006), (Link, 2011): make rigid hierarchies more flexible, change interfaces between organizational units into crosslinks, structure the process portfolio of an organization, define process owners and responsibilities, join isolated department goals into common goals, optimize inventories, optimize personnel capacities, reduce processing times, increase delivery on time, consider customer requirements.

So it can be inferred that in the past, organization's emphasis on process management was driven by complex and hardly structured customer requirements, low service orientation and low quality awareness. In order to achieve a significant improvement, the objectives listed above were declared as major topics to solve and methods for improvement were sought. In response to these challenges, process management developed as a separate discipline (Bleicher, 2011), (Schulte-Zurhausen, 2014).



Source: (Hagen, 2010)

Fig. 1. Project Processes



Personnel Aspects

All the aspects mentioned above deal with organizational structures, charts, positions with assigned tasks, communication structures or operational processes. What all these organizational units have in common is the workforce behind these different concepts assuring the well-functioning of an enterprise. Both structural and procedural organizations need rules, certain kinds of hierarchies and leadership mechanisms with decision making competencies (Gareis & Stummer, 2006).

Leadership is seen as one of several strategic success factors within organizations. Executives help to identify with the goals to be achieved, promote the willingness of the workforce and strengthens the team spirit within the organizational units. Through their contribution, executives can expect more mutual trust, better internal communication and greater respect if they have the ability to empathize, are interested in employee expectations, and integrate the interests of employees into decision-making processes (Rattay, 2013).

Recently digitalization leads to remote controlling activities which is seen as unhuman leadership from the workforce point of view. This phenomenon is contradictory to the actual understanding of management. Leadership begins with creating an environment that enables performance and gives the workforce the opportunity to bring in all the skills and abilities (Covey, 2014).

Leadership styles taken into consideration in this research work are: *autocratic* or authoritarian with its rigid decision paths from executives, *democratic* or cooperative with its participation opportunities for employees, *laissez-faire* with its creative freedom of work and last but not least *situational* with its individual combination of leadership style related to situation and acting persons (Rattay, 2013).

The leadership styles described above deal with the individual leadership of executives and the social interactions between the management staff and the workforce. Management approaches do not consider personal interaction but facts and instructions within the defined environment. The common purpose of all management approaches is the discharge of executives, while different objectives and approaches are being pursued (Berger, et al., 2008).

Several management approaches have been researched and can be listed according to their principles. Management by *Decision Rules*, Management by *Delegation* and Management by *Exception* deal with principles to solve delegation problems. Management by *Objectives*, Management by *Results*, Management by *Projects* and Management by *Participation* consider target and result oriented principles (Hammer, 2015).

Roles within Project Management

Beginning with the start of a project an organizational unit is formed for a defined period of time. Next to business aspects a project organization with different acting people with assigned roles solving specific tasks, owning competencies and responsibilities is established. Such relevant and theoretically well-defined roles are the *sponsor* (person or group that provides the financial resources), *project manager* (assigned by the performing organization to achieve the project objectives), *project management team* (carries out the work) and other *team members* (carry out the work, but not directly involved with management). Sometimes the role of a *project coach* who gives experienced consulting to the project team is also installed. Each



project role is connected to defined responsibilities and assigned tasks. The interaction with each other is determined by the duration of the project itself (Rattay, 2013).

Roles within Process Management

Implementing process management is a challenging task as business processes are executed throughout the entire organization. Strategic and operational goals concerning structural and procedural organization have to be considered as well as decisions from top and line management and the workforce. As all requirements of these mentioned interest groups should be met it is recommended to install roles defined in process management in addition to already existing organizational roles. It is important to complement and not to replace or invent roles when assigning new tasks to positions (Senden & Dworschak, 2012).

Process roles taken under research are following the most common vocabulary as different literature sources like CMMI, ITIL or common standards are using different names for the same roles: the *process manager of chief process owner* (provides the process management system as controlling mechanism for the top management), *process responsible* (development, improvement and controlling of processes), *process owner* (operational responsibility for the execution of the process), *process team member* (support of process responsables and continuous improvement), *process coach* (knowledge transfer from best practice approaches) (Wagner & Patzak, 2015).

Commonalities and Differences

From the organizational point of view process and project management have been considered only in recent decades and are still installed or executed separately from each other. The upcoming paragraphs are addressing commonalities and distinctions found during the research activities with the main focus on organizational and personnel aspects.

Findings Related to Organizational Aspects

Continuous improvement as well as organizational learning are means to raise efficiency and effectivity and are major parts of both project and process management. Another point is the need for planned and well defined organizations. Projects as well as processes feature certain organizational forms and defined roles which can be seen as social sub systems where people work and interact with each other.

Table 1

Project and Process management from the Organizational Viewpoint

Organization Type	Commonalities	Differences
Simple Structure (Tree Structure)	Working together is hardly possible and communication should only be executed via executives. These two facts are in direct conflict with the strategies of project and process management.	If projects are defined, the role of the project manager should be executed by a management position due to the communication and decision rules within a project. As processes support the execution of tasks through different organizational units, process management is not appropriate for such an organizational



		form.
Functional Structure	This organizational form is the basis for the orientation of job enlargement. As the skilled person needed can be addressed, project as well as process oriented tasks can be executed. Project management does not play a key role within such an organization.	The role of the project manager should be executed by a management position, conflicts of goals of project and line organisation will occur. Direct communication lines between the management team will lead to excessive demand of the management.
Line-and-staff Organization	Employees within a staff organization will help to support project and process management activities. Usually assigned staff organizations are built like the PMO – project management office to smoothly support the line organization.	Projects can be directly executed within a staff organization. The execution of process management only within staff organizations is not productive, as the coordination of executives is different over time without the integration of the top management.
Matrix Organization	This organizational form is ideal to execute process as well as project activities as the management assignment is manifold and daily business for employees and management. Integrated project management can be implemented.	No differences can be addressed for the matrix organization.
Tensor Organization	This organizational form offers flexibility enough to install projects and process management. Like in the matrix organization integrated project management can be implemented.	As internationalization often comes with tensor organization, experts from different sites can be integrated into global projects. Processes are addressing customer needs and cannot be seen from a global viewpoint. Regional, cultural as well as market aspects have to be considered.
Process-oriented Organization	The focus on needed processes does not only include process management but also projects as they also need specific task flows. Integrated project management can be implemented.	No differences can be addressed for the process-oriented organization.
Project Organization	All activities are shaped by project oriented thinking. So forming, executing and adjourning tasks are managed by defined processes. This working style can be called differentiated project management.	This organizational form builds the basis to form project organizations for a restricted time period and to manage these projects in parallel. Existing and valid processes within the organization remain the same, they are only expanded by project specific processes.

Source: author's research findings

Taking Mintzbergs configuration of organizational structures into account, the following commonalities and differences related to project and process management can be derived (Mintzberg, 1979).



Table 2

Project and Process management from the Procedural Viewpoint

Organization Type	Commonalities	Differences
Simple structure	Small sized organizations usually operate on a simple structure where tasks are assigned by top management. Project and process management hardly exist as implementation is not worth the effort.	If projects are implemented, the top management is taking the role of the project leader. Tasks are executed in routines, but consciousness about process management usually does not exist.
Industrial bureaucracy	Industrial bureaucracy is excellent in standardization of tasks and processes for project and process management. Controlled information and communication channels support projects, processes can be executed throughout the organizational structure. Despite this long information flows and rigid processes are contra productive in any ways.	Much effort has to be put into the establishment of information and communication rules within project due to rigid hierarchical structures. Processes are standardized throughout industrial bureaucracies and are daily business.
Professional bureaucracy	A professional bureaucracy can be seen as lean industrial bureaucracy. One essential difference is short communication flows and lean processes. This has a positive effect on process and project management.	Within the organizational core experts are responsible for organizational procedures. Due to high specialization of the employees in such organizations, projects are appropriate, but hardly found.
Divisional form	Large companies are usually dividing their organizations into market segments to raise flexibility. These offer rigorous advantages for project and process management.	Due to multiple divisions and long communication flows the demand for coordination between divisions within project is very high. From the business process point of view, processes do not exist across divisions as they usually form closed systems.
Adhocracy	This organizational form is flexible and dynamic. Project and process management can profit from this diversity and dynamic.	Most of the activities in such organizations are executed within projects. Processes have a recurring aspect, so the organization usually does not define standardized processes with the help of process management.

Source: author's research findings

Findings Related to Personnel Aspects

Project and process management activities are strongly characterized by the fact that people are working together on something important, abstracted from their day to day business. These defined goals have to be achieved under certain conditions like time, personnel and monetary resources with the best possible result. Essential factors in this case are defining the



most suitable management style, implementing suitable management aspects and defining roles within an organization.

Executives and the top management play a vital role on the way of goal achievement. They influence their employees with their individual strengths and weaknesses in the course of communication and leadership. The use of a suitable management style allows positive influence on quality, time management and necessary effort.

The use of the appropriate management style naturally depends on various basic conditions. Within the disciplines of project and process management the selection of leadership is mutual from the management perspective.

The autocratic style is suitable for rather unexperienced employees, who are given a sense of security by strict decision lines from the management. However, as new employees very rarely execute major tasks in projects and processes, this management style is rather less suitable for securing productivity. As working in teams is one of the core fundamentals of project and process management the *democratic style* perfectly fits to both disciplines.

Contrary to the democratic style, the laissez-faire style leaves essentials like formulated goals, time limits and required quality behind. This style has weaknesses because of disproportional freedoms in relation to expected results and time and resource constraints.

Project management processes are characterized by a high degree of dynamism, partly changing conditions and short-term approaches. Under these circumstances, the *situational style* can show its strengths and is the most suitable leadership style. Processes have a significant dynamism, but the circumstances do not change due to the definition of a process, so the situational style would not be disadvantageous due to the flexibility, but it is not necessarily the best choice for process management.

Addressing the management concepts under research it can be seen that the common goal is to clear executives from their management role. The distinction lies between the delegation of simple tasks and the delegation of additional goal and performance targets. Both project and process management are target and result oriented, so the management concepts should be oriented on achieved output. The following approaches are therefore recommended for project management: *Management by Objectives*, *Management by Projects* and *Management by Participation*.

The approach Management by Results is not suitable as the selection of means to achieve targets does not play a vital role, so conflicts between involved organizational units can arise.

For the process management the concepts of *Management by Objectives* and *Management by Participation* are more than suitable. The above mentioned problem of the Management by Results approach is also problematic in the process management context, since other organizational components or processes could be impaired and the overall context within the organization is disregarded. Management by Projects is not a viable option for process management because of the lack of framework conditions.

Both project and process management have defined roles and tasks. There are mainly groups of persons with a focus on structure and purpose. In the case of project management this is the role of the *sponsor* or the *project manager*. Process management makes use of the role of a *process manager* to create the necessary structures and to derive the process objectives from the corporate objectives. For the transformation of the mostly abstract process objectives into operationally usable goals as well as the ongoing improvement of the processes is perceived by



the role of the *process responsible*. *Project and process teams* are responsible for the problem solving tasks of both management disciplines.

From the perspective of *coaching*, it should be mentioned that the similarities are very profound. In project management as well as in process management, the main focus of the coaching is on the methodological competencies and provide added value for the instructed persons by introducing experience, tools and techniques.

From the structural organization perspective project and process management are contradictory. Projects are organizations for a certain time period with a defined end and processes are recurring procedures over a long time period. So the assigned roles are also different. The roles of the project management are only integrated into the organization for the duration of the project and require links to the existing structure. Since the projects themselves are only designed for a certain time, but usually several projects run in parallel and new projects are started, the *project management office* (PMO) has proven to be worth the effort of establishing it. The tasks can be coordinated via the PMO and the project-relevant roles can be supported. Trained project managers can be located there in an organizational manner in order to be recruited for upcoming projects based on their abilities and experiences.

It is the opposite with the roles of process management. Processes are recurring activities that are permanently installed in the company. Therefore, these roles are permanently required to achieve the objectives and quality of the processes. In order to generate an overall view of the business processes, to recognize mutual interactions and to make use of synergies, it is recommended to implement a *process management office* (PcMO). Within this PcMO, basic process definitions can be made and assigned to persons with the role of a process manager.

Discussion and Recommendations

Project and process oriented organizational structures are often implemented decoupled from each other. This approach results in duplication, overlapping, misunderstanding, and power struggles between project and process activities. Wasted resources and inefficiencies are the logical consequence. The risk of failed projects and inhomogeneous processes is significantly higher because of the mentioned facts than in a coordinated procedure. A paradigm shift away from the purely function-oriented organizational form to a dynamic process-orientation has already started.

Where project or process thinking is present, it is simply possible to focus on the other management discipline since the approaches and prerequisites are already given from an organizational and personnel perspective. In a way projects and processes are like Siamese twins. Modern management approaches already provide improvement processes, which sometimes even end up in projects in order to develop, implement and sustain the desired optimization measures within the company. At the same time, various processes are taking place in projects which are intended to ensure progress, target achievement and compliance with the planned resources in the given time and the required quality. Interactions of this kind require a coordinated structural organization and a harmonious interdependent procedural organization.

The exploitation of synergies between the two management disciplines and the efficiency increase in the delivery of entrepreneurial activities are fundamental topics for sustainable success. This includes a clear understanding of the roles of the employees, efficient communication channels and a motivating approach to the team members. Within organizational structures, personnel aspects such as management styles and management



approaches are becoming increasingly important as they represent a decisive basis for the achievable output, both in projects and in processes.

Within all organizational structures taken under research, permanent structures of divisions, departments and hierarchies are installed. Within these well-defined structures more or less systematically managed processes are implemented and executed to support entrepreneurial tasks. A fitting supplement are for example projects that cover specific, complex and unique requirements to fulfil set goals. From the already mentioned commonalities and differences from an organizational viewpoint someone can come to the conclusion that projects and processes are not considered holistically although synergies could be generated.

The implementation of a *joint project and process management office* and the anchoring of this organizational unit in the organizational chart would strengthen the importance of these two subjects of research and thus strongly remarked in the structural organization. The systematic control and central organization of the projects and processes by this department generate a holistic view. This allows a direct derivation of the objectives from the company strategy. Based on this, suitable operational activities can be derived for the company within projects or processes.

In addition to all undoubtedly very important questions concerning the appropriate organization, the human factor is one of the most important resources in many companies in order to successfully compete in the market. This is because organizations are also seen as social entities in which people act with all their strengths and abilities, but also have weaknesses, fears and needs that play a role in the work performance. For these reasons, the respective management and the appropriate management style is required in order to employ human resources in the best possible way.

1. Recommended course of action

What can be seen from the findings above the possibilities and prerequisites are very complex and most of the time decision makers are not always aware of all relevant aspects, conditions and measurements. Table 3 shows the analytical dimensions that should be taken into consideration. Examples of these dimensions are aspects of upcoming tasks, the own company's structure or personnel aspects on the horizontal axis and projects, processes or line tasks as vertical categories.

In order to be able to derive recommendations for the top management the most appropriate analytical dimensions are related to criteria of interest and categorized according to the vertical axis. By individually weighting the features according to frequency of assignment a big picture can be derived and used as recommendation for organizational decisions.

Table 3

Analytical Dimensions for Decisions on Projects, Processes and Line Organization

Analytical Dimension	Project	Process	Line
Upcoming task:			
Importance for the organization	high	medium	low
Size of the task	high	medium	low
Risk	high	medium	low
Complexity	high	medium	low
Execution time	long	medium/short	short



Necessity of central control	high	medium/low	Low
Routine task	not suitable	suitable	suitable
Cross departmental activity	suitable	suitable	not suitable
External resources	suitable	partly suitable	not suitable
High coordination effort	suitable	partly suitable	not suitable
Organization:			
Structural organization is related to	flexible structure, project thinking, short decision paths	clear flows, process thinking, customer orientation	hierarchy, long paths
Procedural organization is related to	“ad hoc” processes, divisional thinking	predefined processes and use of experts	formalism and bureaucracy
Personnel aspects:			
Leadership style	democratic, situational	democratic	autocratic, democratic, laissez-faire, situational
Management by – approaches	objectives, projects, participation	objectives, participation	decision-rules, exception, delegation, objectives
Roles are defined and aligned for	projects	processes	line tasks

Source: author's research findings

Conclusions

Structural and procedural organization, leadership styles, management approaches and the personnel roles within an organization are narrowly connected topics which show mutual interaction. After closer consideration, organizational and personnel aspects of project and process management commonalities clearly dominate. A common consideration of both subject areas is extremely recommended.

Due to demanding day to day business decisions have to be made too fast and under a recognizable time pressure. Under these circumstances the author recommends to install suitable precautions. One possible organizational and personnel element could be a joint project and process management office as additional organizational unit to function as link between line organization, projects, processes and the top management.



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AGILE TRANSFORMATION IN PROJECT ORGANIZATION – ISSUES, CONDITIONS AND CHALLENGES

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Abstract

Large-sized enterprises provide advanced business services and products to their customers through complex, innovative and unique projects and programs. The strong market competition raised a lot of challenges in complex project and program management. Some of the key challenges in the project and program management are: increasing transparency of project planning, growing predictability of customer's deliveries, higher overall project efficiency, reduction of project delivery cycle duration, improving communication and cooperation between business and project teams, improving project and program portfolio management and developing the right organizational culture.

The primary goal of this paper is to present issues, conditions and challenges of an Agile transformation as an organizational change resultant from introduction of a new Agile project management methodology in the context of the contingency theory.

Based on a review of the literature, multiple case study analysis of companies implementing new Agile project management methodology is presented as empirical research. It is focused on comparison of issues, conditions and challenges of the Agile transformation in large-sized enterprises.

As the results of the research showed, the change of the project management methodology significantly impacted the entire project organization. It was a source of extensive organizational changes in technology, methodology, processes, strategy, structure and organizational culture and it allowed for improving the competitive advantage of the organization.

Key words: *project management, Agile transformation, organizational change, Agile methodology, contingency theory.*

JEL code: M15, O22, O32.

Introduction

Large-sized companies deliver increasingly advanced business services and products to their customers and stakeholders through complex, innovative and unique projects and programs. A strong marketplace competition stirred up a lot of issues and challenges into complex projects and programs management, as well as into projects and programs portfolio management (Cegarra-Navarro et al., 2016; Appelbaum et al., 2017). The top issues and challenges in the contemporary project and program management are: an increasing transparency of project planning, growing predictability of customer's deliveries, enhancement overall project efficiency, reduction of the time-to-market, increasing innovation and development, improving communication and cooperation among customer, business and project teams, improving effectiveness of project and program portfolio management and development of the right organizational culture.

Agile project management continues its rapid growth in popularity and is being deployed by a number of large-sized organizations through the process called Agile transformation (Gandomani & Nafchi, 2015; 2016; Dikert et al., 2016; Olszewska (née Płaska) et al., 2016). The Agile organization is on the way to become one of the forms of a contemporary organization to cope with marketplace competition by exploring new opportunities and to respond to customers' expectation in an easy, swift, user-friendly and personalized manner (Denning, 2016a; 2016b). Either Agile deployment process or Agile transformation process is somehow unique to a given organization and therefore there is little of empirical research



related to a wide-scale organization transformation (Laanti et al., 2011, p. 276). The research results and conclusions presented in this paper might be valuable for organization management and senior executive to facilitate Agile transformation process with less cost, time and effort and improve performance by considering proactively potential issues and challenges.

The primary goal of the empirical research in this paper is to respond to the research question about issues and challenges, supporting and non-supporting conditions and long-term goals of the Agile transformation as an organizational change in large-sized enterprises resulting from the introduction of new Agile project management methodology in the context of the contingency theory. The empirical research results fill the literature review gap for large-sized enterprises delivering complex IT and ICT projects with Agile methodologies. The research results showed that a change of the project management methodologies may lead to wide, integrated and complex organizational changes in technology, methodology, processes, strategy and organizational culture increasing competitive advantage of the organization.

A literature review and a multiple case study analysis of the companies implementing new Agile project management methodology were applied as research methods. The main limitation of research study analysis is the source of multiple case studies. They are largely based on documents available on the Internet, with a number of successful descriptions of the Agile transformation process and only very few details important from the research perspective. Repetition of the same or similar multiple case studies analysis by several different researchers may lead to interesting comparisons and conclusions as a future research opportunity.

The structure of the paper is as follows: the first part discusses the research results and the second part contains conclusions, proposals and recommendations. The first main part is also divided into subchapters presenting: a review of the existing literature, the methodology approach, the empirical research results and the final subchapter discusses the research results.

Research results and discussion

Agile transformation

Numerous large-sized project organizations have started to deploy Agile methodologies in order to gain or increase their competitive advantage on the dynamic and unpredictable marketplace. A transition process from traditional project methodologies to Agile project methodologies is often known as an Agile transformation process and it concerns almost all areas of organization (Gandomani & Nafchi, 2015, p. 204). In most cases, the Agile transformation (or transition) process is impacted by unique, multiple issues, barriers and challenges and it requires a significant effort and long deployment timeframe while collaboration and engagement among team members/engineers, all level managers, and customers are essential (Ibidem; Gandomani & Nafchi, 2016, p. 257, Dikert et al., 2016). The Agile transformation process is a complex, long and evolutionary one due to its nature of organizational changes requiring tailoring, localization and adoption at scale in a large-sized company (Gandomani et al., 2013, p. 2345) while, simultaneously, these changes may look as revolutionary ones from an external perspective – the whole organization is undergoing “metamorphosis”. Due to the scalability challenge, it also requires lots of effort to synchronize all these changes at various interfaces of organizational units (Dikert et al., 2016, p. 87). Due to



the process complexity and long period of observation, little empirical research was carried out with its focus on transforming large-scale organizations (Laanti et al., 2011, p. 276).

Parental goal of the Agile transformation process is to provide organization with an agility feature. Organizational agility means the ability to respond rapidly, proactively and intentionally to an unexpected changing demand whilst controlling the risk, efficiently adapt and innovate as well as shrinking the feedback loop (Appelbaum et al., 2017). Agility assists organization with the search, acquisition and retrieval of relevant knowledge in order to apply this knowledge in development of high-quality services and products as well as quickly respond to competitors' movements (Cegarra-Navarro et al., 2016). Agility also enables organization characterised by a continuous growth, learning and adaptation to utilize new opportunities and to deliver new value as a response to customer-driven and outcome-oriented demands and expectations (Denning, 2011; 2016b, p. 17). Agile as a mindset is much more important than any management methodology itself and only its full adoption may lead to successful Agile transformation process (Denning, 2016a, p. 13-14).

Table 1 presents comprehensive characteristics of the Agile transformation process based on literature review. Note that most studies focused on human-related aspects and challenges as the key ones (Gandomani & Nafchi, 2016, p. 257).

Table 1

Characteristics of the Agile transformation process – desktop review

Issues & challenges	
Scalability, complexity, reliability, scope of changes, governance and long durability of deployment process; communication; dependencies; lack of management support; lack of knowledge and expertise about Agile; lack of training, mentoring and coaching; inadequate and dysfunctional training; ecosystems and rigid organizational culture; national culture; distributed teams; resistance to the change; wrong Agile mindset; interpretation of Agile differs between teams; misconceptions and shortcomings; lack of effective collaboration and cooperation; negative human aspects; customer attitude; technical issues; lack of budget/investment/resources; lack of trust; high workload; old commitments; new difficulties within ongoing process implementation; reverting to the old way of working; excessive enthusiasm; scalability challenges on interfaces in multi-team environment; hierarchical management and organizational boundaries; management in waterfall mode; old bureaucracy; requirements engineering and management challenges; metrics and quality assurance challenges; iterative planning; integrating non-development functions as incremental delivery pace and product launch activities; rewarding model not teamwork centric; self-organizing team; light weight documentation and tacit knowledge; conflicting priorities; lack of taking ownership or decision; lack of empowerment.	Denning (2011; 2016a), Dikert et al. (2016), Fry & Greene (2007), Gandomani et al. (2013), Gandomani et al. (2014), Gandomani et al. (2015), Gandomani & Nafchi (2015; 2016), Gregory et al. (2016), Laanti et al. (2011), Olszewska (née Płaska) et al. (2016).
Supporting & non-supporting conditions (pre-requisites)	



<p>Management support and strong inspirational leadership, commitment and engagement to change; choosing and customizing the Agile approach; effective trainings, coaching and mentoring; communities of practice involvement; correct mindset and alignment; trust; having convincing reason to change; clearly defined business goals; realistic expectations; people and team members buy-in; engaging people; pilot project selection; pre-start assessment; cross-functional rollout team set up; right people selection and empowering team; continuous meetings and negotiations; Agile Champions and Agile Coaches; incentive and motivation factors; communication and transparency; team autonomy; requirements management; patience and long enough timeframe to implement mindset, goals, principles and values; individually adjusted process to organization profile and its own context; overcoming setbacks and experiments openness; self-training; team practices; individual motivation; automation; tools.</p>	<p>Denning (2011; 2016a; 2016b), Dikert et al. (2016), Fry & Greene (2007), Gandomani et al. (2013), Gandomani et al. (2014), Gandomani et al. (2015), Gandomani & Nafchi (2015), Gregory et al. (2016), Paasivaara & Lassenius (2014).</p>
Benefits & long-term goals	
<p>Improvements in areas of: management and organization, people, technology and processes; increased customer visible value and customer focus; self-organizing teams; requirements management; iterative planning; effectively used feedback; accelerating the response to problems; transparency, visibility and predictability; continuous improvement; productivity and efficiency improvements; frequent deliveries – short time-to-market response; knowledge sharing; horizontal communications; strategic engagement and commitment to agility – in terms of quality, speed, cost; adaptable organizational structures; increased business performance; beyond maximizing shareholder value; passionate and friendly workforce; well-functioning communities of practice; enhanced actual control.</p>	<p>Appelbaum et al. (2017), Denning (2011; 2012; 2016a; 2016b), Fry & Greene (2007), Gandomani et al. (2013), Gandomani et al. (2014), Gandomani et al. (2015), Gregory et al. (2016), Laanti et al. (2011), Paasivaara & Lassenius (2014).</p>

Source: author's calculations

Comprehensive and functional training is a fundamental and necessary pre-condition of an Agile transformation process (Gandomani et al., 2015, p. 308). Communities of practice (groups of experts) with common interest and broad knowledge of the domain may facilitate a successful lean and Agile transition, in particular in large-sized organizations (Paasivaara & Lassenius, 2014, p. 1556). As the cost of Agile transformation in terms of money, disrupted working routines and quality of development may become fairly significant, there is a need to quantitatively measure the impact of an Agile transition (Olszewska (née Płaska) et al., 2016).



Contingency theory

The key assumption of the contingency theory is to apply unique contingency approach in organization management due to the lack of universal management methods. Each organization has a unique profile, operates in a different environment, requires different conditions and a different context and, therefore, it is influenced by miscellaneous contingency factors (Nita, 2013, p. 195). The contingency theory assumes that there is no available universal set of management methods and, what is more, the existing ones are impacted by numerous of contingency factors and contextual variables and they are applicable only into individual unique situations and conditions (Otley, 1980). Hambrick & Lei (1985, pp. 764-765) and Fisher (1995, p. 29) presented the contingency view in reference to two other extreme research approaches: to situation-specific view and to universalistic view. In the contingency view, both proximal and distant organization environment affects organization operability and management decisions. The aim of the contingency theory is to recognize some universal features and properties of the organizational management methods and its effective application to the specific group of organization in the unique situation and in a specific context of identified contingency factors (Otley, 1980, p. 413; Nita, 2013, p. 195).

The contingency theory is also applied to the empirical research related to effective leadership, effective incentive systems, adaptive organizational structure, adaptive management methods, project management and strategic management accounting (Simon, 2007). There are four key components of the research approach in the contingency theory, namely: contextual variables, positive or normative theory, research questions in a given management field and research methods – empirical in the positive theory and deductive in the normative theory (Nita, 2013, pp. 196-197). The empirical research in the positive theory leads to the impact analysis of the existing contingency factors on the already applied management methods, while research in normative theory leads to a search and an offer of a practical solution and improvements of management and organization methods. The empirical research in the contingency theory is focused on recognition of both external and internal contingency factors impacting effectiveness and development of the applied management methods (Nita, 2013).

The Agile transformation in a project organization responds to various contingency factors and conditions in a given enterprise context and in a given enterprise operational environment. This response is triggered by changes in the customer demand and expectations as well as by competitor's movement. A project management transition from traditional methods to Agile methods is an example of wide-scale management method changes initiated by the changing contextual variables in the project organization habitat. There are both external and internal contingency factors which can be identified and classified in terms of Agile transformation process deployment. The context of the contingency theory plays an important role in the Agile transformation process, as it facilitates understanding of issues, challenges, conditions, process nature itself and results of changes introduced in project management methodologies from a positive theory perspective and uses the same research results to introduce some practical improvements in project methodologies from the perspective of the normative theory.

Methodology approach

The main goal of the empirical research in this paper is to present issues and challenges, supporting and non-supporting conditions and long-term goals of the Agile transformation as an organizational change due to the introduction of new Agile project management methodology in



the context of contingency theory. The research population is defined as large-sized enterprises implementing a new Agile project management methodology in order to provide advanced business services and products to their customers through complex, innovative and unique projects and programs.

An illustrative and explanatory multiple case studies (ed. Jemielniak, 2012, pp. 14-16; Kozarkiewicz, 2012, p. 202; ed. Czakon, 2015, p. 201) analysis was applied as a research method to find and analyze answers to the research questions about:

- a) The details of the Agile transformation process in terms of issues and challenges.
- b) The root causes and effects of the Agile transformation as a change related to the newly introduced project management methodology.

The aim of the multiple case studies analysis with intentional selection was to answer the research questions and, consequently, to fill the desktop review gap for large-sized enterprises delivering some complex IT and ICT projects. The triangulation method (ed. Jemielniak, 2012, pp. 182-183; ed. Czakon, 2015, p. 248) was applied to present non-arbitrative perspective of the empirical research. The triangulation method results with variety of multiple case studies sources – different enterprises, consultants and authors and with diversity of methods applied to collect all of these 110 case studies. Case studies of 107 enterprises were collected by searching through the existing Internet repository. Documents created by multiple authors and consultants (informant's triangulation) came from 12 different consultant groups (source's triangulation). Two other case studies came from standardized and unstructured interviews with an Agile coach and the last one is based on the author's observations.

The main limitation of the below-presented research study analysis is the source of the multiple case studies by itself. Most of the case studies are based on documents available on the Internet and contain description of successful Agile transformation processes and the same, very limited number of details important in its research. The author's endeavoured to interpret carefully each case to extract as many details as it was possible from the context of the descriptions. Although it could have led to some incorrect or subjective author's interpretations, repetition of the same multiple case studies by several researchers may lead to some interesting comparisons and conclusions and represent a future research opportunity.

As a result of the multiple case studies analysis, 9 single-valued and 9 multi-valued variables were identified for each interpreted case study – see Table 2 for details.

Table 2

Research variables

Variable	Type	Comments
<i>Industry</i>	Single-valued	Most enterprises applied the Agile transformation process to their IT departments or to IT & ICT projects only. It implies their main areas of interest (see Fig. 1).
<i>Headquarter</i>	Single-valued	More than 55% case studies came from United States companies and the rest from companies outside the US.
<i>Number of employees</i>	Single-valued	Presumably a very important variable from the statistical analysis' perspective, but unknown in most case studies. Here a potential future research gap has been identified



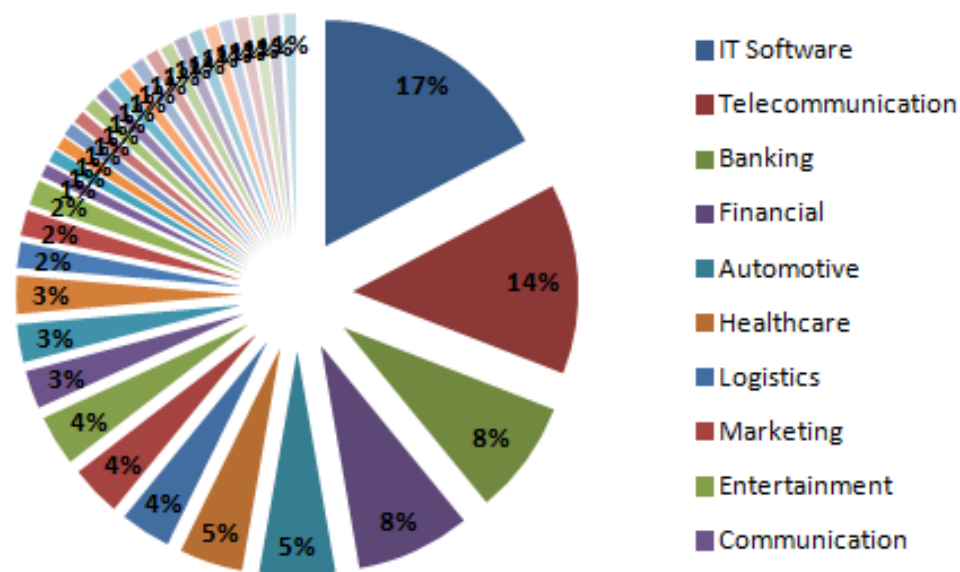
		which is coming up with a concept of deriving it either from the size of department undergoing the Agile transformation or from the total number of company employees. Most of the examined enterprises employed between 500 and 1,000 employees.
<i>Scalability level</i>	Single-valued	Organization Level - 47% and Project Teams Level - 53%.
<i>Scalability model</i>	Single-valued	The scalability model on the organization level: SAFe - 26%, LeSS - 13%, other - Scrum of Scrums or unknown.
<i>Old PMM</i> ^{††††}	Single-valued	28% clearly defined as the Waterfall, other unknown.
<i>New PMM</i>	Single-valued	Scrum - 52%, Kanban - 7%, mixed Scrum/Kanban - 3% and other defined as Agile – the exact methodology unknown.
<i>Duration [months]</i>	Single-valued	Presumably a very important variable from the statistical analysis' perspective, but unknown in most case studies. Here is a potential future research gap to specify it or to get more accurate estimation. A rough estimate indicated a period from 1 to 3 years to complete the entire Agile transformation process deployment.
<i>Approach</i>	Single-valued	In all cases defined as a long, evolutionary approach to the process of changes.
<i>Issues & Challenges</i>	Multi-valued	Issues and challenges of the Agile transformation process. See the empirical research results chapter (see Fig. 4).
<i>Long-term goals</i>	Multi-valued	Long-term goals of the Agile transformation process. See the empirical research results chapter (see Fig. 5).
<i>Supporting conditions</i>	Multi-valued	The conditions supporting the Agile transformation process. See the empirical research results chapter (see Fig. 6 & 7).
<i>Non-supporting conditions</i>	Multi-valued	The non-supporting conditions of the Agile transformation process. See the empirical research results chapter (see Fig. 8 & 9).
<i>Major process steps</i>	Multi-valued	The key steps of the Agile transformation process. Will form a part of the future publication.
<i>Organizational changes</i>	Multi-valued	Organizational changes within the Agile transformation process. See the empirical research results chapter (see Fig. 2 & 3).
<i>Transformation Issues</i>	Multi-valued	Agile transformation issues encountered during the deployment process. See the empirical research results chapter (see Fig. 10).
<i>Knowledge Management Actions</i>	Multi-valued	Knowledge management actions encountered in the Agile transformation process. Will form a part of the future publication.
<i>Organizational Method Changes</i>	Multi-valued	Changes within the organizational method in the Agile transformation process. Will form a part of the future publication.

Source: author's calculations

†††† PMM = Project Management Methodology



The majority of the Agile transformation deployment (31%) took place in the IT software and telecommunication industries and, specifically, in large-sized IT/ICT departments or even at the level of entire enterprises. Agile methodologies deployments met with high interest on the part of IT departments in financial institutions from the insurance and banking sector (came 2nd with the total of 16% of all deployments). The automotive and healthcare industries ended up among the top 5 leading industries in Agile transformation deployments.

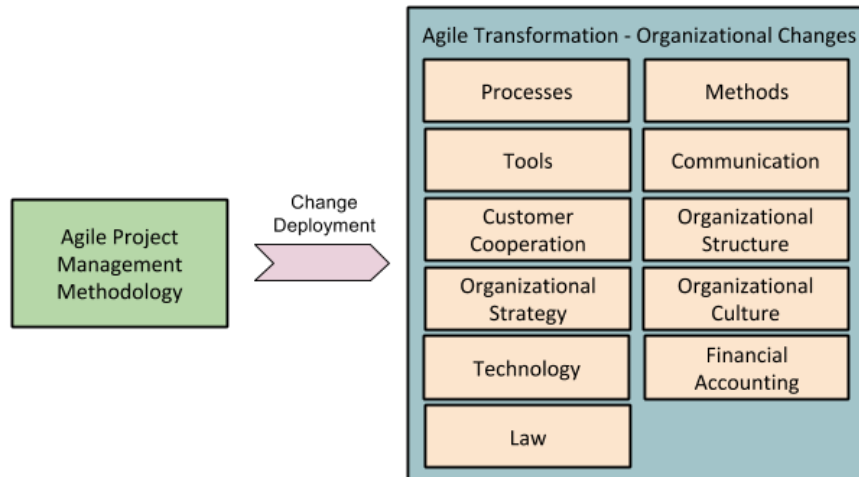


Source: made by the author

Fig. 1. Industry area

Empirical research results

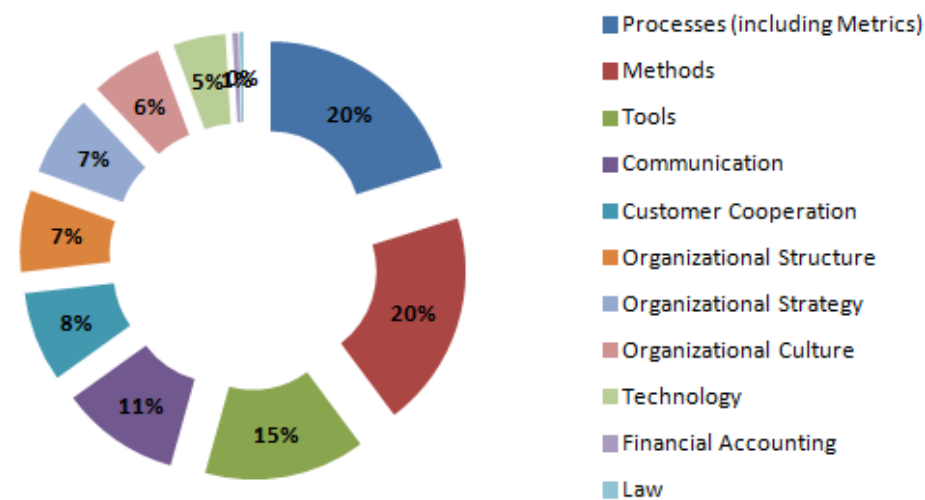
The first very important empirical research result in this paper is the author's own definition of the Agile transformation deployment process understood as an organizational change brought about by the introduction of a new Agile project management methodology resulting in several areas of organizational changes coupled with the synergy of all these organizational changes.



Source: made by the author

Fig. 2. The Agile transformation overview

Following the research results related to *Organizational changes* variable, the introduction of a new Agile management methodology affected several areas of organizational changes presented in Fig. 2 (The Agile transformation overview) and in Fig. 3 (Organizational changes within the Agile transformation). Fig. 3 presents weighted results defined as a percentage of all the marked changes in order to mark the most important areas: processes with new metrics indicators, methods, tools, communication and customer cooperation. An individual case study assessment of each organizational area of changes was as follows: processes – 97% of all 110 case studies, methods – 95%, tools – 70%, communication – 52%, customer cooperation – 39%, organizational structure – 35%, organizational strategy – 35%, organizational culture – 31%, technology – 23%, financial accounting – 3% and law – 2%.

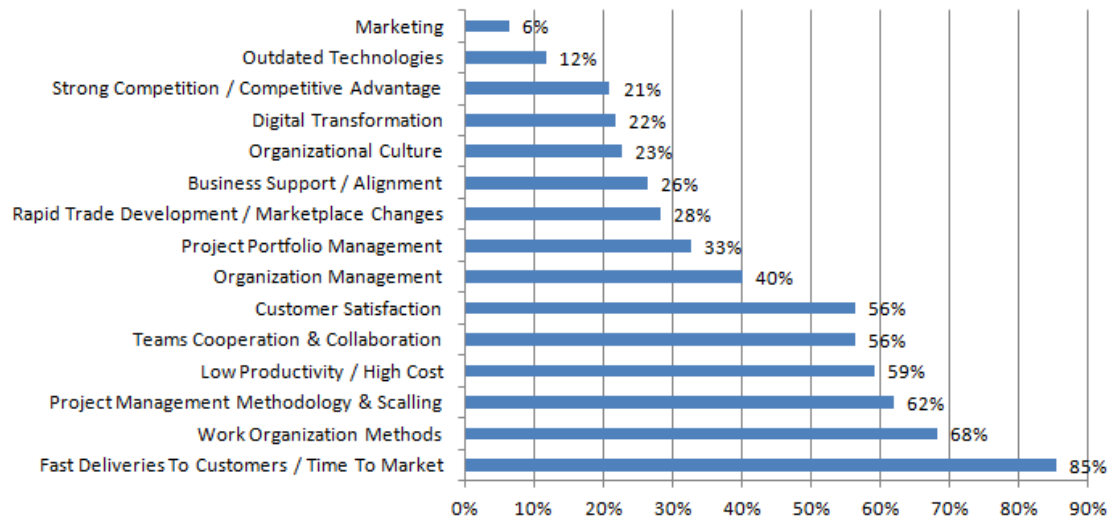


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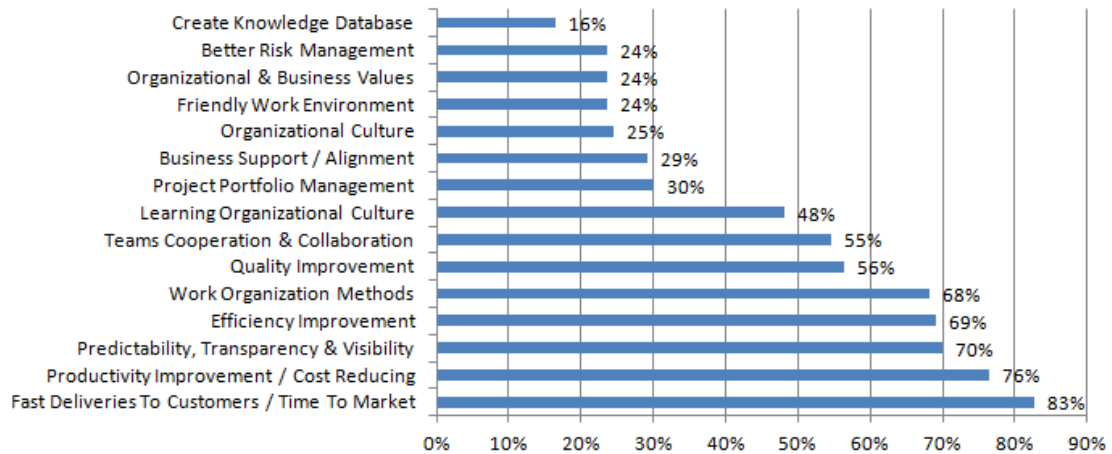
Fig. 3. Organizational changes in the Agile transformation process

The research result analysis of *the Issues & Challenges* variable identified a number of organizational issues and challenges faced by organization heading for the Agile transformation deployment. Fig. 4 presents an individual assessment of each identified organizational issue or challenge for each of 110 case studies. Most of the Agile transformation deployment decisions were connected with exploring the opportunities arising from the competitive advantage of the organization in a given industry area. Note that, in most Agile transformation cases, the decision was not based on a single factor but more on a synergy of several or more organizational issues and challenges leading to the decision over a longer period. Furthermore, the decisions were complex, difficult, costly, risky and, in many instances – irreversible and they were related to the organizational strategy and coupled with its long-term goals. Fig. 5 presents the individual assessment of each identified organizational long-term goal in terms of each of 110 case studies. Both *Issues & Challenges* and *Long-term goals* are complementary variables, as particularly demonstrated by the top expectation from the Agile transformation process deployment – namely, reducing the time-to-market of a service or product delivery. Other significant factors connected with the decision about large-sized Agile transformations included: operability cost reduction – productivity and efficiency improvements, predictability, transparency, visibility, scalability and quality improvements.



Source: made by the author

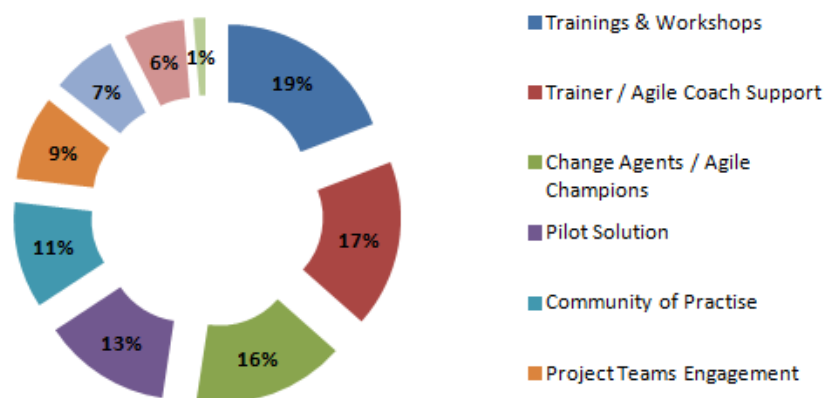
Fig. 4. Issues and challenges leading to the Agile transformation



Source: made by the author

Fig. 5. Long-term goals of the Agile transformation process

A research result analysis of the *Supporting conditions* variable generated a few hints for the organization planning to approach the Agile transformation process deployment. Fig. 6 presents weighted results understood as a percentage of all marked supporting conditions in all 110 analyzed case studies. The purpose of the presentation is to emphasize the most supporting conditions for the Agile transformation process, such as: trainings & workshops, external trainer or Agile coach support, change agents or Agile champion support, pilot solution in one of organization's project or department, community of practise involvement and/or project team engagement.



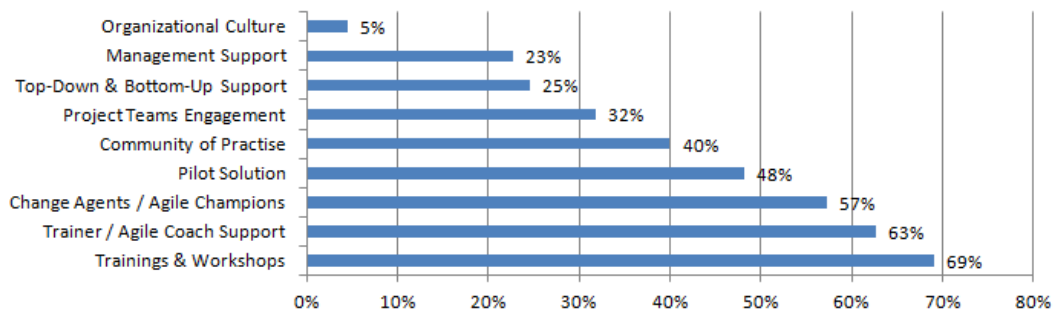
Source: made by the author

Fig. 6. Conditions supporting the Agile transformation process

Fig. 7 presents an individual assessment of each identified supporting condition in terms of each of 110 case studies. The more supporting conditions were identified, the less risk related to transformation process deployment existed. A synergy of all supporting conditions is also



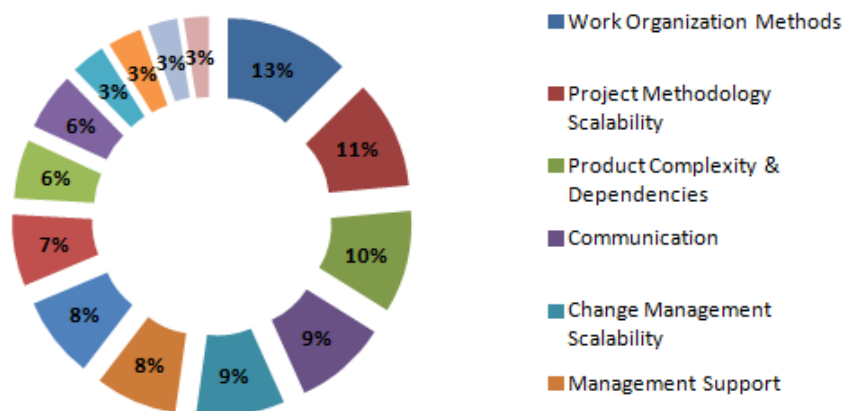
supporting condition by itself. However, the more supporting conditions were met – the higher cost of the process must have been. This cost should be carefully considered before making any deployment decision. The roughly estimated Agile transformation duration was from one to three years. It is a very evolutionary and long process, which is almost impossible to speed up in large-sized enterprises. Research results showed that the management support (23%) and organizational culture (5%) came last in the results but, in reality, they both require much more attention from the senior executives’ perspective. As pointed out during the author’s interviews with Agile coaches, without enough management support the failure is relatively high and even a successful Agile transformation takes long to be codified in the organizational culture.



Source: made by the author

Fig. 7. Supporting conditions of the Agile transformation process

The research result analysis of *the non-supporting conditions* variable resulted in a number of factors preventing or slowing down the organization which underwent the Agile transformation process deployment. Fig. 8 presents the weighted results representing a percentage of all marked non-supporting conditions in all the 110 analyzed case studies. The purpose of the presentation is to identify and stress the least supporting conditions (i.e. the most non-supporting conditions) of the Agile transformation process.

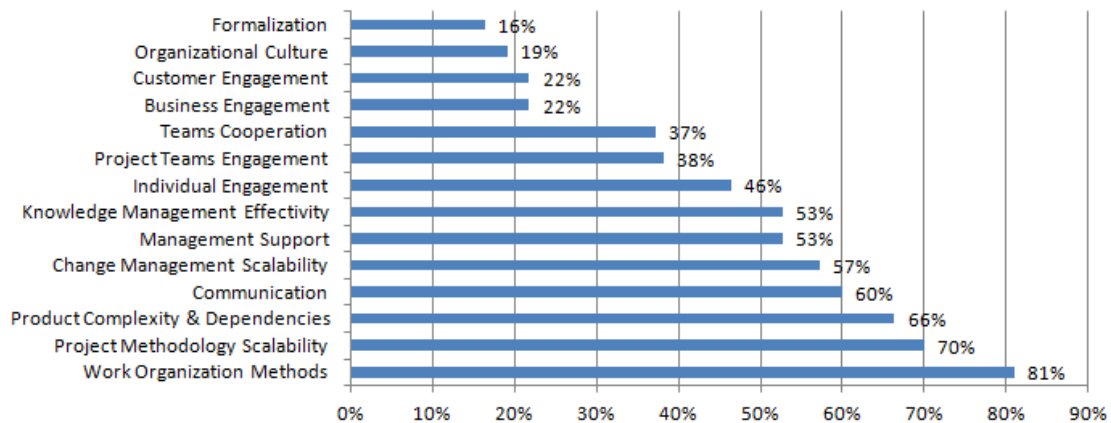




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Fig. 8. Non-supporting conditions of the Agile transformation process

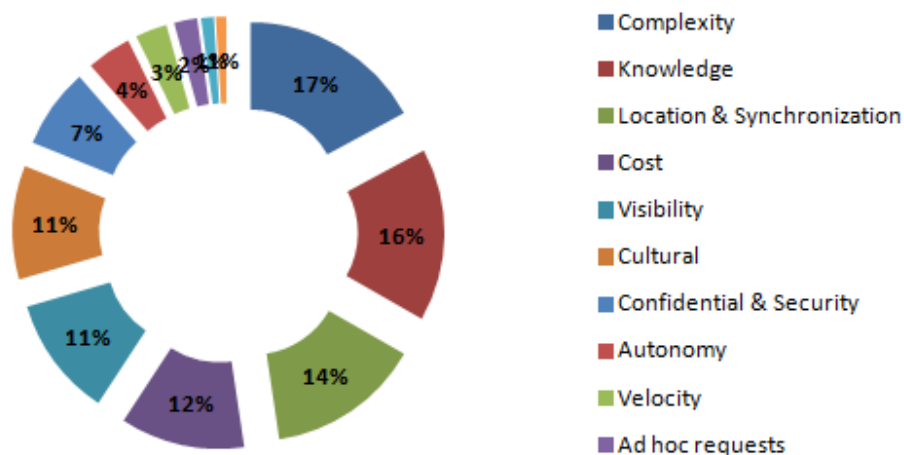
Fig. 9 presents an individual assessment of each identified non-supporting condition for each of 110 organization case studies.



Source: made by the author

Fig. 9. Non-supporting conditions of the Agile transformation process

While the supporting conditions focused mainly around training and learning factors, the non-supporting conditions fell into the area of: work organization methods, scalability of project management methodology, product complexity and its dependencies, related communication issues and required management support.



Source: made by the author

Fig. 10. Agile transformation issues encountered during the deployment process



A research result analysis of the *transformation Issues* variable gave an overview of the Agile transformation process deployment issues. Fig. 10 presents its weighted results understood as a percentage of all marked transformation issues in all 110 analyzed case studies. The purpose was to emphasise the most impacting issues for the Agile transformation process deployment. Individual assessment of each transformation issue resulted in: change complexity by itself – 79% of all 110 case studies, required Agile knowledge and experience – 75%, location and synchronization issues among different enterprise locations – 66%, total process deployment cost – 54%, visibility and change tracking – 52%, rigid organizational culture – 49%, violation of confidential & security – 35%, project team's autonomy – 19%, measuring team velocity – 14%, handling ad hoc requests – 10% and granularity and estimation issues both 5%.

Results discussion

The author's empirical research presents Agile transformation as an organizational change initiated by the introduction of new Agile project management methodology (Fig. 2). This change brought about organizational changes in several other areas including: processes with new metrics indicators, methods, tools, communication, customer cooperation, organizational structure, organizational strategy, organizational culture, technology, financial accounting, law as well as synergy of all these changes (Fig. 3). Gandomani & Nafchi (2015, pp. 209-212) and Appelbaum et al. (2017) propose their own framework and model of the Agile transition. Organizational changes presented by above research results and related to the Agile transformation in large-sized companies correspond to changes described in wide-scale transformation case studies (Fry & Greene, 2007; Laanti et al., 2011; Denning, 2011; 2012; Paasivaara & Lassenius, 2014; Gregory et al., 2016). As the process impacts many organizational areas (Fig. 3) and it is complex, costly, time-consuming and effort-demanding in its nature (Fig. 10), there is a confirmed necessity to quantitatively measure its impact (Olszewska (née Płaska) et al., 2016).

Issues & challenges (Fig. 4 & Fig. 10), benefits and long-term goals (Fig. 5) are complementary aspects of the large-sized Agile transformation process. Once issues and challenges are resolved, there is a simple way to gain benefits or to reach long-term organizational goals such as: reducing the time-to-market of service/product deliveries, increasing customer satisfaction, achieving operating cost efficiencies, in terms of productivity and efficiency improvements, work organization method improvements as well as predictability, transparency, visibility, scalability and quality improvements. The presented research results concerning issues & challenges, benefits and long-term goals are complementary with already existing research results based on a literature review (Table 1), as well as directly with: quantitative research results (Laanti et al., 2011; Gregory et al., 2016), qualitative research results (Fry & Greene, 2007; Denning, 2011; 2012; Paasivaara & Lassenius, 2014; Gandomani et al., 2014; 2015; Gandomani & Nafchi, 2015; 2016; Gregory et al., 2016) and other research results based on desktop reviews (Gandomani et al., 2013; Denning, 2016a; 2016b; Dikert et al., 2016; Appelbaum et al., 2017).

The authors' empirical research result and the literature review revealed jointly a number of supporting & non-supporting conditions, which are also called transformation facilitators, pre-requisites or pre-conditions (Fig 6-9 and Table 1). The supporting conditions concerned effective training, learning, coaching and mentoring preceded with a pilot solution of the



transition process while the non-supporting conditions included: work organization methods, scalability of the project management methodology, product complexity and dependencies, communication, management support and knowledge-sharing (Fry & Greene, 2007; Denning, 2011; 2016a; 2016b; Gandomani et al., 2013; 2014; 2015; Paasivaara & Lassenius, 2014; Gandomani & Nafchi, 2015; Dikert et al., 2016; Gregory et al., 2016).

The above-listed supporting and non-supporting conditions of the Agile transformation may be interpreted according to the contingency theory and classified to external and internal contextual variables in a given class of unique large-sized enterprises undergoing changes in project management methodologies (cf Simon, 2007; Nita, 2013). Strategy, organization, culture and technology were identified as internal contingency factors, whereas the industry sector and macroeconomic factors are classified to external ones. The internal factors largely correspond to the supporting and non-supporting conditions presented in Table 1, while the industry sector and macroeconomic factors can be related to: the digital transformation, rapid trade development, IT & ICT development, pervasive computing, big data, knowledge sources selection, globalization, IT outsourcing and offshoring. Each unique large-sized enterprise should adapt its practices to their own context (Denning, 2016a). The key role of the contingency theory in the Agile transformation process is perceivable in: selection and adaptation of the project management methodology, changes of the organizational structure, knowledge management and organizational culture.

Conclusions

The Agile transformation deployment process is a complex, evolutionary and long-lasting way of introducing changes to gain organizational agility and thus to gain a powerful tool to overtake competitors on a dynamic and unpredictable marketplace. It requires scalability, tailoring, localization and adoption in a large-size project organization.

The following key conclusions are the main research findings:

1. The Agile transformation process in large-sized project enterprises is an organizational change resultant from the introduction of new Agile project management methodology and leads to several areas of other organizational changes. The empirical research results showed a change to the Agile project management methodologies resulting from several areas of wide, comprehensive and complex organizational changes such as processes with new metrics, methods, tools, communication, customer cooperation, organizational structure, organizational strategy, organizational culture, technology, financial accounting, law as well as a synergy of all these changes.
2. The Agile transformation issues & challenges and benefits & long-term goals come as complementary aspects of the wide-scale Agile transformation process. Resolution or mitigation of the issues and challenges translates into benefits or achieving long-term organizational goals such as reduced time-to-market of service/product deliveries, increased customer satisfaction, operating cost efficiencies – in terms of productivity and efficiency improvements, improvement of work organization methods as well as improvement of predictability, transparency, visibility, scalability and quality.
3. The Agile transformation supporting & non-supporting conditions are essentially facilitators, pre-requisites or pre-conditions of a deployment/transition process in large-sized project enterprises. The major supporting conditions are: effective training, learning, coaching and mentoring and pilot solution change while the non-supporting conditions are: work organization methods, scalability of project management methodology, product



complexity and dependencies, communication, management support, knowledge sharing and management support.

4. The Agile transformation process analysed in terms of the contingency theory results in identifying and classifying external (industry sector and macroeconomics) and internal (strategy, organization, culture and technology) contextual variables in a given class of unique large-sized enterprises undergoing changes in the project management methodologies.

The key proposals and recommendations are as follows:

1. As the Agile transformation process is impacted by multiple issues, barriers and challenges, it requires considerable investment of resources, long deployment timeframe as well as strong collaboration and engagement of team members, all level managers, and customers to synchronize all the changes and resolve scalability issues of all organizational units in a large-sized company.
2. Prior to any deployment of a wide-scale Agile transformation, the executive management has to assure provision of comprehensive and functional training, mentoring, coaching and learning at all levels of the organization, ideally supported with one or more additional sources of practical Agile knowledge – for instance: change agents, Agile coaches and champions or communities of practice.
3. During the Agile transformation process, large-sized enterprises should continuously develop their own agility feature i.e. the ability to respond rapidly, proactively and intentionally to an unexpected changing demand whilst controlling the risk, efficiently adapt and innovate as well as shrinking the feedback loop. It will enable enterprises to deliver high-quality services and products as well as quickly respond to competitors' movements.
4. Large-sized enterprises should adapt project management methods and practices as well as Agile transformation process deployment to its own environmental context. Appropriate selection and adaptation of project management methodology, changes in organizational structure, knowledge management and organizational culture are possible to address with using contingency theory approach.

The cost of Agile transformation in terms of money, people effort/engagement and quality of development may become quite significant, so it should be quantitatively measured in terms of the organization impact. It is also a very interesting field for the further comprehensive studies as well as deeper empirical research from the project management perspective. Agile as a mindset is much more important than any management methodology itself and only its full adoption may lead to a successful Agile transformation process.

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HOW AND WHY DO ORGANISATION LEARN FROM PROJECTS. PROJECT KNOWLEDGE TO KNOWLEDGE PROJECT PORTFOLIO

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Abstract

Implementation of projects is a natural mechanism for companies to implement changes, innovations or improvements. In recent studies a lot of attention has been especially devoted to the collection of knowledge and knowledge management as the critical factors and the continuing use of this knowledge in the organization. The flow of project knowledge - vertical and horizontal - is frequently inconsistent and often varies within the same organization. Especially large, multi-branch global companies struggle to define a list of all ongoing and planned projects. Hence many initiatives are duplicated. Frequently separated but redundant solutions are created from the scratch. The authors decided to analyze how and why the knowledge about projects and knowledge of the projects is collected and how this project knowledge is codified in Polish globally operating companies.

The purpose of this article is to study the existing project knowledge processes and their use at the enterprise level. On the basis of this analysis, the authors have proposed a simplified diagram of the vertical and horizontal knowledge flow within an organization - and the central point of knowledge about / in / from projects – knowledge project portfolio.

The study consisted of several standardized, open-ended interviews with the members of the top management, boards, executives and projects managers employed by medium and big companies implementing IT projects in Poland. Then, basing on the analysis of the results, the knowledge flow diagram was created. The studies are preliminary and they are a contribution to further research on the verification of the use proposed scheme.

Key words: *project knowledge management, knowledge management, project management*

JEL code: M15, D83, O22

Introduction

The subject of knowledge management is currently a very popular area of research. It is reflected, among others, in the numerous publications. The number of works that contain the term "knowledge management", which have been published in the EBSCOHost database since 2000 has reached 40 221 items (as of 20.01.2017). Furthermore, starting from the second decade of this century, the number of new publications in the database exceeds 2500 each year. Knowledge management as one of the directions of the development in management science emerged in the 80's and 90's of the twentieth century. The concept of knowledge management has gone through a number of research approaches, practical applications and tools. In terms of research perspectives several trends can be distinguished.

One of them is the Knowledge-Based View of the Firm (Grant, 1996; Grant, 2002), which is, in a way, an extension of the theory of Resource Based View of the Firm. In this theory, knowledge is treated as a strategic resource that gives a competitive advantage. This is particularly important in the economy changing from an economy based on material production to an economy based on knowledge and information. This view has been criticized because of the way it emphasizes the role of an employee in its considerations and analyses and neglects the role of the company owner (Foss, 1996).



Knowledge management at the level of the organization can be considered as a broader information system (Alavi, Leidner, 2001; Markus, 2001; Gold et. Al., 2001). Alavi and Leidner proposed a framework to analyze the role of knowledge management systems within the organization pointing to four main knowledge processes:

- knowledge creation,
- knowledge storage and retrieval,
- knowledge transfer,
- knowledge application.

Knowledge management is also explored from the perspective of comprehensive organization management (Drucker, 1992; Cummings, 2004; Singh, 2005), from the perspective of organizational learning (March, 1991; Nonaka, 1994; Cramton, 2001) or strategic approach (Grant, 1996; Dyer, Noboeka, 2000).

The knowledge management is particularly important in project management. This is due to the nature of the project as a undertaking limited in time, with a predetermined beginning and end, one-time only, resulting in a specific product. This creates challenges for knowledge management in projects. Among them the following can be distinguished (Lindner, Wald, 2011):

- uniqueness of products and temporary character of project organizations, which are obstacles to the creation of organizational routines, organization memory and learning,
- lack of continuity of cooperation, personnel fluctuation, which cause disappearance of both individual and organizational knowledge,
- lack of mechanisms of natural learning which are characteristic for permanent organizations; it is a particular difficulty in the implementation of projects in different geographical areas, ethnically and culturally unlike,
- the contrast between short-term orientation of the project and long-term orientation of knowledge management in which an interval between the effects and the investments made is accepted and even assumed.

Knowledge management in projects need to be seen in three time dimensions (Kozarkiewicz, 2012):

- the perspective of the past, which is a collection of experience, knowledge and skills resulting from previously implemented projects.
- the perspective of the present, that is the context of ongoing projects in portfolio which result in restrictions on access to resources as well as opportunities for sharing experience and creating value for stakeholders,
- the perspective of the future, that is an increase in the potential of knowledge and skills to be used in future projects, expected by the organization and its employees.

Objectives that are set for knowledge management in projects are identifying and acquiring new knowledge from internal and external sources, developing existing knowledge and the creation of knowledge on the basis of ongoing projects, documentation and storage of knowledge in such a way that it is accessible to employees and secured against unauthorized access (Wąsowicz, 2013). The knowledge accumulated in such a way can be classified in four groups (Trocki, 2011):

- knowledge of terminology (glossary, definitions for further use in descriptions)



- theoretical knowledge (description of cause-and-effect relationships in the project environment)
- methodical knowledge (pragmatic)
- normative knowledge (needs, expectations, evaluation, quality criteria).

Project knowledge management is a crucial issue in terms of effectiveness of the projects implemented in the organization. Therefore, it seems reasonable to ask how project organizations manage knowledge. What is the process of organizational learning? Why do project-based businesses tend to select certain ways of knowledge management and not the others? Therefore, the purpose of this article is to analyze the existing project knowledge processes, and their application at the enterprise level. Based on this analysis, the authors have proposed a simplified diagram of the vertical and horizontal knowledge flow in the organization and the central point of knowledge about /from/in projects - Knowledge Project Portfolio.

Research results and discussion

In the first part of the study the researchers decided to look at the flows of the streams of project knowledge in organizations. The main objective of the empirical research was to investigate the perceptions of the respondents in terms of their subjective experiences, their feelings concerning management, use and reuse of project knowledge. It was essential for the research to narrow down the sample group of potential respondents to people acquainted with the characteristics of the project environment, project sponsors or decision-makers taking final decisions about the initiation or completion of the project. Therefore, the selected group of respondents consisted of representatives of the organization senior management, project managers, employees of PMO and people responsible for the coordination of project portfolios.

With carefully selected base of 400 contacts from leading companies more than 50 meetings were confirmed. Finally, the study involved forty three employees from global companies operating on the Polish market. The study had the character of pilot studies aimed at exploration of the subject issues. The research was carried out in the form of individual interviews, both categorized and uncategorized, depending on the individual characteristics and the openness of the respondent (Wengraf, 2001; Hove et al., 2005). Such an approach has enabled examination of the study area in its natural context and circumstances, along with more in-depth understanding of the phenomenon. Therefore, it was more broadly insight than just based on the analysis of variables.

After completion of the study and analysis of the results - in addition to consistent conclusions concerning the layer of flow and project knowledge preservation - the authors have created a high-level diagram representing the flow of project knowledge in the organization. In the first part of this study the results of empirical research have been concisely described. In the second one, the above-mentioned knowledge flow diagram has been proposed and discussed.

Project knowledge dimensions

The essence of the usefulness of project knowledge was the subject of direct examination. All respondents pointed to its importance and the necessity of possessing a certain predefined organizational framework sanctioning its identification, collection and use. It is worth mentioning that all of the respondents explicitly perceived project knowledge in a positive way, and pointed to the direct and indirect benefits from its use as regards the project:



- facilitates the introduction of new team members to the project;
- collection of project knowledge is useful, especially in companies with a large staff turnover;
- enables learning from one's own mistakes;
- enables learning from others' mistakes;
- thanks to these, the company accumulates knowledge and experience, which helps with subsequent projects.

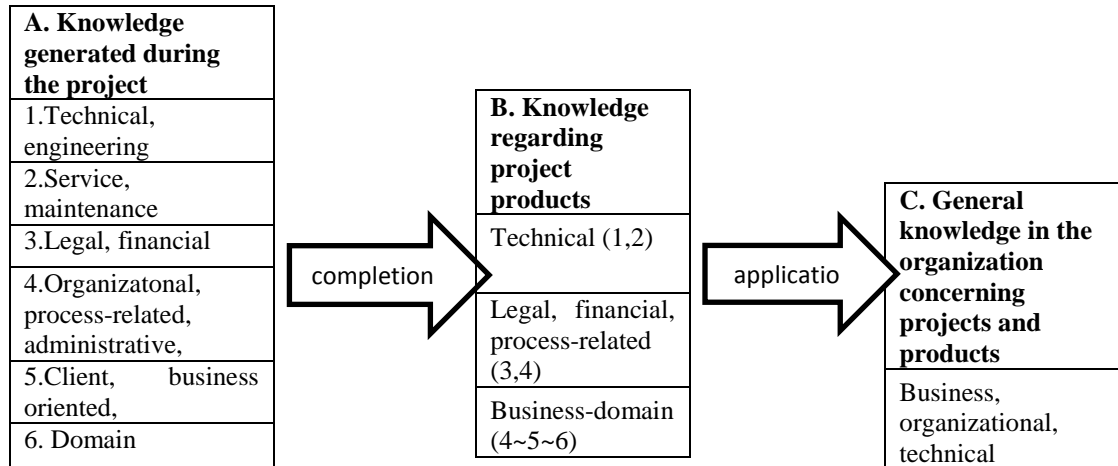
However, only half of the respondents demonstrated understanding of a broader perspective in terms of organization. They perceive a strategic dimension, long-term impact and effect of scale:

- *enables building of knowledge about the organization for which the project is being implemented, which is often valuable in long-term relationships with customers;*
- *allows to achieve synergy during implementation of a similar project;*
- *healthy proportions in our project basket are retained;*
- *only projects consistent with our strategy and vision of the board are carried out;*

The following characteristics were dominant and often repeated in the respondents' statements on acquiring and organization of knowledge at any stage of the project:

- a. each project has a unique resource within the IT infrastructure, where all types of project materials are gathered,
- b. the project team (only selected people) can have access to all knowledge bases regardless of the project they are currently working on,
- c. apart from the standard classification, materials are ranked with tags or keywords (some respondents pointed out that the dictionary of available options is limited and maintained centrally),
- d. access to the part of the material is limited and controlled (e.g. financial data or reports on work effectiveness).

Most respondents indicated that for them knowledge management is a controlled process, regulated by internal policies or the application of adopted project management methodologies (e.g. Prince2, PMI) at the level of the organization. However, most of respondents do not have the awareness of the need for ongoing gathering of knowledge. The majority indicates that knowledge is codified primarily at the end of the project in the form of summary reports or so called "lessons learned" sessions. Then, the knowledge codified in such a way is placed in a certain deliberately designated place where, over time, it becomes outdated. The awareness of the process is present, although the consequences of following it are blurred. Exactly the same situation applies to the subsequent knowledge sharing. Uploading the project materials onto the corporate intranet "closes the case" in most situations. Senior management and portfolio managers pointed out that during the project or after its completion the knowledge is easy to find, but only for the people working in the project environment. For the people outside the project team or new employees the project knowledge is not easily available and incomplete. The more inquisitive ones are able to reach and find only some limited information. In larger organizations, we observed various approaches and methods of gathering knowledge differing depending on the division, geographic area or department. It was an additional impediment to flexible and rapid knowledge acquisition.



Source: Author's own research.

Fig. 1. Changes in the scope of project knowledge availability over time

Fig. 1 shows that the scope (and/or availability) of knowledge which was collected (regardless of the project cycle phase) decreases over time and level of organization. Respondents indicated that in the project there are appropriate people, who, in a sense, by definition of their functions, deal with collecting and maintenance of knowledge (e.g. Technical Manager - technical documentation, Analyst - domain knowledge etc.). Then, after the dissolution of the project team in the organization the project as such becomes less important. It is the product of the project that the employees remain aware of, and besides that it's only some high-level, general information about the projects and products. It is worth mentioning here that at the time of initiating of coming projects, the respondents indicated they acquire knowledge in a more or less formal way:

- use a company-wide database of projects and products (if there is any) or the intranet;
- search for help of dedicated business units or projects support and project offices regarding ongoing initiatives;
- informally contact potential knowledge holders (frequently former team members);
- contact representatives of various departments to see if they have the relevant data;
- seek help from their superiors;
- use internal forums, Wikipedia, social media, task management systems;
- contact portfolio managers or project coordinators;
- contact risk or security department (indicated by the majority of the respondents).

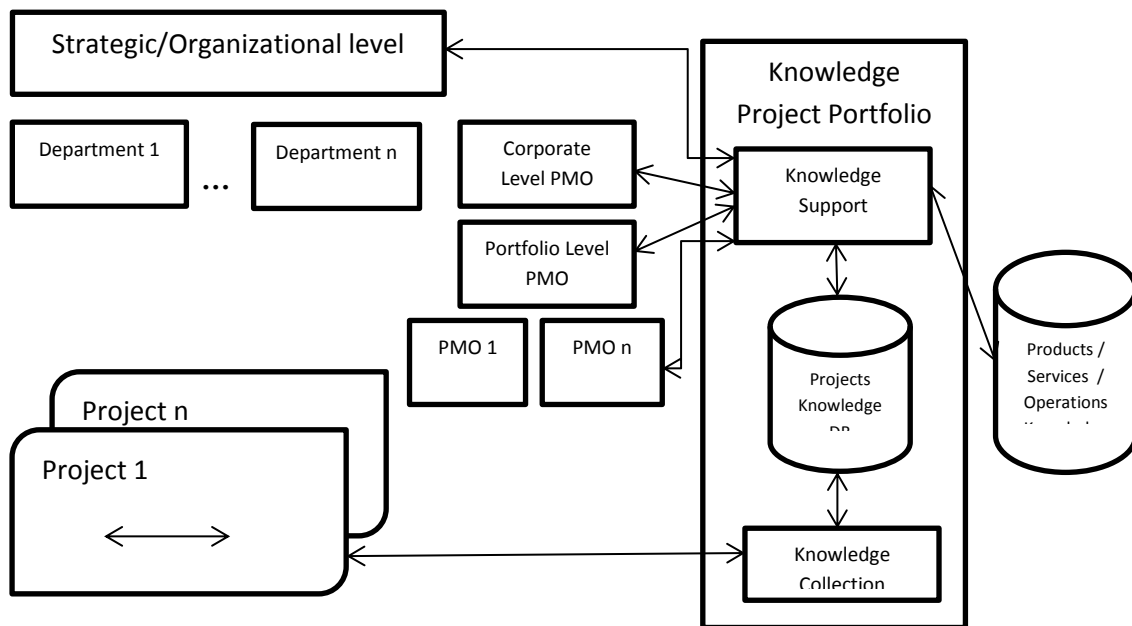
Knowledge is widely dispersed and often partial, loosely connected or inconsistent. There is no single point of knowledge acquisition. Hence the process is superficial and inaccurate or laborious and time-consuming. Project-related knowledge (Fig. 1, square A) is relatively wide and detailed, but mainly collected at the end of the project. Knowledge on the organizational level (Fig. 1, square B, and C) is a certain extract of project knowledge, which in its incomplete form is used as an input when initiating new projects or as a reference material to the decisions taken at the level of portfolio, department or across the enterprise. It is worth emphasizing that



new projects usually have contact with the knowledge processes only at the moment of their initiation and their completion.

Project knowledge flow diagram - knowledge project portfolio

During the study, respondents indicated various concepts of solving problems related to disappearance and availability of project knowledge over time at the organizational level. After collecting all the conclusions the authors visualized project knowledge horizontal and vertical flows within the organization. The aggregate results are shown in figure 2 below.



Source: author's diagram based on Basili V.R., Seaman C., 2002.

Fig. 2. **Project knowledge flow diagram – knowledge project portfolio.**

Project knowledge flow diagram in this article is henceforth called KPP (Knowledge Project Portfolio). It has been based on the concept of Experience Factory (Basili V.R., C. Seaman, 2002) created for software development projects. This concept assumes that organizations producing software can improve their efficiency and effectiveness using experience from any previously completed projects by creating a special unit dealing with processing knowledge. As indicated in Figure 2, it is recommended to establish a dedicated unit of KPP, which will be the central place of aggregation, processing and further distribution of knowledge in the organization in the knowledge-on-demand mode. KPP is the unit independent of the industry and the nature of the project. KPP consists of:

- Knowledge Support - a unit dedicated to the exploration, distribution of knowledge on demand to meet the needs of other organizational units of a certain level of granularity of knowledge and information. In addition, it is the interface for the company-wide databases, where information on all processes, services, products or operations (project products) is collected;
- Project Knowledge DB - multidimensional knowledge system, adapted to the needs of the organization in terms of its construction, access scheme, knowledge update and obsolescence



processes, unified and mapped onto the current structure of the company. Project Knowledge DB is the main driver and a point of project knowledge accumulation, structured appropriately to the needs of the enterprise;

-Knowledge Collection – a unit whose aim is ongoing collection of project data for Project Knowledge DB. It is proposed that in each project there should be at least one person who - for the duration of the project - will be also part of this unit. An additional responsibility is to periodically verify the quality of data flow from projects and to projects.

The central point of project knowledge would reduce an access time to knowledge and facilitate its flow. It would organize its scope and systematize the cycle of its life. Potentially, it would also increase the quality of planning and execution of projects, support more effectively decision-making process regarding commencing/terminating initiatives. It would also allow to preserve the relevance and topicality in the course of time, thanks to synchronizing/linking project knowledge with organizational knowledge (figure 2 - Products / Services / Operations Knowledge database). However, the mere creation of an additional level of project knowledge management, a separate unit of the KPP in the organization, as it was noted by most respondents, will result in an initial increase in funding at the project level and across the organization. In addition, such newly formed unit, in order to operate effectively must be adequately supported by management and has legitimate mandate from organization. The project knowledge flow diagram presented above is very limited, as it covers only high-level assumptions. Potentially applicable character of this solution would have to include the creation of dedicated tools, organizational and project roles along with a system of evaluation of its use.

Conclusions

In any organization the learning process is different. The cognitive or social dimension of knowledge processes depends very much on the specifics of the industry and the nature of the projects implemented. It also applies to the level of adaptation and the degree of implementation of various methodologies and standards by organizations. The studies were just preliminary and limited because of a relatively small sample size. Nevertheless, these merely initial studies already imply that awareness of the significance of project knowledge management is high and partially formalized. Unfortunately, the value of project knowledge erodes and decreases over time.

A similar effect of knowledge blurring is caused by its horizontal propagation in the organization and propagation from project units to conventional organizational units. Following the research, the authors suggest a potential solution to this problem through the creation and implementation of a dedicated unit, for the purposes of this article called - knowledge project portfolio (KPP). This unit would deal with the knowledge maintenance processes both in the implementation phase of the project and after its completion at all levels of the organization in a central and sanctioned manner. Such result and product of the research opens up further opportunities in the field of scientific exploration aimed at verifying the applicability of the discussed knowledge flow diagram and the KPP itself. Potentially, other streams of research may lead to measuring the maturity of project knowledge management through the creation of dedicated, industry specific models of project knowledge management maturity.



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ASSESSMENT OF THE MICRO-ECONOMICAL IMPACT FACTORS OF E-GOVERNANCE PROJECTS

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Abstract

Today ITC plays a crucial role in any economy and its importance is increasing also in the public sector. Nowadays ICT becomes increasingly important for the state and municipal institutions, creating opportunities to automate many manual operations. ICT have an important role in both improvements of services as well as internal and inter-institutional cooperation processes promoting availability and quality of services, facilitating administrative processes for people and entrepreneurs, as well as information availability. In order to improve services for people and entrepreneurs as well as provide the participation in decision-making process, additionally to presence services more and more opportunities are created to claim for and receive services electronically.

The paper looks into different perspectives of the e-governance projects in the public sector. Overall framework and flow of the study are based on author experience and one-month internship of research work in India in 2017. The author has set a limitation for the research based only on micro-economical perspective and impact factors for the project success as there is a wide range of conducted studies on macroeconomic impacts from e-government project implementation and there is no doubt about such project importance to the economy. The study is based on qualitative research methods including Delphi method application, scientific literature analysis, and case studies. The aim of the paper is to stipulate importance of the increasing role of e-government and e-governance projects in the public sector by the analysis of actions undertaken by the public entities and organizations. Case studies are based on Latvian government experience with some comparison of Indian government experience.

Key words: e-government, e-governance, project management.

JEL codes: H43, L86, O33

Introduction

The World Bank, (2012) define E-Government as;

The use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions.

Generally, e-Government is basically the use of Information Communications Technology (ICT) and its application by the relevant government body for the provision of information and public services to the people. In simple terms, e-Government is the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees. It is the use of information technology to support government



operations, engage citizens, and provide public services in a more efficient and transparent manner.

The aim of e-Government, therefore, is to provide efficient dissemination and management of information to the citizen; better service delivery to citizens; and empowerment of the people through access to information and participation in public and policy decision-making. E-government can support more streamlined and responsive service, wider public participation, and more cost-effective business practices at every level of government. It ranges in complexity from basic access to official information to radically redesigned public processes.

e- GOVERNMENT & e-GOVERNANCE



ICT in PUBLIC DOMAIN:

ICTs in Public Service Delivery

- **Dissemination of Public Information**
- **Social Services-Pension**
- **Employment Welfare Services**
- **Utility Payments and Billing Services**
- **Online Tax Payments**
- **Police Complaints**
- **Grievance Redressal mechanisms**
(Mitra & Gupta, 2003).



ICT for SOCIAL INCLUSIVE GOVERNANCE:

ICT to connect disadvantaged people with societal decision-makers so that their voices may be heard in the agenda-setting process.

- e-participation
- e-collaboration
- e-democracy

(Rogers & Shukla, 2001; Rittenbacher & Yoshimura, 2006; Andersen & Henriksen, 2006; Sahu, 2004; Gupta, 2004).

Figure 1.e-Government and e-Governance different application

Source: Author construction based on Dr. Charru Malhotra (2017)



Furtherore the government agencies intend to use Information & Communication Technology (ICTs) for:

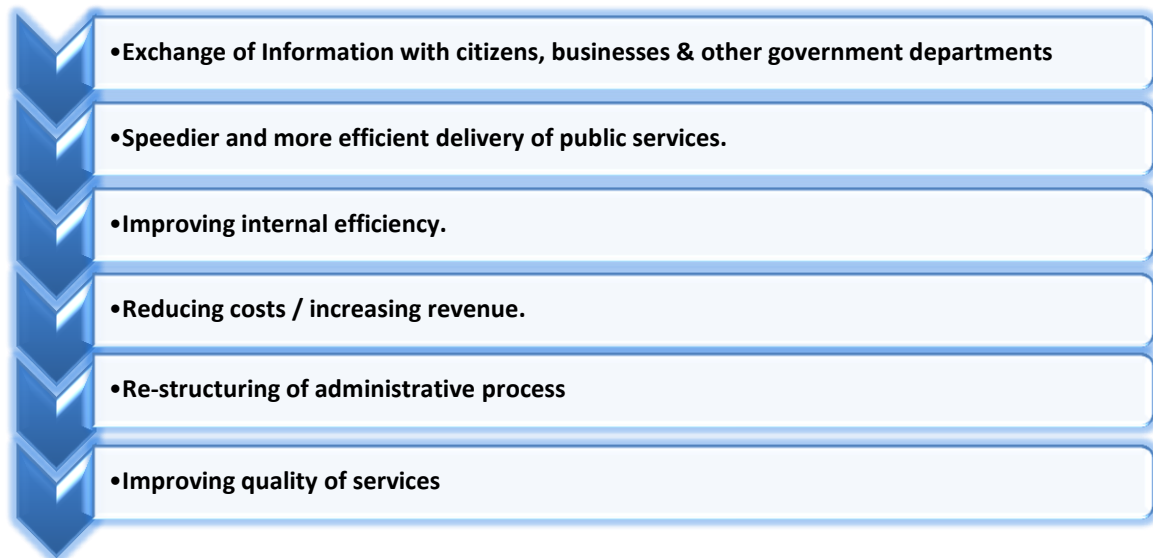


Figure 2. e-Governance goals

Meanwhile the advent of new information and communication technologies has made e-Governance as tool to enhance the below relationship.

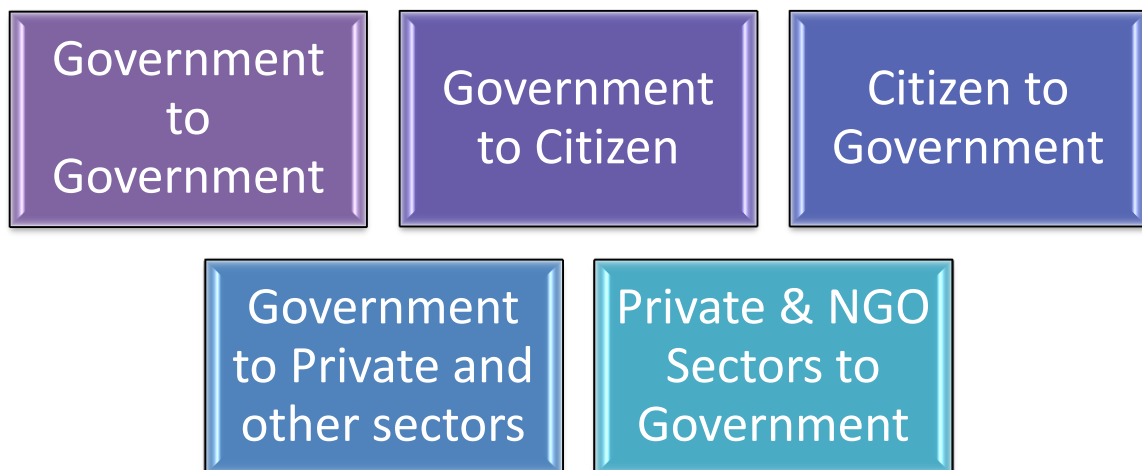


Figure 3. e-Governance goals

In 2016 by the attending differend field events author have experience a lot of dramatizations of rapidly changing world where as an example author can provide well know recent quotation:



The world's largest taxi firm, Uber, owns no cars. The world's most popular media company, Facebook, creates no content. The world's most valuable retailer, Alibaba, carries no stock. And the world's largest accommodation provider, Airbnb, owns no property.

(Tom Goodwin (2015), *The Battle Is for the Customer Interface*, Havas Media, cited in Hamish McRae (2015), Facebook, Airbnb, Uber, and the unstoppable rise of the content non-generators, *The Independent*).

Of course, nowadays ICT tools have rapidly increased their importance and their development speed is challenging for every field of economy and moreover important for the public sector. Nevertheless, such quotations are nothing to be afraid of and show just a good way of adoption of different project implementation approach and development of services by using more ICT tools. In this case, an author can as an example provide also the case of Europeans one of the biggest open-air market what also does not own any food or goods for the sale, simply because it's a marketplace. Same as Uber, AirBnB, Facebook, Alibaba and so do Latvian biggest property seller www.ss.lv what is considered just as a marketplace.

The author points out that this example shows how important is project planning and defining of the best alternative to reach maximum benefit or maximize profit in case of the private sector.

Further, in this paper author provides practical benchmarks from the case study of Latvian project implementation and summarize Delphi analysis results in comparison of Latvian and Indian examples and public sector approach to the e-government project development.

Comparison with an Indian experience is based on author research and study internship and by rising potential of e-government of India as stated in the United Nations e-government survey 2016. *A transparent smart e-Governance with seamless access, secure and authentic flow of information crossing the interdependent barrier and providing a fair and unbiased service to the citizen* (Dr. APJ Abdul Kalam, Former president of India).

E-government and ICT environment in Latvia

One of Latvia's priorities since regaining independence has been to update its outdated data and voice communications sectors. Large investments have been made both in telecommunication and high-speed data transmission networks, and that trend is expected to continue. The Latvian government has adopted the e-Latvia program, which strives to modernize overall communications with the Latvian public and streamline documentation procedures. The most important elements of the program are the coordination and modernization of critical national information systems and the successful implementation of an e-governance system. U.S. companies have had recent successes competing for government contracts in this area, providing both technology and services.

Both Internet and electronic commerce are rapidly penetrating the Latvian market and increasing the need for information and communications technologies (ICT) products, services, and support. The total ICT sector turnover reached approximately \$4 billion and the sector accounts for approximately 4% of total GDP.

For these reasons, the ICT sectors, including computer services, computer software, computer hardware and peripherals, and telecommunications services, have significantly increased their roles in Latvia's economy during recent years.



Since 2002, the Cabinet of Ministers of the Republic of Latvia has approved the implementation of e-government concept; e-government has become an important public policy component.

Since 2010, ICT has been playing an important role in the improvement of the quality of life by providing electronic access and ICT skills, focusing on digital skills and the needs of the people-oriented public services.

Using the methodology and indicators, annually the EU member states prepare comparable figures for the use of ICT and its impact on sustainable economic development and social welfare. Considering that most of the EU member states have already introduced 20 basic services proposed by the EC, new indicators and methodologies will be developed, which will allow analyzing the availability of e-government in the future. One of comparable indicators, which will allow comparing the EU member states at the level of e-government implementation to meet citizens' needs, has promoted the development of public services.

In 2015, the Latvia's e-index was released, being the first national-level initiative helping state and municipal institutions to evaluate their digital development, to assess the necessary approaches and provide solutions for a more efficient development, as well as to identify the best examples implemented by other institutions and thereby enable exchange of experience and motivate further development of the digital transformation. Latvia's e-index was nominated as European Public Sector Award Best Practice example. Detailed information about this project can be found online at <https://joinup.ec.europa.eu/community/epractice/case/latvia%E2%80%99s-e-index-national-egovernment-benchmark-state-institutions-and-muni>.

The Information Society Development Guidelines for 2014 - 2020 were elaborated to ensure continuity of existing policies and to determine the priorities in the area of Information and Communication Technology (ICT) for the European Union Structural Funds Programming period for 2014 – 2020. Guidelines were developed in close cooperation with ICT industry, national ICT associations, Latvian Chamber of Commerce and Industry, Latvian Confederation of Employers, Latvian national committee of UNESCO, representatives of all ministries and representatives of local (municipal) governments. Wide coverage of different stakeholders involved in the development of the Guidelines provides a solid ground for 360-degree analysis of current shortcomings, as well as thorough understanding of future development needs and priorities, following the overall objective of enhancing the national competitiveness, economic growth and job creation. The goal of the Guidelines is to provide the opportunity for anyone to use ICT, to create a knowledge-based economy and to improve the overall quality of life by contributing to the national competitiveness, and increasing an economic growth and job creation. The focus of the Guidelines is economic growth and job creation. Each action line of Guidelines aims at improving competitiveness, economic growth and job creation.

Research and case study

Author research based on the trainings, workshops and study visits in different Indian public entities or public ICT service providers.

During trainings and workshops author discussed the e-government project life cycle, solutions of the cloud technologies and open data in the public administration as well as e-government project implementation challenges of e-government project and its audit



perspectives. Government has no business to do business. The focus should be on Minimum Government but Maximum Governance.

E-Government essence does not lie in "e", but in "governance"

Within the study on e-government projects and e-services, it was concluded that e-government is the essence of effective management in the implementation of the use of information and communication technologies (ICT). This means that the importance of direct service efficiency, rather than the process of digitization.

Effective e-government can be implemented by the transformation of public administration services, which means not just undertake activities for existing service transformation to the e-environment, but also assure the new solution confirmation with a customers (citizens) needs. Unfortunately, often this transformation does not reach the desired objectives; in fact, in many cases, this process is only the digitization, rather than reduction of administrative burdens or the improvement of the service's organizational structure.

At root, it has the power of ICTs, which provide three basic change potentials for good governance for development:

Automation: replacing current human-executed processes which involve accepting, storing, processing, outputting or transmitting information. For example, the automation of existing clerical functions.

Informatisation: supporting current human-executed information processes. For example, supporting current processes of decision making, communication, and decision implementation.

Transformation: creating new ICT-executed information processes or supporting new human-executed information processes. For example, creating new methods of public service delivery (Heeks Richard 2001).

Author stipulates that it is not just about finishing projects as per Specifications, in Time and within Budget. It is also about Changing People Behavior to Embrace & Adopt the Change. E-services implementation and the process of transformation, it is important to respect the three main elements – customer centricity (user friendly), efficiency and effectiveness.

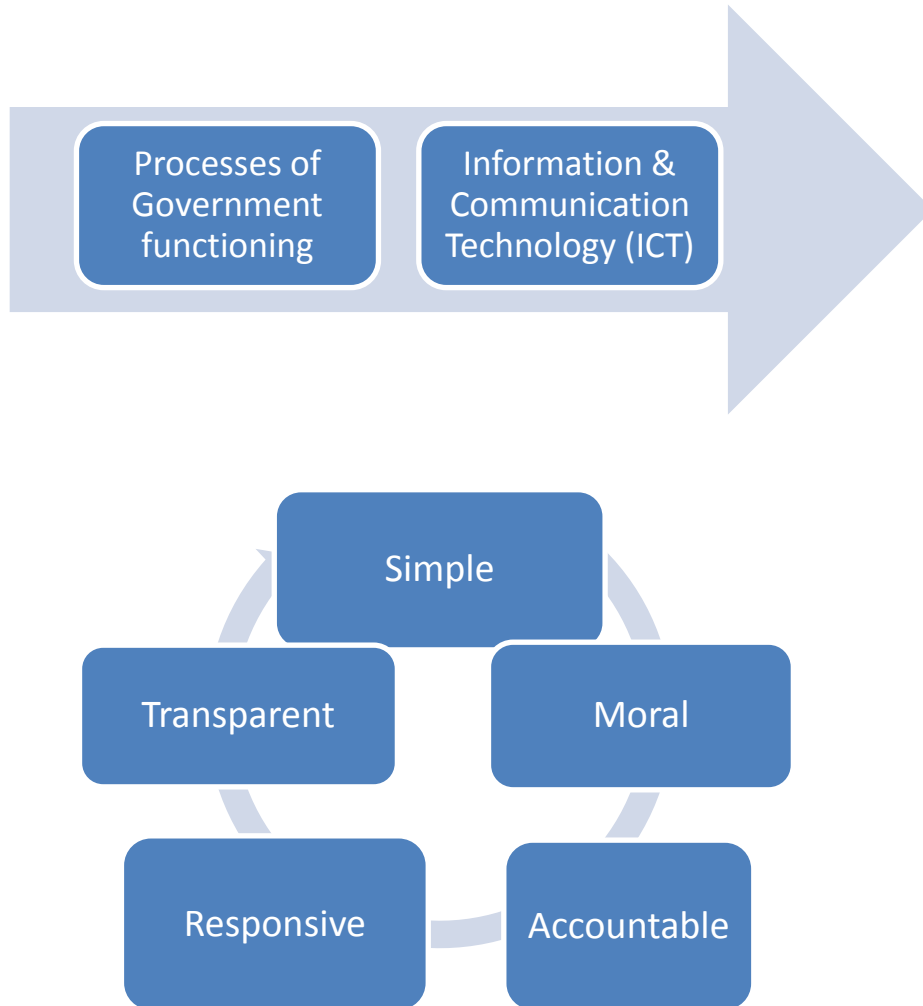


Figure 4. E-governance and transformation factors

Source: Author construction based on Nishant Jaiswal (2017).

E-government projects

E-government project implementation is attributed to a number of risks (uncertainty), and should be implemented in accordance with generally accepted project management best practices, which includes a project feasibility studies, planning, implementation, and conclusion, of course, adequate control activities shall be performed.

During the discussions and the analysis of the Indian government experience, it was concluded that e-government projects problems observed are common in several countries. As the most important aspect was mentioned insufficiently rigorous project planning to be attributed to a number of factors - the lack of a needs assessment, weak risk analysis, weak risk management during the project implementation, as well as issues of technical specifications and contractual development (legal aspects). An important drawback is the lack of stakeholder



involvement in the e-project planning and implementation. Public authorities formally involve the potential audience and the final recipients of the service for project development without adequate advisory support.

Increased risks of e-Government projects can be described by such factors as:

- ⚠ High requirements volatility
- ⚠ Need for more domain integration
- ⚠ Bureaucratic Organizational environment based on Interlinked Processes (G2G, G2B, G2C2G)
- ⚠ Emergence of systemic risk that cross national and sectoral boundaries (ripple effects)
- ⚠ Complex feedback loops
- ⚠ Discontinuity
- ⚠ Diseconomy of scale
- ⚠ Ambiguity- Uncertainty Rules (events, Political scenarios....)
- ⚠ IT Policy & Law

The e-Government has now embraced the convergence capabilities of ICT, computers, Internet, Telecommunications, multimedia, digital broadcasting, and social media etc. that further aggravate the system's & user's vulnerability. Traditionally, e-G entered around only the operations of government; but now includes citizen engagement and participation in governance through the use of ICT to achieve good governance.

Open data in public administration

During the study much attention was given to the open data and its accessibility. Open data is the preferred way in which the generally available information is accessible to the citizens. Public administration data availability and open manner is one of the e-government policy framework 2014- 2020 principles in Latvia as well as in EU in general.

Open data access can be extended to all the information what public authority publishes, such as public registers and public information systems, public research, statistics, charts and more. Approach is based on the idea that public information is transferred in a form to be processed and analysed furthermore by the receiver.

In accordance with the open data fundamental principles information must be available:

- ⚠ free of charge;
- ⚠ online, without access restrictions;
- ⚠ machine-readable format that can be automated process with readily available applications.

Pursuant to those principles would ensure an open-system idea. However, to fully be able to use the published information (data), it should also contain a metadata or structured information that defines the set of information.

Open data examples Latvian:

- Natural data management system "Oak": <http://ozols.daba.gov.lv/pub/> (able to "export GIS data ");
- Company register open data: <http://dati.ur.gov.lv;>



- Riga open data catalog: <https://opendata.riga.lv/>;
- Statistical database: <http://www.csb.gov.lv/dati/statistikas-datubazes-28270.html>(iespēja export data in different formats);
- Regional development indicators module: <http://raim.gov.lv> (Section "Data selection", "Free access to the data");
- Procurement Monitoring Bureau, open-system (Open PMB) Service: <http://open.iub.gov.lv/>.

Although discussions on public administration open data assurance in Latvia has been a topical issue for the recent years. Latvia is on the bottom between European Union countries in the field of open data (European Commission's 2016 annual report, see Fig.5). In November 2016 Latvian Open Technology Association (LATA) sent to the Prime Minister Mr. Māris Kučinskis and Information Society Council, chaired by the Prime Minister, proposals for the Latvian public administration open data policy improvements.

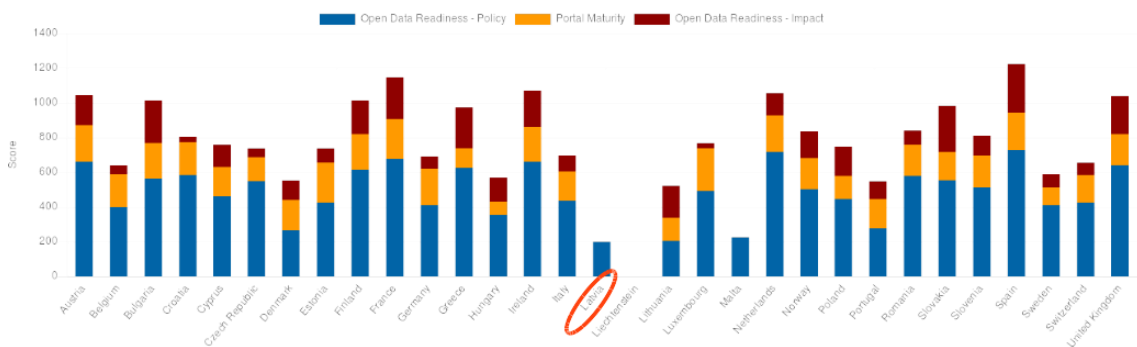


Figure 5. Government Open data accesability in the European Union

Source: European Commission E-gov report

Legal and security aspects of e-government solutions

By the increased use of information and communication technologies and e-services, the data security and legal aspects becoming more and more topical issue. In the process of transforming, the range of services requires a knowledge-based approach, providing liability and other legal aspects of the implementation. The new approach to cloud computing, an introduction of third-party software usage in the public administration internal and external communication (eg Skype, WhatsApp, e-mail service providers) suggests as safety aspects, especially in the field of sensitive data protection. At the same time author concludes that most of the users do not read the third-party developed privacy policies or applications and software terms of use.

In recent years cybercrime and crimes committed in the electronic environment rapidly increasing. Moreover, the world now facing new threats and countries must also consider cyber-terrorism, this is a brand new concept for public administration. Unfortunately, a few high-profile international cyber footprints leading through the Latvian-based servers and Latvian nationals have participated in such kind of committed offenses.



These examples lead to the need of discussion about the legal basis for the adjustment in cyber security. However, the debate was concluded that public administration is facing a significant lack of competence – lack of appropriate personnel who have the appropriate knowledge at all management levels. In addition, the aspects of cyber security can not be attributed only to the judiciary and lawyers. Responsibility should be taken for every party involved - both public administration authority and the customer/user.

Key findings and best practices:

- ⚠ The public sector is often outsourcing a "thinking" process, which is not considered as best practice. It is preferable to purchase only professionals - expert advice or other types of services, but not giving up professionalism and ability to think by them and to analyze specific processes in specific sectors.
- ⚠ Public sector poor knowledge, lack of experience in ICT project planning. Technical specifications are developed careless, are not defined clearly and thoughtfully by the contractual conditions, which subsequently causes unnecessary additional costs. Does not store a copyright ownership, poor licensing policy solutions developed.
- ⚠ E-government projects transition from the simple digitization of the electronic services, which is understandable to the people and that they use. G2C principles (G2C - Government to Citizens). Transformation of e-government solutions from simple digitization processes on a real full cycle service to the public (electronic solutions, mobile solutions).
- ⚠ ICT systems security aspects are often forgotten in the planning of e-government projects. Safety aspects are not always addressed in the audit. There may be problems with the centralized electronic procurement systems, manipulation and fraud schemes analyzed IT system audit files, as well as methods of fraud, which is not shown in a particular system audit files. Security aspects should always be more than one security element (data encryption, passwords, chip card, biometric data etc., Etc.).

During the study author analysed the latest United Nations annual report on e-government and e-government index. In the latest report, Latvia is ranked as 45th, while India 107th (Instead of Lithuania – 23rd, but Estonia 13th). Although Latvia assessment provides a high index of human capital in ICT, but it is lagging behind in e-participation index in comparison with other European countries, being only as 85th in the rank position. This might suggest that there is plenty of e-solutions, but citizens are not using them for various reasons, perhaps because of e-government solutions are not fulfilling G2C (Government to Citizens) approach. This could be attributed also to the possible receipt of the service alternatives that people seem more comfortable and simpler compared to electronic solutions.

Delphi results could be summarized according to the standard project phase model as shown in the Table No.1.



Table No.1

Problems identified in the project audits

No.	Project phases	Problems
1.	Initialization	<ul style="list-style-type: none"> • Weak problem analysis; • Defined goals not always comply with other strategic goals and/or problem analysis; • No links between policy making, planning and budgeting (political influence).
2.	Planning	<ul style="list-style-type: none"> • No plans at all or they are very general, outdated; • Weak ICT project planning; • No detailed alternative analysis.
3.	Implementation	<ul style="list-style-type: none"> • Poor HR management; • Weak change management; • Weak procurement and contract management; • Weak risk management.
4.	Closure, controlling, ex-post	<ul style="list-style-type: none"> • No result and goal achievement analysis or it is formal; • Slow product implementation and or start of processes the project was aimed for; • No future business strategy or it doesn't comply with project specific goals; • No ex-post monitoring and/or evaluation.

Source: Prepared by the author

E-Governance in Latvia and its audit perspective (Case study of e-government project)

There is currently no overall eGovernment legislation in Latvia. However, the 'Law on State Information Systems' provides a legal framework for the operation of State Information Systems and the cooperation of concerned organizational units.

There are no specific units designated for the audits in the field of e-governance and in the case of audits where should be assessed information and communication systems information system auditors are engaged in the audit work. IT auditors working at the Audit and Methodology department of the SAO of Latvia.

The information systems auditors of the State Audit Office keep taking active part in the “E-management” subgroup of EUROSAI, wherein audits performed in the field of ICT are examined and a database is developed for summarizing information on audits performed by supreme audit institutions in the field of ICT, on risks found and conclusions made therein. The database services as grounds for a way how Member States share experience with performed IT audits.



However, ICT projects are worth being emphasized in particular. These projects include the e-health system project, saving of electronic documents and data in the National Archives of Latvia, etc. The inability to define clear goals and measurable results to be achieved, to ensure professional project management and successful project implementation has prohibited the State from using all of its potential that had to be given for investments in ICT development — neither efficiency improvement, nor more convenient availability of services to inhabitants, nor availability of information to the State administration for making better decisions. To provide support to the executive authority for improving the situation, the State Audit Office has summarized the main conclusions and recommendations, as well as, in cooperation with the State Chancellery, invited all interested parties for discussion: a new practice that is planned to be continued also in other areas, in which the State fails to achieve goods results.

The State Audit Office has concluded three-year cooperation with 14 local governments of Latvia in the implementation of recommendations in the field of information technologies which resulted from the audit “Software Management Assessment in Local Governments and Local Government Educational Institutions” conducted in 2013. The recommendations were implemented 97% in the Riga and Ventspils local governments, Alsunga, Alūksne, Cesvaine, Jēkabpils, Koknese, Krustpils, Līvāni, Rauna, Rundāle, Sēja and Skrīveri District local governments.

In 2013 when the implementation of the audit recommendations were initiated in the audited local governments software management was not developed; even the basic IT security mechanisms and control were not implemented, thus failing to provide for assigning responsibilities and development of the main regulations and their application to the protection of information systems and data. Due to unlimited access rights and insufficient control over users’ activities almost one fifth of the inspected software installed in local governments’ computers was used illegally and the local governments were not able to prove the user rights of the software. More information available online at:

http://www.lrvk.gov.lv/uploads/Majaslapa%20ENG/News/informacijas-tehnologiju-parvaldibas_eng_final.pdf.

In 2016 The State Audit Office has taken a new initiative and made its very first public discussion paper in the area of information and communication field. Discussion paper includes the insights and reflections on challenges gained during the audits by the State Audit Office that would allow prevention of systemic problems and invite the public to find better solutions. ICT play a major role in the economy of Latvia and its importance in the last years have increased. This leads to better understanding of public expenditures and efficiency of e-governance and ICT projects implemented in Latvia.

CASE STUDY ON E-HEALTH PROJECT AUDIT

DESCRIPTION OF THE AUDIT

Objective of the audit

Objective of the audit is to verify efficiency and productivity of the actions by the institutions in charge for implementation of the e-health, as well as to audit economy and productivity of use of funds invested in the project for achievement of set objectives and gaining the planned benefits, including:

- is the policy implemented by the Ministry of Health in the area of the e-health updated and compliant with the directive of the European Parliament and the Council;



- do the activities of the National Health Service in fulfilment to the e-health policy ensure for successful and quality implementation by the set deadlines and achievement of objectives and results set in the guidelines;
- will the access to the e-health information system be ensured;
- have the financial means invested within course of implementation of the e-health been used in an efficient and productive manner;
- if the e-health information system set up by the National Health Service relevant (of high quality), covering the required scope and functionalities;
- is the high level information security and protection of personal data ensured in the e-health information system;
- has the Ministry of Health provided sufficient supervision over successful introduction of the e-health.

Legal grounds

The performance audit „The Health Care Information Systems” has been conducted according to the work plan of the State Auditor’s Offices for the year 2014 and the audit assignment No.2.4.1-7/2014 of the Third Audit Department of 31 March 2014.

The audit was performed by the head of the audit group – Senior State Auditor Mareks Zvirgzdiņš, State Auditor Līga Kotāne and the Information Systems Auditor Mārtiņš Vilmanis.

Liability of the auditors and the audited unit

Auditors of the State Auditor’s Office are liable for provision of the audit opinion based on sufficient appropriate and reliable audit evidence.

The Ministry of Health and the National Health Service are in charge for adherence to the legal acts and accuracy of information provide to the auditors.

Audit scope and limitations

The audit has been performed in accordance with international audit standards applicable in the Republic of Latvia. The audit has been performed as to obtain sufficient assurance on the measures taken by the audit entities included in the scope of the audit – the Ministry of Health and the National Health Service – for implementation of the health care policy, i.e. successful implementation of the Guidelines „E-health in Latvia”.

The audit has been performed for the time period starting from the 1 January 2007 through to 1 April 2015.

Since the audited time period covered the day of transition from the Latvian national currency lats to the euro, all the numerical values used in the audit report have been translated into euro by applying the currency exchange rate of one euro being equal to 0.702804 lats.

The audit scope covers:

- the Ministry of Health as the leading authority of the health care sector developing the health care policy, organising and coordinating implementation of the health policy;
- the National Health Service which according to the health policy is implementing the e-health policy and is a holder of the e-health information system;
- the providers of the health care services which have to enter the patient related data in the e-health information system.

Audit limitations:

- the audit tests were performed without using sensitive data of the patients, therefore no achievement of resulting indicators of the implementation of the e-health was tested, since



- the majority of these are patient related and the productively used time for obtaining of information, filling in of medical records and communication with health care professionals;
- the audit scope does not include and tests the activities in the area of the management information systems of the emergency medical aid and catastrophe medical assistance, including the project of the European Regional Development Fund „Setting up of the Control Information System and Dispatcher’s Centres of the Emergency Medical Assistance Service and Centre for Catastrophe Medical Aid (project ID No.3DP/3.2.5.2.0/09/IPIA/VSMTVA/001), that was implemented by the Emergency Medical Service, e-health activities for development of unified control information system of the health care sector, including the project of the Health Care Ministry „Development of unified control information system of the health care sector, stage I (project ID No.3DP/3.2.2.1.1/09/IPIA/IUMEPLS/006)” and in the area of development of a universal information system for supervising and monitoring of the infectious diseases there were undertakings I which were involved various currently reorganized institutions, but systems maintenance is ensured by the National Health Service;
 - the safety of the data of the information system in conjunction with the external factors was not assessed, e.g.,, unauthorised access of the third parties to the data of the system, safe data storage (protection of various levels), fragility of the software (protection against unauthorised software and malware), cryptography keys and methods;
 - at the moment of carrying out the audit there was not possible an inspection of the solution in the production environment (including applicability tests, solution development scope tests, functionality and in-build control tests, etc.), thereby the inspections were carried out in integrated test environment. During the performance of audits, we observed also that some functionality of solutions does not work. We received an approval that during the performance of tests in the test environments there were installed the delivered changes. This fact should be taken into account, upon analysing the conclusions of tests, that due to the changes of deliveries may not be repeatedly observable;
 - together with the integrated system’s test environment unstableness we could not fully verify all the planned inspections. The situation where it is not possible to perform all the planned tests in full significantly increase the risk in the production environment there could be discovered major applicability problems. It should be taken into account that the availability and the response times may differ in the production environment.

Table 2

Assessment criteria

Audit issues	The criteria set	Criteria has been achieved/ criteria has not been achieved
1. Will the e-health policy be able to solve problems and achieve the objective?		
1.1. Has objective and high quality information been used in drafting of the policy documents?		
Development of the policy for use of information and communication technologies in the health care	Policy has been developed	● Criteria has been achieved – the policy has been developed
Justification of the policy	Policy is prepared on a quality basis	■ Criteria has not been achieved – policy have not been prepared on basis of studies performed, surveys and situation analysis, no alternatives have been studied



Audit issues	The criteria set	Criteria has been achieved/ criteria has not been achieved
1.2. Have the policy documents been updated?		
Topicality and actual reflect of the current situation by the policy documents	Policy is updated, corresponds to the current situation	❑ Criteria has not been achieved – the policy has not been updated
1.3. Has the assessment of policy documents been assessed?		
Policy impact assessment	Has been performed assessment of impact of policy	❑ Criteria has not been achieved – no assessment of impact of policy has been performed
1.4. Have the interests of all stakeholders been considered in implementation of the e-health system?		
Involvement of stakeholders in the development	Stakeholders have been involved and the interests have been safeguarded	❑ Criteria has not been achieved – no industry professionals have been involved in drafting of planning documents
1.5. Have the criteria been set for measuring of resulting indicators and achievement of objectives?		
Policy objectives and resultative indicators	Achievable objectives and measurable resulting indicators have been set	❑ Criteria has not been achieved – the defined objectives are not detailed and measurable, the resulting indicators cannot be assessed, are incomplete and not updated
1.6. Will the user's access be ensured to the e-health system?		
Accessibility of the e-health system	Has been provided accessibility to the potential users	❑ Criteria has not been achieved – there is a risk that after introduction of the e-health information system it will not be accessible by all users
2. Are the actual activities performed by the National Health Service justified for achievement of the set objectives?		
1.1. Does the management of implementation of e-health enhance the achievement of e-health objectives?		
E-health management	Orientated to achievement of e-health objectives	Criterion is not achieved – implementation of e-health is not oriented to achievement of e-health objectives
2.2. Do the activities taken for development and implementation of the e-health comply with the plan		
Compliance of the activities taken for implementation of the e-health with the planned activities	Activities comply with the planned activities	❑ Criteria has not been achieved – about 54% of the planned activities are being implemented according to the plans
2.3. Do the activities taken for development and implementation of the e-health comply with the financial budget?		
Acquisition of e-health implementation budget	Acquisition of the granted budget ~ 100% (+/-5%) Stage I 10 102 002 euros Stage II 4 720 981 euros	● Criterion is not achieved , the acquisition of the funding of Stage I- 97% ❑ It is possible that the criterion will not be achieves- the acquisition of finances of Stage II is insufficient, at the end of the project- solely 3%.
Financial estimated of e-health implementation	The costs of implementation of e-health activities fall under the planned financial estimates	❑ Criteria has not been achieved – costs of implementation of the e-health activities deviate from the planned ones by - 81% to 127% ❑ Criterion has not been achieved- the e-health implementation budget exceeds the defined budget



Audit issues	The criteria set	Criteria has been achieved/ criteria has not been achieved
		for 154 364 euros.
2.4. Is implementation of the e-health meeting the set deadlines?		
E-prescriptions implementation deadline	07.12.2014.	❑ Criterion has not been achieved – not implemented by the set deadline, planned to implement by 01.10.2015.
Electronic health card implementation deadline	10.12.2014.	❑ Criteria has not been achieved – not implemented by the set deadline
Implementation deadline for electronic booking, electronic organisation of the health care work flows and public health portal	29.12.2014.	❑ Criteria has not been achieved – not implemented by the set deadline
2.5. Are the health care service providers ready to join the e-health system?		
Awareness and readiness of users of e-health system	Upon initiating mandatory usage of system, 100% of users shall be aware, trained and technically ensured.	❑ Criteria has not been achieved: <ul style="list-style-type: none"> ▪ computer hardware is available only in workplaces of 83% of health care professionals and 97% of pharmacists ▪ computer and internet skills of 59%-71% of health care professionals and pharmacists are good and very good ▪ about 15% of the potential users have undergone general training of use of information technologies; ▪ 4% of potential users have received the training in e-health information systems ▪ only 115 from the health care specialists and pharmacists are informed on the implementation of the „E-health in Latvia” project; ▪ 12 from the 13 of the surveyed pharmacies and health care institutions having agreements on testing of the e-health, have not started testing it by the February, 2015
2.6. Is public informed and educated on implementation and benefits of the e-health?		
Awareness of Latvian population on implementation of the e-health in Latvia	60% of Latvian population has been informed	❑ Criteria has not been achieved – only 47% of Latvian population are informed on the introduction of the e-health
Awareness of Latvian population on benefits of implementation of the e-health	40% of Latvian residents have been informed	❑ Criteria has not been achieved– approximately - 11% of the Latvian population have been informed on benefits of implementation of the e-health
2.7. Is the e-health web site easy to use?		
Information system shall be used according to the intended usage	Shall be used without a particular training of users	❑ Criterion is not achieved- during the inspections it has been observed that many average or unsubstantial deficiencies of applicability, as well as could not perform all the applicability tests since the e-health system is not yet ready.
3. Will necessary information security and personal data protection be ensured in the newly built e-health information system?		
3.1. Has the system been completed from the point of view of information system’s security?		
Development of internal legal acts and actions in the area of management of the	Internal laws and regulations have been drawn up, activities are	❑ Criteria has not been achieved – not all of the required internal legal acts have been developed and not all of the actions are performed in the area



Audit issues	The criteria set	Criteria has been achieved/ criteria has not been achieved
information systems and data protection	regular and correspond to requirements of external laws and regulations	of information systems safety management and data protection
Safety assessment of the e-health and elimination of the safety drawbacks	Activities are sufficient and in the defined scope	❑ Criteria has not been achieved – activities for assessment and elimination of the safety deficiencies of the e-health are not sufficient

Conclusion of project implementation, audit findings and recommendations

- ◆ Management of the e-health implementation is not sufficiently effective, and it is not primarily orientated to achievement of e-health objectives, for:
 - ⚠ The existing management of projects is orientated to precise fulfilment of procedures of procurement and delivered product acceptance;
 - ⚠ Project integration management and the overall management of architecture is not implemented according to the good practice, e-health plan is not developed, upon unifying all the e-health project activities, measures for coordination of project activities are not ensured;
 - ⚠ Project managers have not sufficient education and experience in management of projects of similar complexity, moreover project managers have been changed for multiple times;
 - ⚠ In the level of the program there is no program manager elected, the set e-health management organizational structures are implemented incompletely;
 - ⚠ Nevertheless, according to the good practice it is recommended to introduce e-health solutions gradually, in Latvia there are simultaneously started three major e-health projects that the results of which are ensured with partial compatibility.
- ◆ The State Auditor’s Office believes that the guidelines „E-health in Latvia” will not be introduced in Latvia in full, because the implementation period of the guidelines was by the end of the 2015 and by the late 2014 no e-health activities were even started for the implementation of which the funding amounting to 46% from the total financing of the e-health was assigned.
- ◆ National Health Service has not ensured a timely and compliant with technical specifications and good management practice accepttesting of all developed e-health solutions, since the delivered information systems are accepted even 11 months after the end of term of general agreement, not all the developed solutions accepttesting has been taken minutes of and the pilot operation minutes that were presented instead of accepttesting minutes do not certify that the requirement of technical specification is observed and that the customer performs accepttest, thereby the delivered functionality of the solution cannot work according to the defined requirements.
- ◆ Since the developed e-health solutions are not semantically compatible and there are cooperation problems in the integrated testing environment, moreover the e-signature system does not fully encompass the specifics of health industry business processes; there is a high risk for initiation of valid system operation, quality use of developed e-services and ensurance of planned benefits.



- ◆ The developed e-services of e-prescription and electronic sick-leave certificates do not comply with the requirements of the Regulations of the Cabinet of Ministers⁺⁺⁺⁺, thereby risk persists that upon using these solutions, healthcare processes will not be improved, thereby creating e-health information system users dissatisfaction and unwilling to use e-services, thereby not obtaining planned benefits.
- ◆ By the 1 April 2015 the National Health Service has not ensured users access to any of the 26 e-services notwithstanding the fact that introduction of the e-health policy was started in 2007, currently 9 762 697 euro have already been used for implementation of the e-health measures managed by the Service, and the Service is still improving the development of existing seven e-services and creation of five new e-services, thus attracting to the stage II of the project „Development of integrated e-health information system” funding of 4 720 981 euro.
- ◆ Since in disposal of the Ministry of Health there was available financing in order the solutions of the e-health project, Stage I were possible to start to use (in production environment) in planned term, i.e., from year 2013, nevertheless the Ministry plans to start partially use the e-health information system by year 2016, thereby in three years’ time direct financial benefits have not been gained amounting to 3 millions of euros (under a provision that on January 1, 2016 Stage I will be implemented entirely), that could have been diverted to provision of other healthcare services.
- ◆ Since the implementation plan of the Guidelines „E-health in Latvia” was developed in 2007 and has not been updated, the actual costs of implementation of the e-health activities differ from the planned ones – actual costs of some activities for implementation of the e-health are lower by 81% and even up to 127% higher than planned costs.
- ◆ Actual costs of activities managed by the National Health Service in the Guidelines „E-health in Latvia” will increase the planned costs by 154 364 euro, therefore there is a risk concerned with economy and productivity of funding used for implementation of the e-health.
- ◆ Due to an incomplete procurement documentations or non-quality e-health solution developed, as well as slow implementation of e-health, upon improving the initially developed e-health solutions there is a risk that financial resources amounting to at least 483 406 euros are spent unpurposefully, because:
 - ⚠ in the procurement “Introduction of supplements of integration for development of unified health industry electronic information system” organized after acceptance of e-health solutions developed during the Stage I, the ordered work assignments amounting to 124 206 euros partially or fully overlap with the work assignments of Stage I or eliminate admitted errors in designing;
 - ⚠ works ordered in Stage II amounting to 59 200 euros, in order to identify and eliminate deficiencies in applicability in solution of Stage I;
 - ⚠ for suppliers of Stage II there has been included a payment also for developed e-health solution guarantee in Stage I, the estimate of double paid guarantee amounts to more than 300 000 euros, nevertheless it is also included for suppliers of Stage I.

⁺⁺⁺⁺ Regulations No.175 of 08.03.2005 of the Cabinet of Ministers „Regulations for Manufacture and Storage of Prescription Forms, as well as Writing out and Storage Prescriptions”, Regulations No.152 of 03.04.2001 of the Cabinet of Ministers „Procedures for issuance of Sick-Leave Certificates”



- ◆ Risk persists that during the implementation of e-health have not been used the most beneficial and profitable information and communication technology solutions, thereby, possibly raising the price, because:
 - ⚠ adaptation possibilities of standard solutions have not been evaluated and not performed their comparison with solutions that have to be newly developed, thereby there is a risk that the accumulated experience has not been taken into account, the good practice and not employed other benefits of standard solutions;
 - ⚠ there are not evaluated all possibilities of repeated use of Latvia state information and communication technology solutions;
 - ⚠ due to the lack of technological unification of e-health various e-health solutions have been applied various development technologies, thereby raising the price for their maintenance.
- ◆ Within the process of implementation of the e-health policy for the period starting from 2007 through to 2011 financial means of 196 292 *euro* have been used in vain or unpurposefully for paying for development of the concept and technical specifications for the activity which is no longer been pursued and by paying in 2010 for updating of the concept and technical specification developed in the 2007, for drawing up information system security documentation, nevertheless the documentation has not been validly used, as well as by paying for the activities which do not comply with the Guidelines „E-health in Latvia”.
- ◆ Implementation of e-health has not been primarily directed to implementation of a deliberative, productive and targetful planned solutions, since in the course of implementation of e-health there have been difference services or deliveries ordered in time, since they have not been necessary or received services are not being fully employed, for example:
 - ⚠ funds amounting to 81 191 euros for the e-health information system training organized by the National Health Service in year 2014 have been used inefficiently, since the training was carried out at time when the system did not operate even at test regimen;
 - ⚠ for a part of the developed techniques the term of guarantee has expired, although the production environment has not yet been created;
 - ⚠ ordered e-prescription information system performance assessment, although due to functional errors it was not possible to perform various anticipated tasks;
 - ⚠ the amendments in documentation have not been performed according to the recommendations of quality controllers in cases where the corrections have not been easy to implement.
- ◆ Implementation process of the guidelines „E-health in Latvia” has been dragging to slowly, which will lead to objectives and received benefits for improvement of the health care quality set in the guidelines not being achieved to the full extent, as the Ministry of Health has on several occasions prolonged the deadline for implementation of the e-health system, e.g., initially its completion was planned by the year 2010, then the implementation deadline was prolonged to 2012 and 2013, later already for 2014, when Ministry undertook that all of the realized information systems will be available at the production environment, until at the end the undertaking was issued that as of September 2015 in production environment the e-



prescriptions information system will be available at the production environment, while concerning the other three realized information systems no particular deadlines are set for their launch.

- ◆ The National Health Service has not ensured implementation of the e-health information systems by the end of 2014 although the e-health solutions have been actually developed (by 2013), however they are not available to the users and there is a risk that by 1 January 2016 all planned services 31 e-service of the health care will not be available to the users.
- ◆ Risk persists that upon implementation of e-health projects co-financed by the European Regional Development Fund the requirements of European Community laws and regulations are not observed, since, although all the projects of Stage I were concluded in December 2013, the final inspection of projects are suspended for multiple times, and taking into account that a successful implementation of project of Stage I is closely tied with the results achieved in the Stage I, there is a risk that the final inspections of projects it will be established that the aims of the projects are not achieved, thereby the funds amounting to 11 352 647 euro used in European Regional Development Fund may be recognized as inexpediently spent.
- ◆ Ministry of Health has not ensured preparation of the thorough action plan for involvement of the health care service providers in the e-health information system, e.g., the health care service providers not providing the state paid services, not issuing the sickness leave acts and not issuing prescriptions for medication have not been identified and contacted.
- ◆ Notwithstanding of the fast approach of the deadline for implementation of the Guidelines „E-health in Latvia” the Ministry of Health has not paid due attention to readiness and awareness of the health care service providers which is evidenced by the following data:
 - ⚠ 17% of the health care professionals and 3% of pharmacists at their work place do not have access to the computer hardware, thus the users have no access to the e-health information systems;
 - ⚠ self-assessment of 29%-41% of the health care professionals and pharmacists concerning their computer and internet skills is medium or low;
 - ⚠ within the period of the implementation of the guidelines (9 years) only 15% of the planned training of the potential users of the e-health information system have been conducted and 4% of those concerning use of the e-health information system;
 - ⚠ only 11% of the health care professionals and pharmacists are duly informed on the implementation of the project „E-health in Latvia”;
 - ⚠ 12 institutions out of 13 surveyed health care professionals and pharmacies having signed agreements on testing of the e-health had not started testing yet by the February, 2015.
- ◆ The pilot project of four e-services introduced by the National Health Service in 2010 was not a success, duly announced and promoted, as, regardless of the fact that 76% of the population use internet on a daily basis, only 9% of the population had used these 4 services, while the e-services of the private health care institutions have been used by 20% of the population.
- ◆ National Health Service has not ensured due information and education of the public on implementation of e-health, including the planned health care e-services as only 47% from the 60% (the audit criteria) Latvian residents were informed on implementation of the e-health, and approximately 11% from 40% (the audit criteria) Latvian residents were



informed on benefits of implementation of the e-health which indicates to low awareness level in relation to introduction of the e-health services and benefits brought by their use, which in turn increases the risk that the public will not be using the new e-health services. E-health web site developed by the National Health Service more than 50% from applicability tests were not able to perform, since the web site was available only in test environment with a limited functionality, meanwhile, upon verification of the applicability in the limited amount, there were no material applicability problems identified, but various non-material or moderately material applicability deficiencies, for instance, non-complete assistant information, system does not support most popular internet web browsers, no activities were implemented that would ensure an easy access for information for people with functional disorders etc.). Prevention of mentioned deficiencies would improve usage of information system.

Conclusions

The author concludes that e-Government projects have rapidly increased their importance in public service delivery improvement processes. Nevertheless, any project is implemented in a strong condition of uncertainty what leads to possible risk occurrence during the implementation. Author practical studies showed partial potential and knowledge sharing of Indian government experience as well as provided an analysis of the case study of e-Government project audit perspective. The study shows that Latvia is ranked only by the 85th place in the e-participation index what is serious alert for the e-government policy improvement. Meanwhile, the biggest impact factor at the micro-economical level still reveals as human resources and lack of knowledgeable and appropriate personnel in the public sector.

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MANAGING AN AGILE DEVELOPED IT-PROJECT-PORTFOLIO

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Abstract

This article clarifies the challenges in using classical portfolio management tools and methods on agile developed IT projects.

Based on a short introduction on agile development according SCRUM and a description of classical portfolio management, standard key performance indicators of such are collected grouped according project phases and briefly analysed.

After creating such a basic understanding of that matter, each and every single key performance indicator is investigated about suitability regarding the use in agile developed IT projects.

This investigation will show a large gap. Meaning, that nearly half of the identified key performance indicators are not really suitable for agile IT projects, due to many different reasons like lack of budget, timing and resource information.

Therefor new solutions are needed and postulated to close this described gap.

A brief qualified expert interview is used as scientific method to proof the effectiveness of the created new solutions and key performance indicators (short: KPIs). Also showing that needs of KPIs in project management can differ from those in portfolio management.

Keywords: *Agile Project Management, Agile Project Portfolio Management, Key Performance Indicators*

JEL Codes: M15, H43, O22

Introduction

Agile development is getting increasingly popular and more technology projects are getting developed with an agile approach (Komus and Kuberg, 2015). Reporting and measurability for top management of those projects is often not as traceable as with a classic approach because some important classical portfolio management KPI's cannot be used.

Predictability and reliability are key factors for project- and portfolio managers, but those are completely subordinated topics in agile development methods, approaches and culture.

There are still some old mind sets deep-seated. Such as “widget engineering” – it is possible to analyze everything before starting to develop – or “order taker” – the IT has to do what they are told, saying no is not an option. (Thomas and Baker, 2008)

Those mind sets include the opposite of what agile development stands for. (Thomas and Baker, 2008)

Agile developed projects work from one sub-product or increment to the next and accept no detail planning beforehand at all. (Gloger, 2009)

This area of conflict brings up the question, whether agile developed projects are suitable for prioritization and monitoring within a portfolio of such. Other questions that will be answered in this article are: Which KPI's are needed in classical portfolio management and can they be used with an agile approach? Why can some not be used? And what has to be changed to close the gap?



To answer those questions each KPI has been individually analyzed and solutions to close the gap have been elaborated. Those results have been discussed with experts to substantiate the developed KPIs.

Research results and discussion

1) Agile developed IT projects

In 2001 the agile manifesto was created by a group of people, because they were unhappy with the process of developing software. They tried to find a better way of developing software and have come up with four values: (Waters Kelly, 2007)

- “Individuals and interactions over processes and tools” (Beck et al., 2001)
- “Working software over comprehensive documentation” (Beck et al., 2001)
- “Customer collaboration over contract negotiation” (Beck et al., 2001)
- “Responding to change over following a plan” (Beck et al., 2001)

There are many different approaches on agile development. (Oesterreich, 2008) One of the best known and most used is Scrum. (Komus and Kuberg, 2015)

The SCRUM process is small and easy to understand, it contains six roles and six meetings. At the beginning, there is a vision and the product owner documents and prioritizes the properties of a new or modified product in the product backlog. (Roock and Wolf, 2016)

One of the most important artifacts in Scrum is the product backlog. The items of the product backlog are never complete, they always can be modified. This happens especially after each sprint in a sprint review meeting. (Gloger, 2009)

The development is done in sprints which lasts a maximum of 30 days and the development team is responsible to develop the items of the product backlog. At the beginning of each sprint there is a sprint planning meeting where the product owner and the team is participating. Goal of the meeting is to decide how many of the prioritized product backlog items can be included in the upcoming sprint. (Roock and Wolf, 2016)

Right after the sprint planning meeting the development starts and the team is organizing itself. Scrum provides rules and principles which should help the team to self-organize. It takes time to develop a framework where the team can work most efficient. Teams need to get to know each other and how they can work together when problems and troubles occur. The organization should not give strict instructions but should provide experts to guide the team – such as the scrum master. (Gloger, 2009)

The scrum master supports the team at their self-organization and makes sure that the team can work without any interference. In a sprint there is a daily scrum meeting where the development team briefly present their progress. (Roock and Wolf, 2016)

At the end of each sprint the team delivers a shippable product increment and presents it at the sprint review meeting. Participants at this meeting are relevant stakeholder – customer, user, management – and they can give important feedback to the product. This feedback than will help to update the product backlog. (Roock and Wolf, 2016)



After the sprint review the sprint retrospective takes place. This meeting should help the team to grow. The operating process will be analyzed and improvements are defined to make the team more efficient. (Gloger, 2009)

2) Classical project portfolio management

It is important to distinguish between project portfolio, program and multi-project-management.

A project portfolio is the summary of all planned, approved and running projects within a company or an organization. (Seidl, 2011)

The program includes several individual projects and all with the same strategic goal and a common benefit. (Seidl, 2011)

Multi-project-management defines the planning and overall control of several projects. (Seidl, 2011)

It is also defined as the collective leadership and control with the goal to reach an overall result. (Knöpfel, 2000, p. 129)

The project-portfolio-management process consists of different phases.

First, ideas are collected and evaluated. The next phase selects relevant items/projects using consistent prioritization methods. After selecting the projects the portfolio-management governs all projects and at the end a review has to be done. (Alter et al., 2016)

At the first phase, it is assured that the ideas are consistent with the business strategy. Is it doable? Are there enough resources regarding including human and budget? Is the idea even a project? Also, a prioritization of under the different projects in the portfolio takes place at this point. This phase often takes place in the middle of the year for the year following. (Sterrer, 2014)

Project-portfolio-controlling is another important phase. Frequent status checks are a part of this phase. Those checks ensure that the portfolio-management knows upcoming delays, budget overshoots and other problems. With this information, it is possible to prepare a decision making process for the management. The portfolio is a dynamic structure and while controlling this portfolio it is often necessary to change. Like stopping running projects, including new projects to the portfolio and re-prioritization the different projects under each other. All this things can only be obtained, if the project managers deliver the right data. (Sterrer, 2014)

The last phase is the project acceptance and review. This is a very important phase for the company, a lot can be learned of already faced problems. The critical part of this phase is the documentation of the lessons learned – if no one has access to them, no benefit can be created. (Sterrer, 2014)

There are two important components of the project-portfolio-management – the PMO (Project Management Office) and the PSC (Project Steering Committee).

The PMO supports the PSC and the project managers. They build the portfolio and keep it up to date. Another task of the PMO is the organization of the PSC's – preparation, execution and postprocessing. The PMO is responsible for enhancements of the project management process and the training of relevant resources in project management matters. (Sterrer, 2014)

It is important that the PSC participants are allowed to make decision at the meeting, therefor relevant managers and resource-managers should attend. They are approving projects and help running projects when they are facing problem that cannot be solved within the project or with the project owner. To ensure a good committee everybody needs to know their duties and responsibilities. (Sterrer, 2014)



2.1.) KPIs in classical portfolio management

The following tables give a complete grouped view of classical KPIs being used in standard- non agile- portfolio management. This collection will be the basis of the suitability analysis regarding the use of portfolio key performance indicators in agile developed projects.

KPI's used when gathering the ideas: (Alter et al., 2016)

KPI	Importance
Profitable efficiency (ROI, NPV)	Does the project have a benefit for the company?
Prioritization	Necessary to choose the right/ most important projects

*Table 6: KPI's used when gathering the ideas
 Portfolio status KPI's: (Alter et al., 2016), (Kütz, 2012)*

KPI	Importance
Number of projects in different status	What is currently part of the portfolio?
Number of changes in the portfolio	Is our planning good?
Earliest possible start	Is it possible to hold the timeline?
Latest possible finish	Is it possible to hold the timeline?
Level of capacity of bottleneck resources	Can we do the change/start a new project?

*Table 7: Portfolio status KPI's
 Budget KPI's: (Alter et al., 2016), (Sterrer, 2014)*

KPI	Importance
Budget consumption (Plan, Actual comparison)	How good is our planning? Can we hold our budget goal? Do we have to stop projects?
Capital needs of all projects	Is our portfolio used to capacity?
How much of the total capacity is used?	Can we hold our budget goal? Can we start new projects, make change requests?

*Table 8: Budget KPI's
 Drill-Down KPI's: (Alter et al., 2016), (Kütz, 2012), (Sterrer, 2014)*

KPI	Importance
Generated project performance	Are we working efficient?
Quality of the results	Are we working effective? Do we have to train our stuff? Change processes to ensure better quality?



Risk status of the projects	Are we facing major risks? Is there anything we can do to prevent it?
Change status of the projects	Is our planning good?
Budget per project	Is our portfolio used to capacity?
Resources per project	Important for resource management? Can Person XY work at this project?

*Table 9: Drill-Down KPI's
 Schedule control KPI's: (Alter et al., 2016), (Sterrer, 2014)*

KPI	Importance
Time overshoot	Are we reaching our goals/fulfilling our agreements?
Not reached deadlines	Are we facing troubles with our customers? Do we have to change the portfolio?
Extend of the overshoot	Do we have to change other parts of the projects (tied resources)?

Table 10: Schedule control KPI's

3) Hypothesis

When using agile approaches, there are some important characteristics missing to evaluate all of the above KPI's. Some of the most important KPI's – Budget, Timings and human resources – cannot be reported as easy as in a classic approach. Therefore, the management often does not support agile approaches, because they have problems monitoring certain things.

3.1.) Suitability of classical Portfolio KPIs for agile developed projects

In the tables below, each and every KPIs is assessed regarding suitability in for portfolio management under the premises of an agile development.

KPI's used when gathering the ideas: (Alter et al., 2016)

KPI	Suitable for agile approach
Profitable efficiency (ROI, NPV)	ROI: Yes – It is possible to generate a benefit when starting an agile project. NPV: No – At the beginning of an agile project the whole scope is unknown.
Prioritization	Yes – there is a vision. This vision can be prioritized.

Table 11: Suitable for agile approach - KPI's used when gathering the ideas



Portfolio status KPI's: (Alter et al., 2016), (Kütz, 2012)

KPI	Suitable for agile approach
Number of projects in different status	Yes – the development approach does not effect this KPI
Number of changes in the portfolio	Yes - the development approach does not effect this KPI
Earliest possible start	Yes - the development approach does not effect this KPI
Latest possible finish	No – when using an agile approach it is unsure when the end date of a project is
Level of capacity of bottleneck resources	Yes - the development approach does not effect this KPI

*Table 12: Suitable for agile approach – Portfolio status KPI's
 Budget KPI's: (Alter et al., 2016), (Sterrer, 2014)*

KPI	Suitable for agile approach
Budget consumption (Plan, Actual comparison)	No – there is not an overall budget plan, only for the next iteration
Capital needs of all projects	No - At the beginning of an agile project the whole scope is unknown, therefor it is uncertain how much money is needed
How much of the total capacity is used?	Yes - the development approach does not effect this KPI

Table 13: Suitable for agile approach - Budget KPI's

Drill-Down KPI's: (Alter et al., 2016), (Kütz, 2012), (Sterrer, 2014)

KPI	Suitable for agile approach
Generated project performance	Yes - the development approach does not effect this KPI
Quality of the results	Yes - the development approach does not effect this KPI
Risk status of the projects	Yes - the development approach does not effect this KPI
Change status of the projects	Yes - the development approach does not effect this KPI
Budget per project	No - At the beginning of an agile project the whole scope is unknown, therefor it is uncertain how much money is needed



Resources per project	No - At the beginning of an agile project the whole scope is unknown, therefor it is uncertain what, when resources are needed
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*Table 14: Suitable for agile approach - Drill-Down KPI's
 Schedule control KPI's: (Alter et al., 2016), (Sterrer, 2014)*

KPI	Suitable for agile approach
Time overshoot	No - At the beginning of an agile project the whole scope is unknown, therefor the timeline cannot be created
Not reached deadlines	No - At the beginning of an agile project the whole scope is unknown, therefor the timeline cannot be created
Extend of the overshoot	No - At the beginning of an agile project the whole scope is unknown, therefor the timeline cannot be created

Table 15: Suitable for agile approach - Schedule control KPI's

3.2.) Gap-Analysis for agile project portfolio KPIs

As seen in tables 6 to 10, almost half the KPI's are assessed as not really suitable used for agile approaches without modifications.

Overall there is one main reason why – when using agile techniques not everything is planned beforehand.

The biggest gaps are with KPI's concerning budget (budget consumption, capital needs of all projects, budget per project), timings (latest possible finish, time overshoot, not reached deadlines, extend of the overshoot) and resources (resources per project).

4) Development of a suitable set of KPIs for agile developed project portfolios

Two solutions or methods are presented to help reducing the gap. Furthermore, four newly proposed KPI's will help creating a set of KPIs covering all important sections of a successful portfolio management in an agile develop environment.

Solution I: Agile fix price

With an agile fix price there is a budget maximum and a latest delivery date defined but the scope still stays variable. When using this approach, the customer still has a cost awareness and all the budget related KPI's can be reported and used for further management decisions. (Opelt, 2012)

Solution II: Slicing projects in deliverable increments

This solution restricts the agile approach a little because it is crucial to start your project using classical methods. You define the scope of the overall scope of the project and make a basic analysis to be able to slice the project in deliverable increments. Each of those increments can be reported individually and therefor, all the above KPI's can be reported.

KPI 1: Velocity

Velocity is a time estimation KPI – how many stories/story points can be completed in a sprint. Teams can complete a certain amount of user stories/story points per sprint. When taking



an average amount of story points a team finished in the last sprints you get the velocity. With this KPI you can estimate how long your project will take. For example in your product backlog are 500 story points and the team is able to finish 25 story points per sprint, your project will take 20 sprints to finish. (Rouse, 2013)

KPI 2: Capacity

The velocity shows how much a team can do in a sprint. Capacity shows how much a team can do considering holidays, other liabilities of a team member, sick leave and people are leaving or joining the team. This KPI can help the portfolio-management manage their resources. (Tatroe)

KPI 3: Work in progress limit

This is a Kanban KPI which should help preventing bottlenecks. Each swim lane in a Kanban board is only allowed a certain number of items. If the maximum is reached, the team is not allowed to start working on new items but must finish those already in. (Rouse, 2012)

KPI 4: Story points

To estimate the dimension of a functionality story points are used in scrum. The development team estimates the dimension of each item of the product backlog. A story point is a standardized size. (Gloger, 2009)

To estimate story points three things are essential. A reference story, a entity and a scale which should show the quantitative difference. (Gloger, 2009)

Often story points can be translated into money (1 Story point = 100€) and therefor KPI's regarding budget can be reported when using story points.

5) Expert verification for agile project portfolio KPIs

The interview for the expert verification has been divided into two parts. First part was a questionnaire of all the KPI's shown and evaluated for agile suitability in chapter 3.1. Then, the experts stated their opinion regarding the use the four in chapter 4 proposed KPI's in their company and if they agree with my opinion on the suitability with an agile approach?

All the experts agreed comprehensively supported the not only the evaluated KPIs but also the proposed 4 new agile suitable KPIs. Some mentioned, that you can report all those KPI's within the next sprint and at the end of the project. Which is true but was not the aim of the questionnaire.

Further, open questions were asked about their thoughts on the two proposed supporting solutions. The two new solutions are broadly, they just observed that parts of the agile approach are limited. For example, with the agile fix price you have a time and budget cap, which limits your agile development process.

The experts were not convinced that the work in progress limit is a benefit for project-portfolio-management. They all agreed that this is an important KPI within the project but it is not as valuable for the project-portfolio-management.

Three experts have been questioned to verify the solutions and new KPI's.

Expert 1: Martin Galanda, sales manager and general manager at rmData GmbH



He is responsible for all the communication of all customer projects, which are developed with an agile approach, to the customers. Therefore he has to know all the important issues regarding all projects at all time – to keep the customer up to date.

Expert 2: Besnik Hoti, portfolio manager at A1 Telekom Austria GmbH

He is responsible for the internal project portfolio in A1. He is also part of the Project Management Office and leads the Project Steering Committee.

Expert 3: Alex Bock, portfolio- and project management at ING-DiBa AG

Mr. Bock is responsible for IT project portfolio management and also acting as an agile project manager.

The following questions are shown as the four most important examples supporting the hypothesis:

Question 1: Are there any KPI's for the classic approach missing?

66% No

33% Yes

Additional relevant statement: “Additionally, to the earliest start and latest finish it would be nice to also have the planned earliest start and planned latest finish.”

Question 2: Do you think the presented two new solutions could work and would you use it in your company?

100% of the experts liked the first solution (agile fix price) and would also use it in their company.

All the experts think that the agile approach gets lost a little bit with the second solution (slicing projects in deliverable increments) but that it would still be doable and helping closing the gap for a successful portfolio management. They are not convinced to fully implement this solution into their companies.

Question 3: What is your opinion on the four new proposed KPI's and would you use it in your company?

66% of the experts think that those KPI's can be used to close the gap in project portfolio management between classical and agile approaches.

33% think that three of them can be used as described above, one – the work in progress limit – is a very important KPI for the project but one expert was not convinced that it would have a great benefit for the project portfolio management.

Question 4: Are there any important parts missing?

100% No, nothing major is missing.

Conclusions

As anticipated, the use of an agile culture and development method challenges well established project portfolio approaches. Many classical KPIs focus on predictability and fixed scopes. These are exactly the areas, where agile methods demand freedom and empirical progress. That's why standard KPI's can fail in controlling these areas.

But just a view newly established and pretty easy to handle KPIs can facilitate the situation. With additional support of easy to use of methods like fixed pricing and establishment of major releases or “project slices” a portfolio of agile developed project can also be successful controlled and managed.

It's harder and requires a lot of attention and flexibility, but it also follows an agile trend instead of fighting it.



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THE RELATIONSHIP BETWEEN A PROJECT MANAGER'S SELF- PERCEIVED LEVEL OF EMOTIONAL INTELLIGENCE AND PSYCHOLOGICAL CLIMATE, AS PERCEIVED BY PROJECT TEAM MEMBERS

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Abstract

Projects in organization involves deadlines that, usually speeds up time and intense all communications in team, that require from manager's to handle stress, manage differences among team, deal with changing requirements, manage conflicts and build the relations. Project manager's work can cause reputation of organization (Kirkland, 2011; Sadri, 2012) and underlines importance of human side in project managers' work and success (Cooke-Davies, 2002). Emotional intelligence is recognized to be a good tool for communication and for dealing with personal stress (e.g., Butler and Chinowsky, 2006), determining job performance (Goleman 1995, 1998) and manager's emotional intelligence create a positive climate (Klem, & Schlechter, 2008; Momeni, 2009).

The aim of this research is to study the relation between the project manager's emotional intelligence and the project team members perceived supervisory support and wiliness to involve. Sample – sixty project managers were invited participate in research, they fill newly developed emotional intelligence measure (by authors), project team members: supervisory support and involvement scales from Organizational climate measure (Patterson, et al., 2005).

Results show association between project manager's emotional intelligence factors and project team members perceived supervisory support and involvement.

Implications, limitations and advices for future research is provided.

Key words: *psychological climate, supervisory support, involvement, emotional intelligence; organizational climate.*

JEL code: M1

Introduction

Emotional intelligence is recognized to serve a number of important psychological functions in a different circumstance, e.g., leadership because of ability to influence others emotions and get the desirable responses (Goleman, 1998), reduces stress (e.g., Butler and Chinowsky, 2006), determining job performance (Goleman 1995, 1998) and manager's emotional intelligence create a positive climate (Klem, & Schlechter, 2008; Momeni, 2009).

Projects in organization involves deadlines that, usually speeds up time and intense all communications aspects in team that underlines importance of human side in their work (Cooke-Davies, 2002) and they do communicate most of project time (Strohmeier, 1992). From project manager's requires stress tolerance and manage team different opinions, conflicts, build the relations, etc. Project manager's work can cause reputation of organization (Kirkland, 2011; Sadri, 2012).

In some research emotional intelligence importance for project management was proved (Butler & Chinowsky, 2006; Mullar and Turner, 2007; Sunindijo et al, 2007). In communication, especially intensive as it in projects, important for a team member to understand the emotions of other, and lack of, will destroy positive and supportive communication that in turn makes it difficult to reach the goals of the project. Team members



under control of manager's with higher emotional intelligence, come up with more creative ideas (Sunindijo & Hadikusumo, 2013), with more effort (Cacamis & El-Asmar, 2013).

This research focuses on finding the relation between a project manager emotional intelligence and their subordinate's perceived managerial support and involvement.

Emotional Intelligence

There are many definitions of emotional intelligence, but in general: the ability to regulate and manage emotions will make people more intelligent (Brackett, Rivers, Shiffman, Lerner, & Salovey, 2006). Mayer, Salovey, Caruso, and Sitarenios (2001) defined emotion as "an organized mental response to an event that includes physiological, experiential and cognitive aspects..." (p. 233). Sternberg (1984) defined intelligence as "purposive selection and shaping of and adaptation to real-world environments relevant to one's life" (p. 312). A review of the various definitions of emotional intelligence found that there are common elements including the use of problem-solving, coping with demands, the understanding of one's self, and the ability to develop relationships (Bar-On, 2006; Barchard, 2003; Low et al., 2004; Mayer & Salovey, 1997). Low et al. (2004) defined emotional intelligence as "a learned ability to identify, experience, understand, and express human emotions in healthy and productive ways" (p. 9).

There are three major models of emotional intelligence: ability, integrative, and mixed-model or trait (Mayer et al., 2008):

1) Ability models focus on one emotional and mental capacity, such as emotional perception, emotion-facilitated thinking, emotional reasoning, or emotion management (Mayer et al., 2008). The researchers of these models consider only one specific element of emotional intelligence and how it is developed. Therefore this model is very specific and narrow. It doesn't provide a comprehensive picture of emotional intelligence.

2) Integrative models represent emotional intelligence as a cohesive, global ability integrating at least two abilities (Davies, Stankov, & Roberts, 1998; Mayer et al., 2008). Most frequently found in literature are the following two integrative models: A) Izard's model of emotional knowledge (1993) focused on emotion perception and labeling also known as EPL. A person with emotional knowledge is able to express and label emotions as well as understand the functions of such emotions. Such person changes his behaviour based on emotional motivation and arousal. The perception of emotion is a cognitive function. Therefore the person can label and make meaning of that emotion in social contexts (Izard, 2001). High emotional knowledge means the person's ability to accurately perceive, label, and utilize the emotions of himself/herself and others. According to this model understanding of emotions helps people to adapt and change. B) A second integrative model is the 4-Branch Ability model developed by Mayer, Salovey, and Caruso (2004). This model examines the ability of a person to understand his/her emotions and to deal with other people on four levels (branches). The first level/branch is the ability to perceive emotions and express emotions accurately. Perception of emotions means the observation and interpretation of both verbal and non-verbal cues and is basis for further emotional development. This leads to the second level of competence that is the ability to generate and access feelings during facilitation. For example, an individual interprets the non-verbal cues during presentation and uses emotions to generate sympathy. This is the high second level emotional intelligence (Mayer et al., 2001). In this model, every competency depends on the competencies developed previously. Development and competences forms hierarchy of



levels. The third level of the 4-Branch Ability Model (Mayer et al., 2004) is when an individual understands emotions within themselves and the emotions of others, so called the understanding emotions competency. This means that person with developed third level of emotional intelligence is able not only to interpret the physical and emotional cues, and generate feelings, but also to empathize with others. It is considered the person has reached the fourth level when a person has developed the ability to manage emotions. A person with this competency of emotional intelligence is able to control emotions in various situations to interpret others' emotions to come to the best solution for the group. This person does not allow his/her feelings to overwhelm and influence decisions. A person with a high emotional management competency is able to perceive, facilitate, and understand the emotions within him/her and the group, without letting those emotions control the situation. This integrative model illustrates the concept of emotional intelligence as a developmental exercise, with each branch building upon previous abilities. Therefore, these integrative models show that in order to become more emotionally intelligent person the one should develop different branches/competencies/areas.

3) Mixed-model approaches provide a broader definition of emotional intelligence including abilities, emotional and social behaviors, and aspects of personality theory (Mayer et al., 2008; Zeidner, Matthews, Roberts, & MacCann, 2003). Wang, Young, Wilhite, and Marczyk (2011) constructed a model based on four emotional component areas including self-awareness, empathy, self-management, and interpersonal relationship skills. These components are seen as a process of development on several levels. The first level is about development of self-awareness; the ability to observe one's own behavior and be aware of how one's emotions influence one's behavior. Next is empathy, the ability to understand another's emotions. The third level is self-management, where person uses self-awareness and empathy to actively manage one's emotions both personally and in social interactions. Finally, a person develops interpersonal relationship skills as an extension to the self-management skill. Specifically, an emotionally competent person would be able to have productive relationships and interactions during emotionally-charged situations. It is considered that these competencies can be developed through social and educational environments. This model was very closely aligned to integrative models (Izard, 1993; Mayer et al., 2004), however mixed-model approaches include a process or hierarchy of development. Petrides and Furnham (2000) defined Mayer's Four-Branch model as an ability-model focused on cognitive emotional ability. Petrides and Furnham (2000) divided models of emotional intelligence into only two categories: ability/information-processing or trait. Trait emotional intelligence is concerned with the development of emotional behaviors such as empathy, assertiveness, and optimism, which are personality variables. Trait emotional intelligence considers emotional intelligence as a personality trait that fits within the Five-Factor Model of Personality. Some of the personality traits that are directly related to emotional intelligence include adaptability, assertiveness, emotional appraisal and expression, self-esteem, and stress management. This mixed-model approach is a departure from other theories as Petrides and Furnham (2001) place emotional intelligence as a trait within personality as opposed to a separate construct. A seminal mixed model of emotional intelligence was developed by Reuven Bar-On (2006). It consists of five social and emotional competencies that individuals can develop to increase his/her emotional intelligence. Bar-On (2006) defined emotional-social intelligence as "a cross-section of interrelated emotional and social competencies, skills and facilitators that determine how effectively we understand and express ourselves, understand others and relate with them, and cope with daily demands." (p. 14). One competency is intrapersonal skills. It means the the ability to understand oneself, be aware of strengths and weaknesses, and to express emotions accurately. The next competency is the



person's ability to understand others' emotions and work cooperatively in a group. The third competency is the ability to manage one's stress level in regards to emotions. A person who possesses stress management ability can regard emotions objectively and keep them from influencing decisions and outcomes. A person with low emotional intelligence when stressed tends to be over-emotional and allow emotions to influence decisions and relationships. A person having high emotional intelligence in this competency can cope with stress in a healthy way and control emotions. The fourth competency in this model is adaptability. A person able to adapt to each situation and social group will be more successful in the workforce. Development of quick-thinking and decision making with regard to emotions, but not because of emotions will lead to high emotional intelligence. Finally, Bar-On (2006) believed that a person who developed high emotional intelligence would also have a strong sense of psychological wellbeing. In this regard, the final competency is general mood, including optimism, happiness, and self-motivation. The Bar-On model is one of the most cited and researched models of emotional intelligence and provides a comprehensive definition and explanation of the competencies that can be developed to increase a person's ability to adapt and handle different emotional situations (Leedy & Smith, 2012; Mayer et al., 2008; Reiff, Hatzes, Bramel, & Gibbon, 2001; Sparkman et al., 2012).

Psychological climate: managerial support and involvement perceived by subordinates

Managerial support is a part of psychological climate. Psychological climate, in general, refers to the shared perceptions by the members of an organization of the types of behavior and actions that are rewarded and supported by the organization's policies, practices, and procedures (Schneider, 1990). Some scholars distinguish organizational climate, referring to organizational attributes in a collective description of organizational practices and procedures, from psychological climate, pertaining to individual attributions in describing the same environment (James and Jones, 1974).

Climate as the recurring physical environment includes all factors in the organizational situation to which the employees react. These reactions, in the form of behaviors, attitudes, and emotions, create the climate. The people as well must be regarded as part of the organizational situation. Employee A is an environmental factor influencing employee B and vice versa. Thus, the interaction between employees is an important feature of the climate. At the individual level of analysis, the concept is called psychological climate. At this level, the concept of climate refers to the individual perceptions of behavioral patterns. When aggregated, the concept is called organizational climate. These are the objectively shared perceptions that characterize life in the organization (Isaksen, et al., 2000; Schneider, 1975).

Others state that both kinds of climates are based on perceptions what individuals get from their environment which they believe to be factual and intersubjective (Joyce and Slocum 1982). Psychological climate possesses measurable, enduring qualities, which influence the behavior of individuals in the organization (Field and Abelson, 1982). Being aware of organization's climate is important as it allows one to understand an individual's behavior so that he or she can be managed effectively and efficiently (Tustin, 1993).

To measure psychological climate scholars have identified a variety of overlapping dimensions, which, according to Litwin and Stringer (1968), include the following features: (1) *structure* (perception of formality and policies in the organization), (2) *challenge* (perception of challenge and opportunity for sense of achievement), (3) *reward and support* (focus on positive



reinforcement rather than punishment), and (4) *social inclusion* (sociability, belonging, and group membership). Campbell *et al.* (1970) suggest: (1) *autonomy/control*; (2) *degree of structure*; (3) *rewards*, and (4) *consideration, warmth and support*. As can be seen, Supervisory support is a constant feature that has been incorporated into the newest measures (Kopelman, Brief and Guzzo, 1990; Patterson *et al.*, 2005), that is why it has been chosen for this research. The other reason is that this research is focused on emotional intelligence effects in communication, and perceived supervisory support can only occur in leader-follower communication. Providing subordinates support through a positive, constructive and helpful attitude, managers keep in mind and convey the organizational goals that they want to reach. Supervisor support can be defined as the degree to which supervisors value subordinates' contributions and care about subordinates' well-being (Kottke & Sharafinski, 1988). Several scholars have suggested that supervisor support may enhance employees' job satisfaction. For example, Eisenberger and Rhoades (2002) stated that supervisor support may increase employees' job satisfaction through the mechanisms of satisfying employees' socioemotional needs, raising employees' performance – reward expectancies, and signaling the availability of needed help.

The relationship between leader emotional intelligence and psychological climate

Leader plays important role in psychological climate model (Field & Abelson, 1982). Support provided by managers as leaders is based on a positive, constructive and helpful attitude towards their subordinates in order to reach organisational goals. House, 1989 (cited in Cilliers & Kossuth, 2002) conceptualises managerial support as information support, appraisal support, instrumental support and emotional support. The way the above organisational climate dimensions are managed, as well as the quality of the leadership style of the manager, would therefore, influence the organisational climate. The leader influences the psychological climate by his/her managerial behaviour and leadership pattern, rewards and controls. Leadership involves both rational and emotional sides of human experience as people think, feel, hope and dream differently (Hughes, Ginnet & Curphy, 2002). Due to this fact, leaders use rational and/or emotional techniques to influence followers and should weigh up the consequences of their actions. Leader applying emotional intelligence should distinguish which technique to use, to ensure the desirable psychological climate in the follower.

Aim of the study

The aim of this study was to examine the relation between the project manager's emotional intelligence and project team members' perceived supervisory support and involvement.

Hypothesis

A direct positive relationship exists between the project manager's emotional intelligence and project team members' perceived supervisory support and involvement.

Method

Participants. Two sources of data were collected, from project managers and their subordinates.

Project managers: all together 60: females (n = 35, age M – 36,3, SD – 8,07) and male participants (n = 24, age M – 34,5, SD – 7,8).

Subordinates: data on the psychological climate were collected from 195 employees, approximately 3 to 4 from each unit, females (n = 107 age, M=35,45; SD=12,10) and males (n =



88, age $M=36,18$; $SD=11,76$). Managers vary from three to five years of experience to held position.

Organizations: In research, include 36 organizations, one until four project groups was chosen for inclusion in this study. All of the companies were located in Riga, the capital of Latvia.

Procedure. First, organizations were selected from address book, and asked for participation in research by telephone with short explanation of focus – psychological climate with motivation to give feedback of results in it.

Two sorts of data were combined: first, in organization selected project manager completed the emotional intelligence questionnaire. Second, after project manager complete questionnaire, his(her) subordinates was asked to participate in research, after agreed, completed Organizational psychological climate measure scales – the supervisory support and involvement. Data from subordinates, belongs single unit was calculated by Cohen's kappa coefficient of agreement.

Measures

Develop new emotional intelligence measure. Emotional intelligence measure (Bar-on, 1997) was adapted to Latvian, but factorial structure is somewhat different from original and some scales have low Cronbach's alphas that appeared in different research and adaptations (for review Roze, 2013). Original Emotional intelligence measure (Bar-on, 1997) was restructured (some statements taken out and some added), added some extra scales that is known as important for emotional intelligence (Use of emotions to facilitate performance, Understanding of others, Emotional stability, Influence others emotions). Participants responded to 97 items of the emotional intelligence measure on a 5-point Likert-type scale ranging from "strongly disagree" to "strongly agree". Structure of measure was checked and prove to be sufficient (Factorial analysis varimax rotation used) and Cronbach's alphas is satisfied (from, $\alpha = 72$. for Self-regard and $\alpha = .86$ for Well-being).

Organizational Climate Measure (OCM) was developed by Patterson with colleagues (2005), and was translated and adapted for the Latvian population by J.Roze (2010). OCM consists of 82 items with 17 items per scale, each of which was rated on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). It assesses the psychological climate in a social unit by means of the following two scales –Supervisory Support (SS) (consisting of 5 items, $\alpha = .85$, example: "Supervisors here are friendly and easy to approach") and Involvement (I) (consist 6 of items, $\alpha = .86$, example: "Management involve people when decisions are made that affect them").

Results

To answer on hypothesis, was made correlation between the project managers' emotional intelligence and their subordinates' perceived Supervisory support and Involvement scales.

Some guidelines how to analyse level of correlation coefficient do exist (Cohen 1988): 1) Small ($r = +/-0,10$ to $+/-0,29$), 2) Medium ($r = +/-0,30$ to $+/- 0,49$), 3) Large ($r = +/-0,50$ to $+/- 1,00$).



As we can see (see 1 table), the relationship between emotional intelligence scales and Supervisory support and Involvement scales do exist. Subordinates' perceived supervisory scale correlates with Emotional Self-Awareness ($r = .54, p < .01$), Independence ($r = -.16, p < .05$), Interpersonal Relationship ($r = .24, p < .01$), Empathy ($r = .35, p < .01$), Social Responsibility ($r = .43, p < .01$), Interpersonal Relationship ($r = .42, p < .01$), Impulse Control ($r = .28, p < .05$), Reality-Testing ($r = .48, p < .01$), Optimism ($r = .23, p < .05$), Using emotions for performance ($r = .26, p < .01$), Understanding of others ($r = .46, p < .01$), Influence other's emotions ($r = .58, p < .01$). Employee' perceived Involvement scale correlates with Self-Awareness ($r = .51, p < .01$), Empathy ($r = .44, p < .01$), Social Responsibility ($r = .39, p < .01$), Interpersonal Relationship ($r = .41, p < .01$), Reality-Testing ($r = .54, p < .01$), Using emotions for performance ($r = .27, p < .01$), Understanding of others ($r = .21, p < .01$), Influence other's emotions ($r = .55, p < .01$).

Table 1.

Correlation between project managers' emotional intelligence and their subordinates' perceived Supervisory Support and Involvement scales.

	M	SD	Supervisory Support	Involvement
1. Emotional Self-Awareness	28.52	5.36	.54**	.51**
2. Self-Regard	25.66	5.17	.17	-.05
3. Assertiveness	34.73	5.28	-.14	-.12
4. Independence	36.34	4.79	-.16*	.24
5. Self-Actualization	22.2	4.27	.09	-.10
6. Empathy	31.88	4.43	.35**	.44**
7. Social Responsibility	34.84	4.61	.43**	.39**
8. Interpersonal Relationship	37.76	5.7	.42**	.41**
9. Stress Tolerance	31.34	5.41	.23	.09
1. Impulse Control	33.84	5.16	.28*	.16
11. Reality-Testing	26.12	5.73	.48**	.54**
12. Flexibility	30.98	5.68	.17	.08
13. Problem-Solving	29.23	6.86	.18	.04
14. Optimism	37.32	5.17	.23*	.07
15. Happiness	33.1	4.49	.22	.09
16. Using emotions for performance	33.5	5.1	.26**	.27**
17. Understanding of others	24.49	3.45	.46**	.21**
18. Emotional stability	22.4	4.86	.14	.17
19. Influence other's emotions	23.49	3.43	.58**	.55**

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).



Discussion

Emotional intelligence measure – EQ-I (Bar-on, 1997) adapted to Latvian do not replicate original structure that is appear in all translated to Latvian version. In his research, new emotional intelligence measure was tested and proved sufficient (structure as well – Cronbach's alphas).

Results show that manager's emotion intelligence play important role for their subordinates. As higher a manager's emotional intelligence scores, as the higher the subordinates' perceived supervisory support and wiliness to involve. This supports hypothesis that Manager's emotional intelligence associated with subordinates' perceived supervisory support and involvement. This association has very high scores that is too much for two source of data (managers and subordinates), but it is possible, because of sample – managers, is very homogeny. Selected for research managers are narrow in age and experience being in position.

Results show that emotions play important role in managers-employees communication. If manager aware their own emotions, they can better manage their subordinates, especially for how employees perceive support from their managers'. This findings are similar to Klem, Schlechter and Momeni (Klem, & Schlechter, 2008; Momeni, 2009), but in this research managers' emotional intelligence defined broader that helps to look on results from different viewpoints. Leaders who better understands his or her subordinates emotions provide better communication in team and on individual level (manager – subordinate) supporting that, if the project manager understands the feelings of his subordinates, he or she can predict how subordinates to respond to different circumstances, events and changes and effectively manage these reactions (George, 2000). Project manager's social responsibility connects with the subordinates perceived supervisory support and wiliness to engage concern for their well-being, and have shown of Project manager's interest in the workers not only at the level of business, but also about family, hobbies etc. (Holstad, 2011). In addition, subordinates may appreciate that managers find subordinates' work as useful and meaningful to the wider sense. Perhaps, it increases subordinate awareness of the usefulness of their work to the public and increase their role and increase employee loyalty to the organization.

Conclusion

At the most general level, we can conclude that project managers' emotional intelligence play important role for the supervisory support and subordinates involvement.

The nature of this study, where a quasi-experimental design is used, does not make it possible to determine causality, but it does appear that the direction of influence likely that the project managers' emotional intelligence influence subordinates' perceived supervisory support and involvement, than vice versa. That encourages do draw *implications* – that focus of project managers development and selection should be based not only on professional knowledge and skills, but emotional intelligence should be in included in training courses and in selection process.

Limitation and further research direction

First, from project managers' research data were collected by self-report approach, but sufficient, when we deal with managers, to use of 360⁰ data collection method.



Second, it is impossible to generalise this findings for all managers and, because of small ample size, applied for project managers with caution.

Because of in privies research gender difference reported, it possible, that replication correlation separately for gender, some differences will appear.

In future research would be interesting to test results on managerial positions, as well to look separately for genders.

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THE IMPACT OF THE PROJECT ENVIRONMENT UNCERTAINTY ON PROJECT MANAGEMENT PRACTICES IN FAMILY FIRMS

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Abstract

The growing role of family businesses, independently of the economic and cultural context of these enterprises, has been widely confirmed in literature. Important finding from the aforementioned studies is that family firms have to tackle many, dynamically changing obstacles of different character which strongly determine their growth opportunities. The primary objective of this research is to study how Polish family firms, as representatives of Eastern-European emerging economy, evaluate the influence of project environment uncertainty on their project management practices. The results of this study provide broader and better understanding of the impact of project environment over project management success from a family firm perspective.

Keywords: *project environment uncertainty, project management, family firms, emerging economy.*

JEL code: L21, M21, O22

Introduction

There is a common consensus in literature on the importance of family firms in every economy, independent of the development stage. The significance of businesses founded and managed by families results among other from the fact that these entities generate the majority of Gross Domestic Product (GDP). At the same time however family firms have to look for solutions which enable them to overcome many obstacles they encounter in their business activities. For the above reason many family companies have started to employ project management practices. Employing project management facilitates performing business activities by these firms by offering them different methods and tools they can use to support their decisions and activities. As every project is implemented in a specific environment, family firms constantly have to pay attention and react to changes taking place in their environment. To the best knowledge of the author of this paper, there have been little, if any research dedicated to the problem of how Eastern European family firms evaluate the influence project environment has on projects they manage. This paper tries to fill in this gap by asking the research question: how do family enterprises evaluate the impact of project environment uncertainty on management and success of their projects. For the purpose of the paper, family businesses in the emerging economy of Poland have been investigated. This paper provides better understanding of project management practices in family-owned companies in the context of the impact of project environment uncertainty.

Theoretical framework

Project management success in light of the uncertainty of the project environment

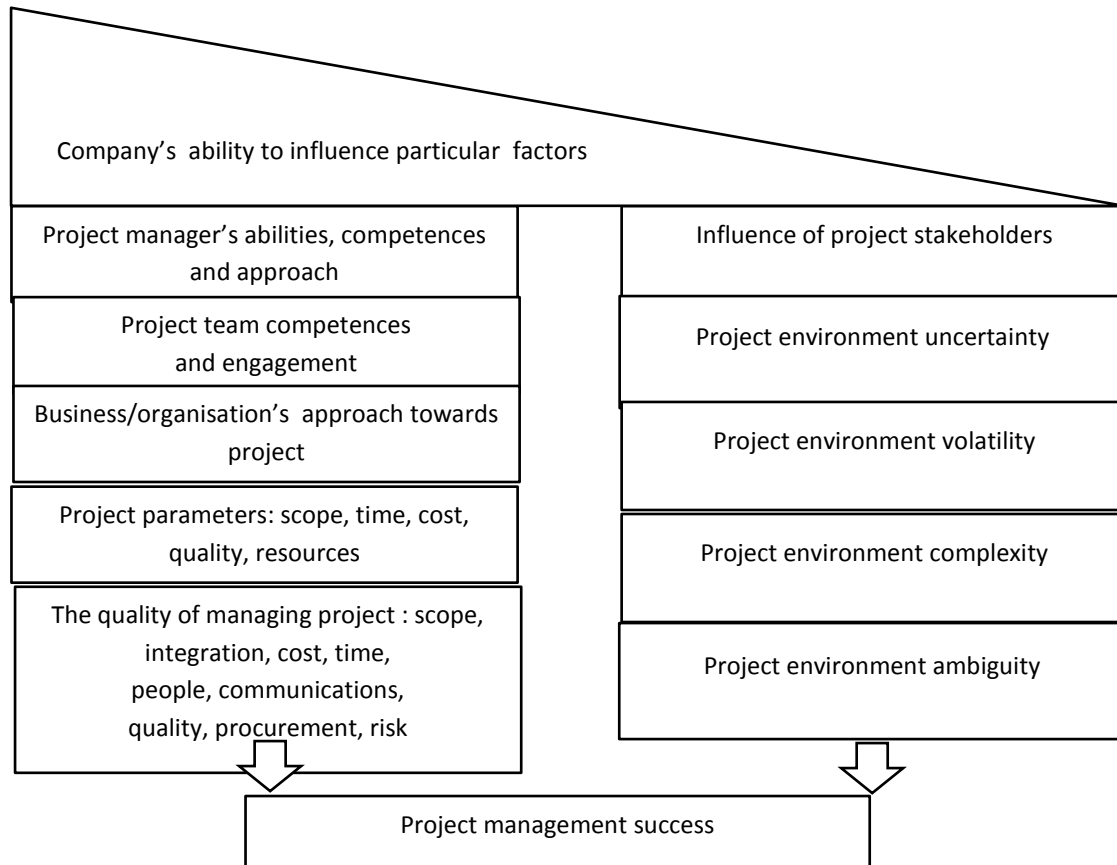
Project management success is perceived in literature in many ways. The authors emphasize different aspects which influence project failure or success. An interesting approach can be observed while studying project management methodologies authored by: Project Management Institute, International Project Management Association and Office of



Government Commerce (Project Management Institute 2013; International Project Management Association 2006; OGC 2005).

Project Management Institute in the *Project Management Body of Knowledge (PMBOK)* discusses the concept of project success in relation to both project knowledge areas and project processes (Project Management Institute, 2013, pp. 71-344). Successful completion of a project is seen among others as a consequence of project scope-, human resource-, quality-, cost-, time-, communications-, risk-, integration-, and procurement management. The aforementioned approach, by integrating project processes with particular management areas, builds a stable knowledge platform for a project manager and a project team.

International Project Management Association in the *International Competence Baseline (ICB)* approaches project success as a result of the proper and optimum application of three groups of competences: technical, contextual and behavioural ones (IPMA 2015). Such an approach underlines an important aspect of: the people, the project team and other project stakeholders- as a foundation for establishing processes and procedures in a particular project and further on building the basis for project management. It also underlines the necessity of a project manager to identify and work successfully with project context: organisational, economic and social one (International Project Management Association 2006; IPMA 2015). At the same time however, project is seen as successful when its outcomes finally gain the appreciation of different project stakeholders (International Project Management Association, 2006, p. 16). The idea of relating project success to the satisfaction of its stakeholders brings however certain risks (Compare Sadkowska J., 2016). The aforementioned are related mainly to the fact that, in most cases, projects 'are unable' to satisfy all stakeholder groups. This happens mainly for the reason that particular stakeholders have different expectations and requirements- which are in conflict. While managing projects in such an 'environment'- project managers have to base their choices and decisions on the priorities- agreed according to the defined project objectives. Key project management success factors have been presented in figure number 1.



Source: own study

Fig. 1. Selected determinants for project management success

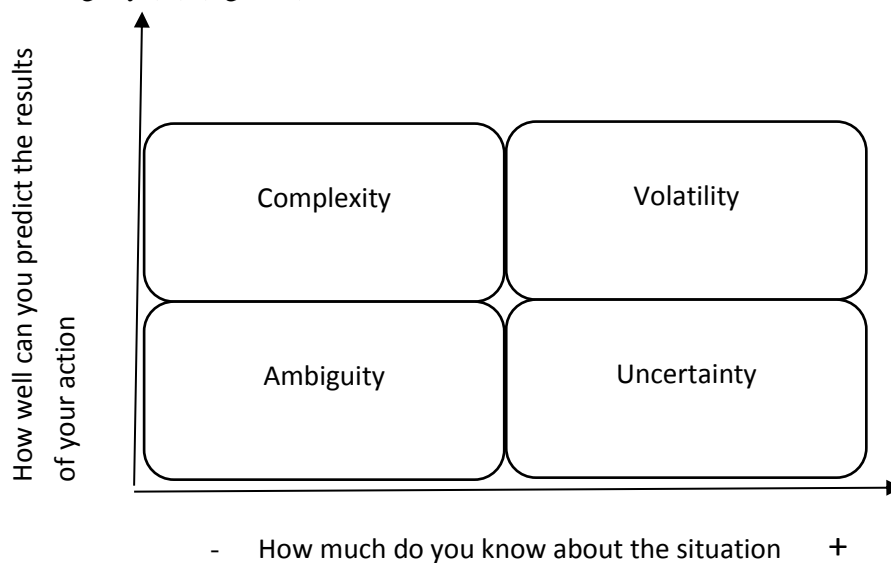
The growing dynamics of changes that take place in business environment causes that project management success starts to be influenced to a higher extent- than in the last decades of the XX century- by external factors. This group is constituted mainly by the specificity of the environment where projects take place and the influence of particular project stakeholders.

Uncertainty is defined as ‘a lack of certainty sense’ (Jaafari A., 2001, p. 98). In projects this term is most often associated with risks. Some authors argue however that in the processes related to project risk management more focus should be forwarded towards uncertainty than risk as a threat (Jaafari A., 2001, p. 97). Such an approach shall indicate a significant difference in perspective where more attention is paid to opportunities than threats. What is crucial however is the fact that in literature uncertainty was so far in most cases related to variability in project’s ‘internal factors’ such as: cost, scope, and/or time (Compare Jaafari A., 2001, p. 99) as the key determinants for project management success. According to the author of this paper the same attention should be forwarded to factors of ‘external type’, firstly to project environment. The aforementioned is caused mainly by the fact that project as a ‘social construct’ has to higher extent than previously ‘take into account’ phenomena and processes taking place outside.



Project environment uncertainty can be sometimes associated with lack of information. Some authors however relate uncertainty to the situation when the organization has some knowledge concerning some situation but lacks the influence to predict results of the actions taken (Bennett N.& Lemoine G.J., 2014, p. 27).

The phenomenon of the uncertainty of the project environment has been also reflected in the tools used to describe the external conditions in which companies were performing their business activities. One of such approaches is presented in the VUCA matrix where the environment was described using four criteria: volatility (V), uncertainty (U), complexity (C) and ambiguity (A) (figure 2).



Source: (Bennett N.& Lemoine G.J., 2014, p. 5)

Fig. 2. Uncertainty versus volatility, complexity and ambiguity

As already mentioned before, in case of projects, the uncertainty of the project environment is ‘created’ first of all by the influence of project stakeholders defined, as proposed by Freeman, as ‘any group or individual who can affect, or is affected by the achievement of a corporation’s purpose’ (Freeman R.E., 1984). This complexity of influences generated by ‘a number of influencing factors’ has also been underlined by Jaafari in terms of factors which cause uncertainty (Jaafari A., 2001, p. 99). Family firm studies emphasize that nowadays family firm managers should take responsibility for managing all stakeholders, not just key shareholders of a company (Berrone P. & Cruz C., 2014). Some studies show that keeping effective relationship with the local stakeholders even strengthens environmental performance of family businesses (Berrone P., Cruz C., Gomez-Mejia L.R., & Larraza-Kintana M., 2010, pp. 260-275). In the light of the above arguments, stakeholders should be seen as those people, organizations and other entities who are helpful to understand that every project is first of all a set of social relations (Sadkowska J., 2016, pp. 317-318). Summing up, it should be emphasized that although external factors play a very significant role in shaping project outcome, the final result cannot be built without keeping up with main project assumptions expressed in project triangle such as project scope, schedule and budget. Those, by enabling determining the project duration in an accurate way (Oomen O.& Ooztaso A., 2008, p. 49), facilitate controlling project progress and allocating project resources in an optimum way.



The methodology and dataset

The objective and methods

The objective of this paper is to study how family enterprises evaluate the uncertainty of project environment in terms of its influence on their project management practices and project success.

For the purpose of the study the definition of a family firm by Olson et al. has been employed. According to the above definition, family company is a business which is owned and managed by one or more members of a household. This household is built by two or more people who are related by blood, marriage or adoption (Olson P.D. et al., 2003). Project management has been defined, following Kerzner, as an endeavour with a definable objectives, which consumes resources, operates under the constraints of time, cost and quality (Kerzner D., 2004, p. 1).

In order to reflect the specificity of both project management and family enterprises, the methods used in the study were designed twofold. In the first stage of the research, the structured literature analysis was used (Svejvig P. & Andersen P., 2015). This analysis covered three basic knowledge areas: family firms functioning, project management and project environment uncertainty. In the second, empirical stage, a structured on-line questionnaire was employed (Salant & Dilman 1994).

In the analysis of the results the descriptive statistics was used. The analysis was performed using Spearman rank correlation analysis. Finally, due to the character of the explained variable, ordinal logistic regression was employed.

The variables

In the study one dependent variable and seven independent variables were used. The dependent variable was defined as ‘uncertainty of the project environment’. The independent variables were the following: 1. the number of employees (fewer than 9, 10-49, 50-249, more than 250 employees) 2. the sector (as defined in sample description) 3. the organizational and legal form (self-employment/civil law partnership/registered partnership/professional partnership/limited partnership/limited liability company/other) 4. Firm’s location (village/town with fewer than 20 000 citizens/town with 20 001-50 000 citizens/city with 50 001-100 000 citizens/it with more than 100 000 citizens) 5. the age of the company measured by firm’s presence in a market (less than 1 year/1-5 years/6-10 years/11-24 years/25 years and more) 6. Generation managing the enterprise 7. the range of business activities (local/regional/domestic/global).

The studied sample

The survey was conducted with 154 Polish family firms. Such a sample reflects the specificity of family owned businesses in an Eastern-European emerging economy. Each company had ‘to go through’ two stage selection process in order to be qualified to take part in the study. First each company, as a family one, was selected from the existing registers of family enterprises in Poland, second every study participant had to confirm that he perceived himself as a family firm. Each company taking part in the study fulfilled both criteria.

The sample was constituted by the following respondents. The majority of the studied enterprises were active in services (51,8%), while 14,1% were working in trade. 8,2% were



manufacturing companies. The studied family firms represented the following sectors according to Polska Klasyfikacja Działalności Gospodarczej: Agriculture, Forestry and Fishing (A), Manufacturing (C), Electricity, Gas, Steam and Air Conditioning Supply (D), Construction (F), Wholesale and Retail Trade, Repair of Motor Vehicles and Motorcycles (G), Transportation and Storage (H), Accommodation and Food Services Activities (I), Information and Communication (J), Financial and Insurance Activities (K), Real Estate Activities (L), Professional, Scientific and Technical activities (M), Education (P), Human Health and Social Work Activities (Q), Arts, Entertainment and Recreation (R), Other Service Activities (S). The companies were located both in villages (28,2%), as well as in cities of different size. The majority of them were micro enterprises with fewer than 10 employees (76,5%). They were in most cases ‘older’ than 1 year. Only 3,5% of the studied enterprises were founded during the last year. Likewise, the sample was dominated by the firms managed by the founding generation. This finding is interesting to compare with results of other studies on family firms. For example Villalonga et al. (Villalonga & Amit 2006) studying family firms from the list of Fortune- 500 have found that 32% of the studied family firms where in their first generation, 32% in the second, while 21% in the third and only 14% in the fourth generation. This variance might indicate that family businesses in mature economies, on the contrary to the emerging ones with Poland being example of them, are more eager to go into the succession process. It also confirms the natural development process of Polish family businesses being currently at an earlier stage of development which is confirmed by the structure referring to the generation managing particular companies.

The research results and discussion

In the first part of the study family firms employing project management practices were identified. Out of the investigated 154 family firms, only 69 confirmed that at the time of the survey they performed their business work by managing projects.

Table number 1 presents how the studied family firms evaluate the influence of project management uncertainty on their project management practices.

Table 1

Degree of influence of project environment uncertainty on the studied family firms^{§§§§§}

Degree of influence	Family firms (N=154)				Test for difference	
	currently not managing projects (n=85)		currently managing projects (n=69)		cc	p
	frequency	percentage, %	frequency	percentage, %		
uncertainty of the project environment					,251	,169
no	4	13,3	5	7,2		
small	10	11,8	13	18,8		
medium	9	10,6	29	42,0		
significant	3	3,5	15	21,7		
very significant	4	4,7	4	5,8		

Source: own study.

Though the differences between the studied groups of firms are not statistically significant ($p = ,169$), differences are large in terms of the effect size. The majority of the studied family firms which managed projects evaluated the influence of the uncertainty of the project environment

^{§§§§§} In case of some companies no answer in this field in the questionnaire was obtained.



either as medium (42%) or as significant (21,7%). On the contrary, the majority of firms not managing projects evaluated the influence of this factor as none or small. This difference is meaningful and underlines the difference in approaches of these two groups.

It is also very interesting to analyze the systemic lack of data referring to the studied aspect of project management. In case of the firm's managing projects, only 3 companies did not provide answer to the above question. However, in the group of the family owned firms which confirmed they did not manage projects, the answers were given only by 30 companies with a lack of data in case of 55 firms. This might lead to interesting conclusions including those that these companies, due to the fact that they did not manage projects, might have had no knowledge concerning the potential influence of the uncertainty of the project environment.

Table number 2 presents Spearman rank correlation for the first group of the studied family enterprises.

Table 2

Descriptive statistics and correlation matrix- the family firms currently not managing projects

Variable	1	2	3	4	5	6	7	8	9	10
Influence of the project environment uncertainty	1									
Number of employees	,277	1								
Range of activities	-,015	,325**	1							
Generation managing the firm	,475**	,201	,057	1						
Firm's location	,058	,228*	,161	-,19	1					
Firm's development in the last year	,485**	-,028	-,116	,132	-,222*	1				
Intention to leave the firm in family's 'hands'	-,205	-,272*	-,176	,067	-,251*	,185	1			
Age of the firm	,216	,426**	,271*	,212	,09	,021	-,385**	1		
Construction *****	,519**	,098	,262*	,189	-,129	,249*	,116	,313**	1	
Other service activities	-,415*	-,132	-,294**	-,09	-,095	,053	,251*	-,229*	-,316**	1
M	2,767	1,271	1,941	1,353	2,847	1,506	1,882	3,035	,176	,318
SD	1,223	,543	,980	,702	1,384	,610	,993	1,096	,383	,468

*. Spearman's correlation coefficient is statistically significant at $p < 0,05$ (2-tailed)

** .Spearman's correlation coefficient is statistically significant at $p < 0,01$ (2-tailed)

Source: own study.

***** For the purpose of the correlation analysis, only those sectors which were most often represented by the studied family firms were included.



For the group of family firms currently not managing projects the analysis revealed statistically significant relationships between the influence of the project environment uncertainty and four variables: the generation managing the firm, company's development during the last year and the sectors of 'construction' and 'other service activities'. The weaker was the development of the studied companies during the last year- as perceived by these entities, the higher the influence of the uncertainty of the project environment on their project management practices ($\rho = ,485$). Furthermore, in perception of the firms representing sector of 'construction' the influence of the uncertainty of project environment had higher significance on projects they managed- compared to the companies from other sectors.

The next table shows results of the Spearman rank correlation analysis for those family businesses which employed project management practices.

Table 3

Descriptive statistics and correlation matrix- the family firms currently managing projects

Variable	1	2	3	4	5	6	7	8	9	10
Influence of the project environment uncertainty	1									
Number of employees	,145	1								
Range of activities	,056	,211	1							
Generation managing the firm	-,04	,399**	-,095	1						
Firm's location	-,229	,292*	,151	,271*	1					
Firm's development in the last year	,24	-,072	-,089	-,114	-,101	1				
Intention to leave the firm in family's 'hands'	,015	-,002	,152	-,148	,147	,336**	1			
Age of the firm	,119	,312**	,122	,218	,035	,064	,067	1		
Construction	-,028	,088	-,065	-,153	,117	,224	,144	,069	1	
Other service activities	-,417**	-,214	,025	,082	,031	-,175	-,154	,112	-,19	1
M	3,000	1,464	2,191	1,412	3,250	1,449	1,449	3,435	,159	,159
SD	,992	,584	1,069	,652	1,262	,654	,631	1,144	,369	,369

*. Spearman's correlation coefficient is statistically significant at $p < 0,05$ (2-tailed)

**.. Spearman's correlation coefficient is statistically significant at $p < 0,01$ (2-tailed)

Source: own study.

The results of the Spearman rank correlation analysis performed for the second group of family firms which managed projects are significantly different compared to the findings in the first group (with no project management activities). The main outcomes of the analysis are summarized in table 4.

Table 4

Results of the correlation analysis for the studied family companies

Correlation between the explained variable and	Family firms currently not managing projects	Family firms currently managing projects
The generation managing the firm	$\rho = ,475^{**}$	No statistically significant correlation
Firm's development in the last year	$\rho = ,485^{**}$	No statistically significant correlation
Construction sector	$\rho = ,519^{**}$	No statistically significant



		correlation
Other service activities	rho= -,415	rho= -,417

*. Spearman's correlation coefficient is statistically significant at $p < 0.05$ (2-tailed)

** . Spearman's correlation coefficient is statistically significant at $p < 0.01$ (2-tailed)

Source: own study.

The results of the Spearman rank correlation analysis lead to the following conclusions. First of all, it is interesting to observe that that the test confirmed different relationships in case of the family-owned firm's not managing projects and those employing project management practices. In case of the first group there is statistically significant, positive correlation between the influence of the uncertainty of the project environment and two family related factors: the generation managing the company (rho= ,475) and this firm's development during the last year (rho= ,485). In case of the second group of the family entities which managed projects, none of the above relationships was confirmed.

The above results might suggest that the younger generations who manage these enterprises, having more knowledge and consciousness regarding the influence of the environment, pay more attention to this factor. The fact that the above results were not confirmed for the group of the firms which managed projects can be explained by the fact that implementing project management methods and tools gives these businesses a chance to reduce the negative influence of the uncertainty which is generated by the project environment.

It is also interesting to see that firms not using project management which evaluated their development during the last year negatively also evaluated the influence of the project environment uncertainty as more significant (rho= ,485). Likewise, this relationship was not observed in the businesses which managed projects (rho= ,24). This can again be explained by the opportunities that employing project management practices creates for the firms. In order to verify the obtained results, the ordinal logistic regression analysis was used (table 5).

Table 5

Results of the regression analysis- the family firms not managing projects

Predictors	Estimator (B)	Standard Error	Level of Significance	Lower bound	Upper bound	Exp(B)
The generation managing the firm	1,917	1,363	,160	,470	98,316	6,800
Firm's development in the last year	,990	,803	,218	,558	12,982	2,691
Sector: construction	18,837	18363	,999	,000		1516338
Sector: other activities	-1,983	1,039	,056	,018	1,055	-,138

Source: own study.

Table 6

Results of the regression analysis- the family firms managing projects

Predictors	Estimator (B)	Standard Error	Level of Significance	Lower bound	Upper bound	Exp(B)
The generation managing the firm	,088	,538	,871	,380	3,136	1,092



Firm's development in the last year	,485	,567	,392	,535	4,934	1,624
Sector: construction	-,244	,907	,788	,132	4,638	,784
Sector: other activities	-2,829	,886	,001	,010	,336	,059

Source: own study.

What is worth underlining is the fact that in case of both groups, regression analysis revealed that firm's belonging to the 'other activities' sector was particularly significant in explaining the studied phenomenon. Firm's belonging to this sector noticeably decreased the influence of the uncertainty of the project environment on project management. This relationship was identified both: in the firms managing projects as well in those not doing this. The test revealed also that in case of both studied groups of the family firms, factors such as: the generation managing the firm and firm's development during the last year, though not statistically significant, would increase the influence of the project environment uncertainty- as evaluated by the studies companies. Again this relationship was independent of the fact whether the company employed project management or not.

Conclusions

It is of importance to deeper understanding behaviour of family-owned enterprises in the context of their project management practices. Due to the fact that the growing numbers of family firms are managing projects in an environment which is characterized by a high uncertainty it is of significance to recognize particular mechanisms which influence this phenomenon.

The results of this study allow us to draw the following conclusions. The first one is that the performed analyses revealed different results for the two studied groups of family businesses: those employing project management and those not managing projects. In case of firms which declared they were not using project management there can be observed a higher influence of factors related to the family influence, such as the generation who currently managed the company. For the firms which used project management practices this relationship was not confirmed which might suggest that these business entities are more task and objective focused than the first group. Furthermore, those enterprises which did not manage projects and which evaluated their development during the last year negatively also evaluated the influence of the project environment uncertainty as more significant ($\rho = ,485$). As the above relationship was not observed in businesses which managed projects ($\rho = ,24$) it can again lead us to the initial, conclusion that employing project management practices might have a positive influence on how these companies develop. An interesting result concerns also the relationship between firm's belonging to a particular sector and how it perceives the influence of the project environment uncertainty. In case of both studied groups this factor has a significant, facilitating influence- as confirmed by the results of the ordinal logistic regression.

Proper identification of the influence of the uncertainty of the project environment can make a significant contribution to facilitate project management and, by early elimination of threats, increase the probability of project success.



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A PROJECT MANAGER’S PERSONAL AGILITY SIGHTINGS

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Abstract

This paper explores the nuances of different aspects of agility on a personal level of Project Managers honing business/professional agility through Personal Agility (PA) self-assessment. This paper highlights the different flavours of PA that projects and project oriented organization frames need for successful project implementation, whether it is a small/medium/large project in any industry. Agility brings personal value, leadership, navigation, managing the tides of knowledge and putting on the captain’s hat of resilience. The lighthouse of this paper guides you to the safe shores by guiding you through several colours of agility such as emotional, outcome, cerebral, flexibility, adaptability and preparedness. Our PA lighthouse guides you to the secure shores of your personal vision, prepare you to tread the long roads of mergers/acquisitions, use Individual and Collective PA Assessment, which is a vital requisite for managing successful projects in the present fast changing environment. Influencing with PA to work on personal visions (long-term plans) and development sets a Project Manager’s directions be it right or wrong. Many strong pillars of PA steers you to your goal alignment, paving the way to project agility, getting ready for opportunities and changes when and where all your stakeholders need it. The problem statement is - “why are projects less than 100% successful?”. The aim of our research is to instil in PMs that using our PA methods results in projects reaching the desired outcomes. The findings of our paper are 7 main PA subtleties that are the guiding light to avoiding turbulences.

Key words: Resilience, Healthy procrastination, Project adaptability

Introduction

Decision on management mindset and best practices cuts through impact and quality of personal and group knowledge. Take a journey on a Personal Agility Boat to visualize options, alternatives and opportunities. Visualization is the way to your shore’s lighthouse.

Maintaining leadership competence with personal agility means Return on Trust, diplomacy, maintaining and building attributes at all the stages of involvement. Training at the Personal Agility gym is crucial for balance/speed to cope with Project Managers' business approach and quality and honing of business/organizational agility through personal agility self-assessment. Agility is an amenity. We need to work on our personal and collective habits in order to merit and master Agility.

The quintessential question at hand is; to what changes should we adapt to? There are so many of them. We need to work on our personal thermostat and figure out the right temperature for each entity. We could also say that we live in a VUCA environment, reflecting on the volatility, uncertainty, complexity and ambiguity of general environments and circumstances. We can also say that every project sails in a VUCA environment.



Research results and discussion

In this present era, the trend is such that changes in our environment and projects occur at the very high pace. In order to survive we need to learn and adapt at a much faster pace than ever before. These then steps up to the Hyper and Hypo factors of crucial and unplanned agents for vigilance which includes individual and team characteristics as the Personal Agility Lighthouse shown in the Exhibit 1 below:

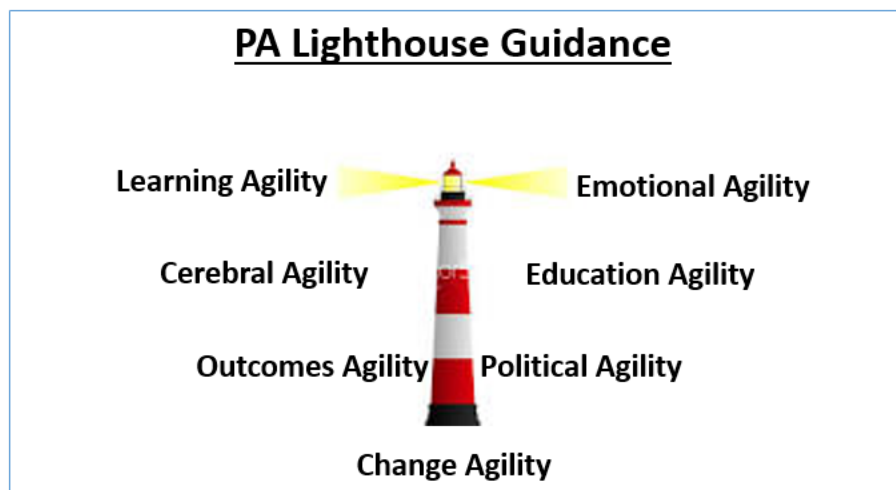


Exhibit 1: Personal Agility Lighthouse Guidance

1. *Learning Agility* equates to learning fast, extracting and applying learnings from proficiencies and realizing results optimally. Learning agility intertwines with personal agility when it comes to 1980s to 2000 born workforce in many ways. Looking beyond the notebook knowledge to survival with individual qualities, a skill etc. ‘Not being afraid of change’ is the rowing rhythm of the millennial coxswain. Learning Agility also means that we need to have the courage to admit that we do not know everything. We need to be brave enough to accept the fact that we can be wrong about our assumptions. Only then, will we be open to new discoveries and learning opportunities. This situation is visible at the beginning of every project. On one hand, we want to know everything – meet the entire stakeholders request and gather all requirements. But at the end of the day we need to know that it is impossible to know everything. Even if we gather most of the requirements, we need to treat them as assumptions and be open to check them throughout the project timeline.

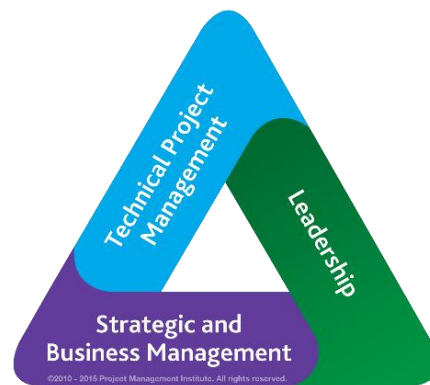
2. *Cerebral Agility* fetches new viewpoints, shows ease in difficult and obscure situations, coming up with timely guidance. Here is the mantra that combines the ingredients to maturity - know more, read more, be curious – therein lies your adaptive achievement! When you want to have good ideas you need to have many ideas. Having options and ideas is a luxury. Keeping it in a repository radar screen, monitoring, generating more ideas to use and gauge the ideas as and when it is needed. When we manage projects, we need to build interdisciplinary project teams



that are able to generate new ideas and options on how to deliver consensus driven projects. Interdisciplinary teams use different perspectives and this guides them to convergent and creative options. For a Project Manager it is also important to wear two hats:

- Leader of a team – Leadership from PMI Talent Triangle (shown below from the Project Management Institute) - These skills help us develop a vision for our team members and inspire them to achieve the target. Leadership is about winning as a team, not as an individual.

- Partner to a business – Strategic and Business Management from PMI Talent Triangle (shown below from the Project Management Institute) - These skills help us analyze business decisions before you implement them. These analyses include cost benefit analysis, strength and weakness analysis, market conditions, legal requirements and compliance, etc.



Putting on the captain's hat of resilience, a Project Manager seeks for the PA lighthouse to be a leader and partner by wanting to know/learn/read more, be more curious about project outcomes, team members, and organizational strategy, to list a few guidelines.

3. *Outcomes Agility* means enterprising, inspiring, and pushing to excel beyond one's limit. It is ok to never reach the lighthouse, it is not ok to not improve and strive for excellence. It is ok to understand that excellence in outcomes can be treated as an object that moves in a forward direction constantly inspiring us to better ourselves to excel to the next level.

4. *Emotional Agility* is to develop an understanding of the relationship between moods, thoughts, behaviors and then to take charge of them by practicing skills to cope with intense negative feelings, extreme sadness, anxiety and anger, so on and so forth. One broadens oneself via awareness, coping skills, regulating difficult feelings, killing skepticism and tolerating challenging situations in setting goals. Emotional intelligence and partnership in government visibility and innovation can be smooth sailing by following all of these.

5. *Education Agility* in our context is to do role-playing in companies, getting the feel of the pain points of the person sitting in a different chair and doing the roles that does not necessarily fall into your daily routine.



6. *Political Agility* according to our take is being effective within a setting where politics together with great media and community analysis are an inherent ingredient of a company scenario. Steering multifaceted political waves and navigating towards safe shores without turmoil is viewed as the tugboat that guides and adjusts reality with the political typhoons.

Every project has many stakeholders with different impact on future outcomes. Project Managers must be fluent and transparent in Political Agility in order to cope with different interests, needs and wants. The challenge is that most of the politics are not visible thus require Emotional Agility to capitalize accomplishments throughout the length and breadth of the journey.

7. *Change Agility* in our minds translates to:

Are all the stakeholders rowing the boat or are some sinking the boat? In other words, ‘what, where, how’ are the three questions all the stakeholders need to sync to the same beat for an organization to glide smoothly. Taking the LRM (last responsible moment) concept borrowed from Lean thinking, as an example, authors think that reaching the lighthouse can be achieved without much turbulence if one keeps in mind that commitment can be deferred to the point where non-decision moments will have a negative impact. Therefore, a fair balance can be struck to avoid rocking the boat by understanding that LRM is often essential. Having options is a luxury, but at some point we need to take a decision and choose one. This is every wave in a PM’s ride to make a decision between options. Many times when we deliver upfront detailed analysis and planning, we take thousands of decisions without a need. Due to this we lose our natural change agility. Also our team members are affected by old decisions as they may believe that whatever was decided before is still valid and they lose the agility flavor. Project Managers in order to maintain Change Agility need to communicate what the vision is, what decisions were taken and to what options we are open. Both Project Managers and team members must be aware about LRM so that a shared vision can guide all stakeholders to the shores with emergent and empowered success.

Educational Agility has to happen on both the project level as well as the leadership level in order to increase the process and people alignment. There must be flexibility in all types of problem solving techniques and critical thinking skills to allow innovation and agile thinking to address new challenges in both the next step of the project and the PM. Decision makers of policies at the higher level sometimes are faced with policy challenges that prevent new technology from being implemented quickly. This prevents PMs and their teams from accessing the most advanced technology that could help engage in moving through the projects in a way that feels familiar to them. This then brings the authors’ research to the *Change Agility* waves namely setting, working toward and achieving common goals that not only directly relate to organizational objectives but also contributes to PM commitment by making a PM feel like an important part of the organization. Looking at how their overall actions are affecting others, and the organization in the long run, as every crewmember of a ship is as important as the captain to lead the ship to the PA lighthouse. If one PM has a negative affect and still contributes, she or he is in a sense is “weighing” the project down. So individualistic mindsets, needs to change to agile mindsets such as servant leadership to prevent anchoring the project or the PMs, and boost business value. For business value to grow, *Political Agility* is a must, which the authors think emerges with distinctive divide may it, be between PMs, other stakeholders, departments etc. Perfect alignment is never a possibility, so avoiding overbearing, overriding conflicts with



rationalistic and ideological waves will guide a PM to the PA lighthouse with persistence, dedication and collaborative contribution. For collaboration, emotions cannot come in the way, which navigates us to **Emotional Agility** that warrants agile appearances and sometimes suppression of inner feelings. Psychological adaptability and cognitive improvisations under stress creates anticipating changing situations include obstacles. A PM may arise to a non-programmed decision, and emotional agility would, without a doubt be a great trait to have to utilize in unusual, unpredictable opportunities and threats. Emotions involves the brain and the mind, two of the most agile parts of a PM that is now seen in the horizon as **Cerebral Agility**. To reduce mental fatigue, reduce anxiety, support healthy brain function of a PM, etc., a clear intellectual thought is imperative. Efficiency and alertness combined with a sharp risk response mitigation is supported by this sailboat cerebral agility. All of the above Personal Agility can be engineered only if **Learning Agility** is part of a PM. PMs with strong learning agility, always willing to learn new information can rapidly study, analyze, and understand new situations and new business problems to understand difficult problems and strengthen possibilities by making fresh connections. PMs need people skills to understand tough situations and improve by means of collective performance. PMs perform well in new and first-time situations through resourcefulness and inspiring teams. Self- Awareness in PMs who know themselves well viz about their strengths/weaknesses and do not have any blind spots becomes better performers. Last, but not least the **Outcomes Agility** is now shown in the full beam of the authors PA lighthouse with all of the fog lifted up towards far-reaching clarity of the PM's vision, goal and consequences that will row the boat to the shores that the organization sees as well. Thinking of all ends of the spectrum brings a PM to walk the sands of a happy shore.

Some of the main characteristics of Personal Agility that organizations desperately need are:

- ⚠ Leadership and how we manage personal value - Making project leaders through candid conversations, cost transparencies (guesstimations, actuals and false assurances).
- ⚠ Personal Agility and its influence in resilient projects - Address cultural customs and adaptations by all stakeholders. Build trust internally and externally amongst stakeholders throughout all projects.
- ⚠ Stable adaptability in choppy atmospheres - Optimizing trust and integrate planning involving all stakeholders periodically, not take a “when needed” attitude/policy.
- ⚠ Innovative thinking and openness to alternatives - Use both divergent and guided ideas. Openness to experimentation and solving problems by drawing alternative thought processes from within and outside the comfort zone.
- ⚠ Using ‘Influencing with and without positional authority’ to cross the environment bridge. Hindsight. Environmental factors. Team dynamics.
Strategic Business Management Skills for Project, Program and Portfolio management encompasses characteristics specific to a few essential guidelines.

1. Leadership and how we manage personal value
2. Making agile leaders through transparency
3. Personal Agility and its influence in a resilient organization

Conclusion

In conclusion, the authors opine that Personal Agility is:

Adapting one's approach as the needs of a change that is not comfortable in uncertain conditions.



Rather than exhausting oneself, security zone is where one can relax, have fun, and accomplish complicated issues in simple ways.

Listen inwards, juggle tasks and projects in improvisational ways to ensure needs are met while enhancing long-term goals.

Ability to use principles or tools to help you adapt to situations in and figure out the right decisions to make for each situation.

Creatively work through obstacles in life, learn and grow from mistakes, listen to one's own resistance instead of fighting it.

Boldly face challenges, to use them to learn and grow in an agile arena where you feel relatively in charge, protected and confident in your capability to handle whatever is thrown at you.

Learn to distribute one's use of time more purposefully, connect and collaborate with others in a way that enhances relationships, and view criticism and rejection as feedback that we can use to help and learn from.

To sum it all up the authors feel that to maintain stability and attain one's highest quality of work to meet the project purpose, Personal Agility discoveries will lead one to:

- ⚠ improve organizational achievement in a PM's career as well
- ⚠ have the capability to be open minded and positive when adapting to change
- ⚠ find ways to counteract oppositions to change
- ⚠ improve project team member satisfaction, customer satisfaction, increased sales and revenue, and improve the overall efficiency of the company holistically
- ⚠ commitment which lessens fear that leads to lag
- ⚠ take work skills to new heights enabling honing of personal agility technicalities as shown in the Exhibit 2 below

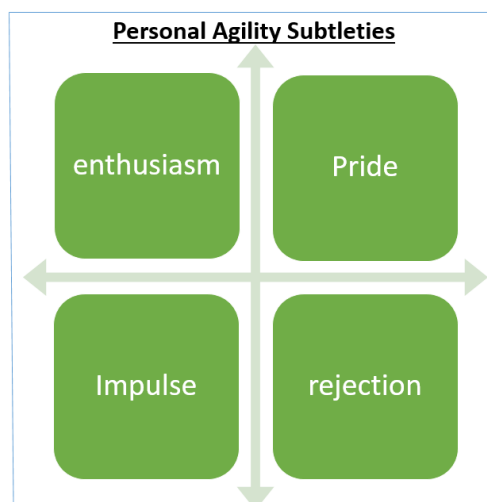


Exhibit 2: Personal Agility Subtleties

If all four quadrants are dealt and addressed in a timely and efficient manner, it will definitely result in:

- ⚠ Analyzing the situation genuinely
- ⚠ Understanding emotions aptly



⚠ Interpreting and empathizing with others

The authors have touched on just a few pointers of Personal Agility and wish the readers a smooth sailing experience guided by the PA lighthouse.

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ANALYSIS OF PROJECT MANAGER COMPETENCIES IN JOB POSTINGS IN LATVIA

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Abstract

The problem is that many job postings with the title “project manager” do not correspond to the responsibilities and competencies of a project manager. A lot of job postings are designed for other professions, and there is a lack of research into how many companies use the title “project manager” to attracting potential employees.

The aim of the research study is to analyse postings for the position of a project manager and their content to offer recommendations for correct recruitment of project managers.

This study will answer to the questions – 1) Do the content job postings for the position of a project manager complies with IPMA Individual Competence Baseline 4th Edition?; 2) “Which are the most demand key competencies for project managers in the labour market Latvia?”.

The study is conducted using the quantitative and qualitative data obtained in a period of 7 months, between October 2015 and April 2016. 560 postings for the position of a project manager were collected and analysed during the study. The competencies used in the project manager job postings are compared with the competencies from ICB, 4th Edition.

The results of the study show that 25% of the job postings have been correct, i.e., the requirements applicable to and the duties of a project manager have been defined in line with the competencies of a project manager in them.

Most required competencies for project manager are People competencies: self-reflection, self-management and teamwork, and personal communication. In the Practice competency group, the most frequently required competencies are: organization and information, plan and control, and goals, objectives and benefits.

On the basis of the analysis of the results, the further development of the project manager’s profession and correct job postings creation is presented in conclusions.

Key words: *project manager competence, job advertisement, ICB4*

JEL code: J24

Introduction

According to the Project Management Institution forecast of the project management industry growth (PMI, 2013), it is expected that between 2010 and 2020, 15.7 million new project management roles will be created globally across seven projects-intensive industries. Along with the job growth, there will be a significant increase in the economic footprint of the profession (PMI, 2013). The survey of Ministry of Economics of Latvia points out that project manager will be one of the most demanded professions in future. (Ministry of Economics, 2014).

State Employment Agency overview of the employment situation shows that vacancy of project manager is one of TOP 10 most demanded highly qualified vacancies in Latvia. (Maskalovs A., 2016) The project manager’s job is one of most challenging jobs in any organization, because it requires broad understanding of the various areas that must be coordinated and requires strong interpersonal skills. (Ashan K. et.al, 2013)



Recruiting the “right” project manager is an important challenge for organizations and still is an important organizational imperative. (Ashan K. et.al, 2013) Recruitment for project management is the same as for other business sectors. The objective is to find the right person at the right time with the requisite blend of education, skills, experience and personality for the job. (Scott L, 2013)

There is a lack of research on which recruitment messages are used to attract potential project managers and whether these signals reflect to project manager’s competency guidelines from professional bodies. International Project Management Association (IPMA) on October 2015, presented IPMA Individual Competence Baseline for project, program and portfolio management, fourth edition (ICB4). The ICB4 is a global standard that defines the competences required by individuals working in the fields of project, programme and portfolio management. The competencies of project management are created as Eye of Competence and organized in three competence groups: people, practice and perspective competences.

In this study authors examine the recruitment of project managers in Latvia from job postings, and address how organizations understand the project manager’s role. The competencies used in project manager job postings are compared with the competencies from ICB4. The study is done using quantitative and qualitative data analysis in a 7 months period: from October 2015 till April 2016.

This study addresses the following questions: 1) Do the content job postings for the position of a project manager complies with IPMA Individual Competence Baseline 4th Edition? 2) “Which are the most demand key competencies for project managers in the labour market Latvia?”

Theoretical background

Organizations define more their activities as projects, the demand for project managers grows, and there is an increasing interest in project management competencies and in standards for assessment, development, and certification in these competencies. (Crawford L., 2005)

Two prime Project management Professional organizations, the International Project Management association (IPMA) have developed the IPMA Competence Baseline (ICB4) and Project management Institute (PMI) have developed The Project Manager Competency Development (PMCDF) framework. The ICB4 components (people, practice and perspective) and the PCMDf components (knowledge, performance, personal) are structurally similar. In this study are used ICB4, because it is available free of charge for wider audience and oriented more on individual competences.

The ICB4 (2015) takes the *Eye of the Competence* into next generation, with a redefinition of the competence elements required by the modern project manager. 29 competence elements are organised in three competency groups:

- **People competence:** self-reflection and self-management; personal integrity and reliability; personal communication; relations and engagement; leadership; teamwork; conflict and crisis; resourcefulness; negotiation; results orientation.
- **Practice competence:** project design; goals, objectives, and benefits; scope; time; organisation and information; quality; finance; resources; procurement; plan and control; risk and opportunity; stakeholders; change and transformation; select and balance.
- **Perspective competence:** strategy; governance, structures and processes; compliance, standards and regulations; the informal power and interest; the culture and values.



The previous version of ICB4 was ICB3, which is used for different researches. Nahod M. et.al. (2013) research provides concrete evidence that the influence of ICB effect 3.0 competences can be linked to project success.

Competency modelling is an important method used to examine job-related information and employee skills in the management of employees. The principle of competency evaluation is that competencies have to fit the required characteristics and the job. (Liikamaa K., 2015)

A lot of literature focuses on project manager technical skills (Hyvari I., 2006; Brown K, 2000; Pinto J. & Kharbanda O., 1995). Continuous development of project management discipline and researches find out that interpersonal skills are more important to project success than technical skills. Turner and Müller (2006) reported that traditional project manager skills are basically entry level skills and do not as often lead to successful project outcomes as do interpersonal skills. In the similar research, which was done in New Zealand, results show that in job advertisements for project managers soft skills and competencies are emphasized. (Ahsan K. et.al.,2013)

Research in 107 companies (Springer, 2013) shows that 85% of the behaviours of the top researched companies believe qualitative behaviours are at least as important as quantitative. The main qualitative behaviours include leadership, communication, personal effectiveness.

Chipulu et.al (2013) found that industry puts more weight on generic skills than on project management knowledge. This we may apply to labour market in Latvia when looking at Classification of Professions.

In Latvia, the principal qualification requirements for each profession and the key professional functions are defined in the Classification of Professions. The following positions are included with regard to project management: Project Manager/Director, Project Manager Assistant, Project Coordinator, Planner of Advertising and Marketing Projects, Construction Project Manager Assistant, IT Project Manager, Financial Product Development Project Manager, Credit Project Manager, Payment Card Project Manager and Study Project Manager (Ministry of Welfare, 2016)

Project manager competence is proven through certification. According to Creasy T. and Vittal S. (2013), as more project managers get certified and enter the field, we can be confident that the technical skills will be addressed. Certifications could be focused on processes and individual project manager's competencies. The second approach verify soft skills or competencies from ICB4 people competency group. Of course, a certificate cannot guarantee an individual's success, but it certainly is a significant indicator and tool for differentiation.

Certification by international organizations transfers positive, tested knowledge and experiences gathered across the world into the everyday business processes of project managers. (Uhlir Z., 2013) Furthermore, through their positive action, project managers transfer their knowledge and skills to their work environment, thus forming the preconditions for quality improvement in project management in general.

Research Method

This study utilizes qualitative and quantitative techniques in an integrated manner.

The selection of the job postings lasted for 7 months, between October 2015 and April 2016. Once every seven days, the keywords "project manager" were used to screen the new, unique posting on www.visidarbi.lv. **Visidarbi.lv** was chosen because it is a **leading job search engine in Latvia** with a single pool of all job offers in Latvia.



The analysis of the job postings was performed in 3 stages:

Stage 1: Exclusion of duplicate postings. Duplications occur on www.visidarbi.lv because:

- The postings are pooled from various sources
- The validity periods of postings are extended

Stage 2: Creation of a database of job postings according to Table 1 and analysis of the general information.

Table 1

Database matrix for postings for the position of a project manager

No.	20
Job title	Project Manager
Name of Employer	ABC Ltd.
Location	Riga
Sector	IT, trade, services, construction, production, EU funds
Public/private/association	Private
Requirements, obligations	Computer skills, accuracy, sense of responsibility, time management skills
Experience in project management	Yes/No
Project Manager certificate	Yes/No
Education	Yes/No
Language	LV, ENG, RUS
Motivating factors	Social guarantees,

The database includes all postings with the job title “project manager”. The job title was copied exactly as written in the job posting to be able to determine the number of job titles not matching the titles of project manager jobs included in the Classification of Professions during the study. The postings were classified as follows:

- *Non-corresponding postings* – those in which the job title does not correspond to any of those included in the Classification of Professions, and the key professional functions include those of other specialists.
- *Partly corresponding postings* – those with a content corresponding to the key professional functions of a project manager, but with a non-corresponding job title.
- *Corresponding postings* – those in which the job title and the functions correspond to the key professional functions of a project manager.

Stage 3: Analysis of the competencies of a project manager in order to find out what competencies of a project manager have the highest demand in the labour market. The competences from the people competence group and the practice competence group according to ICB4 (2015) were analysed in the job postings. The perspective competency group competencies are not included in the analysis because they occur in job postings very rarely and are more frequently used on the level of project programmes and portfolios.

The knowledge and skills included in the postings were grouped by the competencies. Microsoft Excel and Microsoft Access were used for the collection and analysis of the selected data.

Results of Analysis

560 job postings were selected and the Stage 1 analysis was performed between October 2015 and 30 April 2016, and, as a result, 352 postings were confirmed to be valid in the Stage 2 analysis.

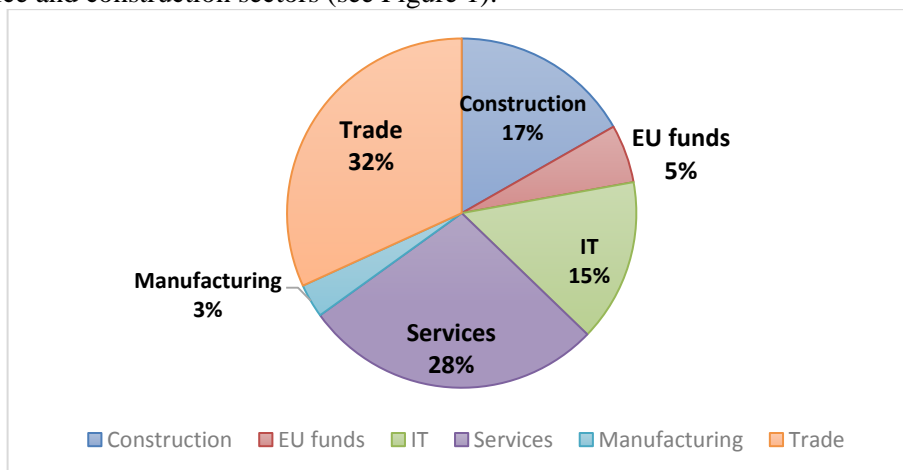


It was concluded after the **Stage 1 analysis** that companies requiring a project manager look for the employee in more than one job search portal in order to cover the widest possible range of potential job-seekers. The authors found out that the companies which use the possibility to publish their vacancies in several job searching portals are large and publicly well-known companies, such as, JSC Lattelecom, JSC G4S Latvija, PICHE, Ltd., JSC UPB, which have larger budgets for personnel recruitment.

A conclusion was drawn during the Stage 1 analysis that one of the most frequent reasons for job posting validity period extensions is the content of the posting, which is either too general or includes over-complicated definitions of the requirements.

352 unique job postings were selected **in the Stage 2 analysis**. Monthly averages of 50 job postings for project manager vacancies have been published in Latvia between October 2015 and 30 April 2016.

The largest numbers of postings for the position of a project manager have been in the trade, service and construction sectors (see Figure 1).



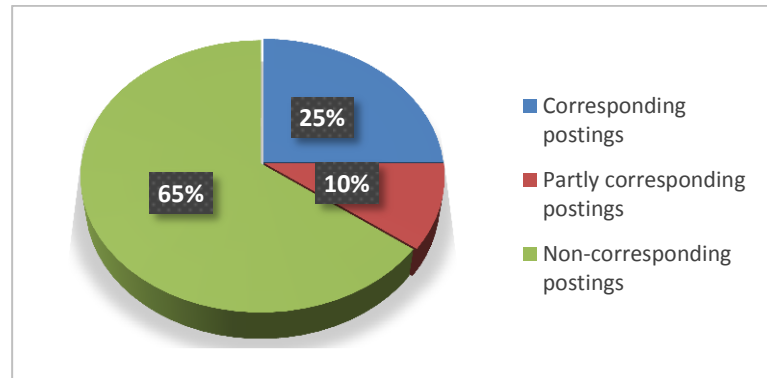
Source: author's construction based on research

Fig. 1. Distribution of Job Postings by Sectors

In the descriptions of the potential locations of the places of work of project managers, 90% of the project manager vacancies were offered in Riga, and only 10% of them were outside Riga. This suggests that a project manager has more career opportunities in Riga.

The job postings were analysed by sectors as well. The private sector includes commercial undertakings, farms and societies, whereas the public sector includes state and municipal institutions. 87% of all job postings have been published in the private sector, and 13% of them have been in the public sector.

The corresponding, partly corresponding and non-corresponding postings were selected during the second stage of the analysis. Figure 2 shows that only one quarter or 25% of all postings corresponded to the key professional functions of a project manager.

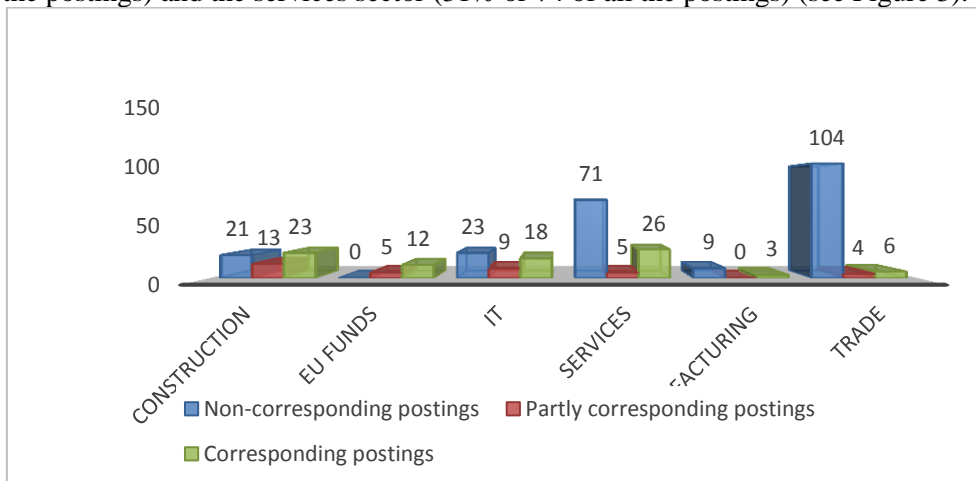


Source: author's construction based on research

Fig. 2. Correspondence of Job Postings to the Key Professional Functions of a Project Manager

Employers have different interpretations of the key professional functions of a project manager and lack proper understanding of what the job duties of a project manager would be. The job title “project manager” is used to have an attractive title for the position, but, in fact, the professional functions appear to match those typical of some other profession. In the non-corresponding postings, the duties most frequently specified for a project manager include attraction of new clients, selling of a product or service, conduct of price surveys and preparation of quotes, maintenance of a website, commissioning of buildings, translation/interpretation, and performance of annual audits.

The non-corresponding job postings include such job titles as a trade project manager or sales project manager. These job titles have been created within a sectoral context because the largest amounts of non-corresponding job postings appear to be in the trade sector (46% or 104 of all the postings) and the services sector (31% or 74 of all the postings) (see Figure 3).



Source: author's construction based on research

Fig. 3. Sectors of Postings for Project Manager Vacancies by Types of Postings

In the partly corresponding postings, which represent 10% of all the postings in the research study period, the title of the position of a project manager has not been defined according to the job titles included in the Classification of Professions of the Republic of Latvia. The non-corresponding job titles include lease project manager, occupational health and safety



project manager, procurement project manager, integrated communication project manager, real property project manager, public relations project manager, marketing project manager, and construction project manager. When comparing the job titles “marketing specialist” and “marketing project manager”, the potential employee might find the position of a project manager more attractive.

The range of jobs offered in the labour market is indicative of the necessity to revise the Classification of Professions and, provided that professional functions of a project manager are adequate, include new job titles in various sectors. The existence of inadequate job titles for a project manager also suggests that employers do not always respect the information provided in the Classification of Professions and create job titles creatively to attract larger numbers of potential employees.

No previous experience in project management is required in 67% of the non-corresponding or partly corresponding job postings. This requirement is included in only 33% of the postings. Based on the analysis of the content of the postings, a conclusion has been drawn that previous experience in selling products and services as well as in the attraction of new clients has been required in the non-corresponding and partly corresponding job postings.

In the non-corresponding and partly corresponding job postings, the duties specified for a project manager include attraction of new clients, selling of a product or service, maintenance of a website, commissioning of buildings, translation/interpretation, conduct of price surveys, preparation of quotes, performance of annual audits, or similar.

Knowledge of Latvian, English and Russian is required in 78% of the non-corresponding and partly corresponding job postings. Knowledge of Latvian and Russian is required in 10% of the postings, and this is typical specifically in the postings associated with trade and service sectors.

In the corresponding postings, the job title is stated according to what appears in the Classification of Professions, i.e., “project manager”, and the content of the posting includes the key professional functions of a project manager.

As can be seen in Figure 3, the highest amounts of corresponding job postings have been in the services sector (30% or 26 job postings), the construction sector (26% or 23 job postings), and the IT sector (20% or 18 job postings).

Requirement for previous job experience prevails in the corresponding postings, i.e., experience in project management has been required in 74% of the job postings, with 26% of the postings being without a requirement for previous job experience. This suggests that job experience of a project manager is highly essential, as a project manager having it would be able to deal with any issues associated with project management more efficiently.

The requirements for the length of experience could not be identified in the analysis because job experience occurred as a general requirement in most of the postings. Project managers are required to have knowledge of Latvian, English and Russian in 82% of the job postings, and knowledge of Latvian and English is required in 11% of the postings. Knowledge of Latvian and Russian has not been required in the corresponding job postings, and this opposite to what can be seen in the non-corresponding postings, because knowledge of Russian is essential particularly in the trade and services sectors. Knowledge of other languages, such as German, Italian, Danish, Norwegian, Swedish, was required in 2% of the corresponding job postings. These requirements are set for project managers to be employed in international



projects with affiliated companies or cooperation partners, in order to assure quality communication without intermediaries.

One of the independent documents confirming the professionalism of a project manager is the project manager certificate. The analysis shows that the project manager certificate has been required in only 2 job postings in the entire period of the research study. The results show that the importance of certification of project managers is not acknowledged or appreciated by employers. Specific IT or construction certificates have been required in some of the job postings.

In the corresponding job postings, the most frequently required project manager competencies were evaluated for compliance with the People and Practice competency group in the ICB4.

As can be seen in Figure 4, employers have required project managers to have teamwork competency most frequently (in 85% of the job postings) in the People competency group, appearing in the job postings as ability to organise project processes, ability to maintain and establish teamwork. The second most frequently required competency is self-reflection and self-management, required in 82% of the job postings. Within this competency, employers have most frequently required ability to manage own working time, ability to work independently and set and perform work tasks. The third competency is personal communication, required in 55% of the job postings. This most frequently appears as excellent communication skills, ability to maintain good contact, management of conversation. The TOP 5 of the People competency group includes results orientation (33%) and relations and engagement (27%).

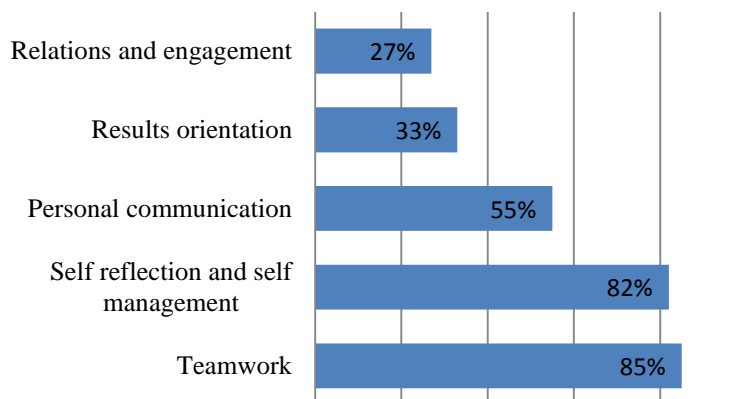


Fig. 4. TOP 5 People Competencies in Project Manager Job Postings

As can be seen in Figure 5, the most frequently required competency in the Practice group is organisation and information, included in 34% of the job postings. Organisation skills, presentation of information and cooperation with the parties involved are required as part of this competency. The second most frequently competency is plan and control, which has been included in 31% of the job postings, and, within it, employers have required planning and supervision skills, monitoring of targets, preparation of overviews, and reporting on the work. The third most frequently competency (in 16% of the job postings) is goals, objectives and benefits, and, within it, employers have indicated the skills of stating and analysing objectives/targets and setting priorities. The most frequently required competencies also include project design (15%) and finance, resources, procurement (13%).

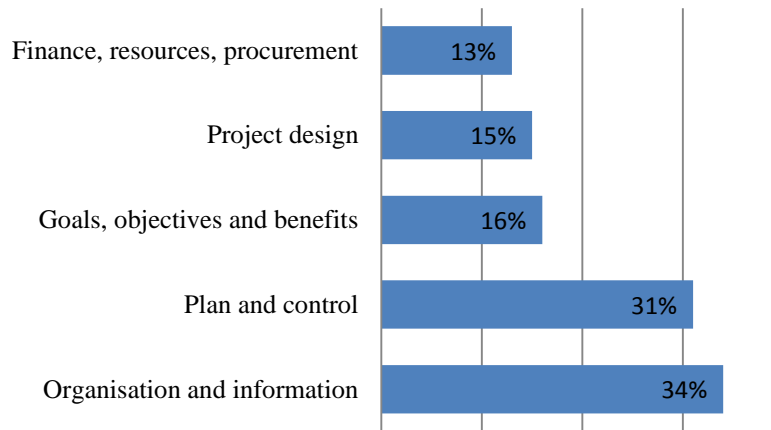


Fig. 5. TOP 5 Practice Competencies in Project Manager Job Postings

A comparison of the competencies required in the corresponding job postings shows that those of the People group have been required most often, and this suggests that the personal qualities of the project manager are more important for the employer than the competences of the practical competence group.

Conclusions

1. As an answer to the first research question, it has been concluded that the content of job postings for the position of a project manager complies with the IPMA ICB4 in only 25% of all cases. This suggests that employers have poor understanding of the responsibilities and job duties of a project manager, and, for job-seekers, the environment of job postings creates a wrong perception of their future job as a project manager.
2. To answer the second research question, it has been concluded that the competences with the highest demand in the People Competence group are teamwork, self-reflection and self-management, personal communication, whereas the competences with the highest demand in the Practice Competence group are organization and information, plan and control, goals, objectives and benefits.
3. In the development of the competences of a project manager, more emphasis should be put specifically on the soft competencies or, according to the IPMA ICB4, the people competencies, which employers in Latvia require more frequently than the practice competencies.
4. The levels of being informed about and the understanding of the necessity for certification of project managers are critically low among employers. Understanding the significance of certification and having it included as a requirement for the potential project managers would increase the prestige of the profession and, at the same time, facilitate the process of evaluation of the practical competencies of a project manager.
5. The analysis of the job postings shows that there are much more types of project managers required in various sectors of the labour market than the Classification of Professions provides. A substantial analysis of the positions in demand should be



carried out in collaboration with the professional associations in various sectors to widen the range of occupations available in project management, especially in the sectors in which increases are expected according to The Informative Report on the Medium- and Long-term Labour Market Estimates.

6. The professional project management associations should organize information events and educate employers as well as recruitment companies regarding the position of a project manager job. The authors have created a list of competencies to help recruitment companies as well as individuals determine whether the position of the potential employee is a project manager.
7. Requirement for previous experience are one of the indicators which shows that job postings are corresponding. Irrespective of the amount of previous experience, a decisive factor for a correct job posting would be experience particularly in project management, and no other fields like sales, customer service or similar.
8. Requirement No.7 for previous experience is suggestive of a correct job posting. Irrespective of the amount of previous experience, a decisive factor for a correct job posting would be experience particularly in project management, and not in sales, customer service or similar.

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MODELLING THE STRUCTURES OF STAKEHOLDER PREFERENCES

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Abstract

A modern view on the evaluation of the project's success turns into managing stakeholders expectations. Those expectations are based on identification of stakeholders needs. Different groups of stakeholders can have different power and consequently different influence on project. Determining their influence, we can establish needs priorities for all the project. As we claim, they are consequence of stakeholder's preferences. Determination of structure of stakeholder preferences can be helpful in managing the project, and thus in achieving its success. The aim of the research is to develop a procedure for determining the structure of the preferences different groups of stakeholders. The problem was solved using an Analytic Hierarchy Process (AHP) and its extension Analytic Network Process (ANP).

Key words: *Stakeholders management, Mathematical Methods, Preference Modelling, AHP and ANP methods*

JEL code: C65

Introduction

Project evaluation by stakeholders, is one of the key elements of the project's success. The establishing new knowledge areas in the ISO 21500 standard (ISO 21500: 2012) and also in fifth edition of PMBoK (Project Management Institute, 2013), dedicated only to the stakeholders, is the realization of this view. In technical projects, it is important to define stakeholder expectations for the product being developed. They take the form of requirements. One of processes defined in PMBoK Scope Management knowledge area is collecting requirements.

In practical projects we may obtain few thousand requirements, their prioritization plays an important role. This problem first arises in software engineering. Recent literature survey (Achimugu et al., 2014) reports 73 studies, first of them dated late 1990. Among the many methods used, the most commonly cited is method AHP (Analytic Hierarchy Process). The same problem of requirements prioritization arises in projects ruled with system engineering principles, as described in SEBoK (BKCASE Editorial Board, 2017).

The question arises: can we use in requirements prioritization, the knowledge about the influence of stakeholders on the project. To do that first we must describe their dependencies and influence on project.

This paper proposes to use Analytic Network Process to describe stakeholders' structure of preferences. This structure may be later used to requirements prioritizations.

Research results and discussion

2. Analytic Network Process

Analytic Network Process (ANP) (Saaty, 1996), is an extension of Analytic Hierarchy Process (AHP). In this method both criteria and variants are called elements. They are grouped into components (clusters). As seen in figure 1 we define source components, sink components and intermediate components. They are connected with paths of influence. We can consider two



types of dependence: inner dependence between elements of this same component and outer dependence between elements of different components.

We can define paths of dependencies using tabular method as presented in table 1.

Table 1

Tabular method		
Influencing components	List of components	Influenced components
C_2	C_1	
C_2, C_1	C_2	C_2, C_j
...
C_2, C_j	C_N	C_1

Source: author's calculations based on (Saaty, 1996)

The impact of a given component on another component is derived from paired comparisons as in AHP method.

The derived weights (v_{ij}) are used to weight the elements of the corresponding column blocks of structure called initial supermatrix (W). It is assigned zero when there is no influence. Initial supermatrix is obtained by paired comparisons on the elements within the clusters. This supermatrix is a two-dimensional matrix. The priority vectors from the paired comparisons appear in the appropriate column of this structure. We obtain weighted supermatrix (\bar{W}) using equation (1) :

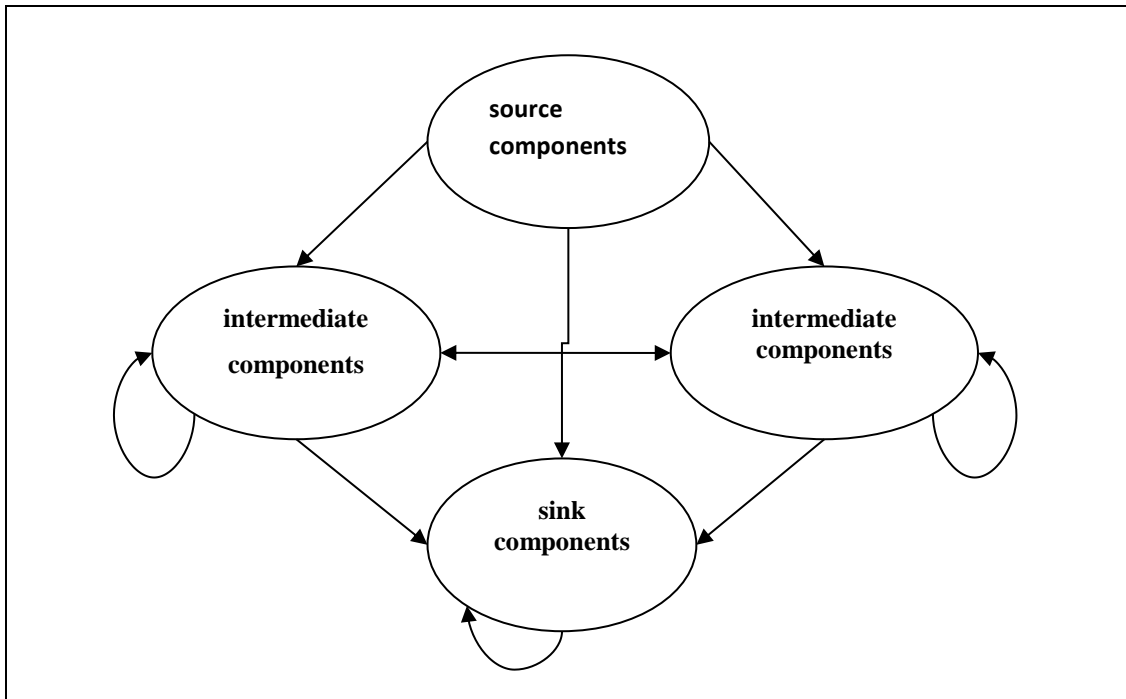
$$\bar{W} = [W_{ij} * v_{ij}] \tag{1}$$

Then we compute limited supermatrix (G) raising the weighted supermatrix to k power, using equation (2):

$$\lim_{n \rightarrow \infty} \bar{W}^k = G \tag{2}$$

Columns of limited supermatrix give as priorities of components and elements.

In order to prioritize requirements, we will define the structure of the relationship between stakeholders. An example structure is shown in Figure 2. The structure was obtained by a tabular method as shown in Table 2.



Source: author's construction based on (Saaty, 2005)

Fig. 1. ANP model structure

3. Proposed method

In order to prioritize requirements, we will define the structure of the relationship between stakeholders. An example structure is shown in Figure 2. The structure was obtained by a tabular method as shown in Table 2.

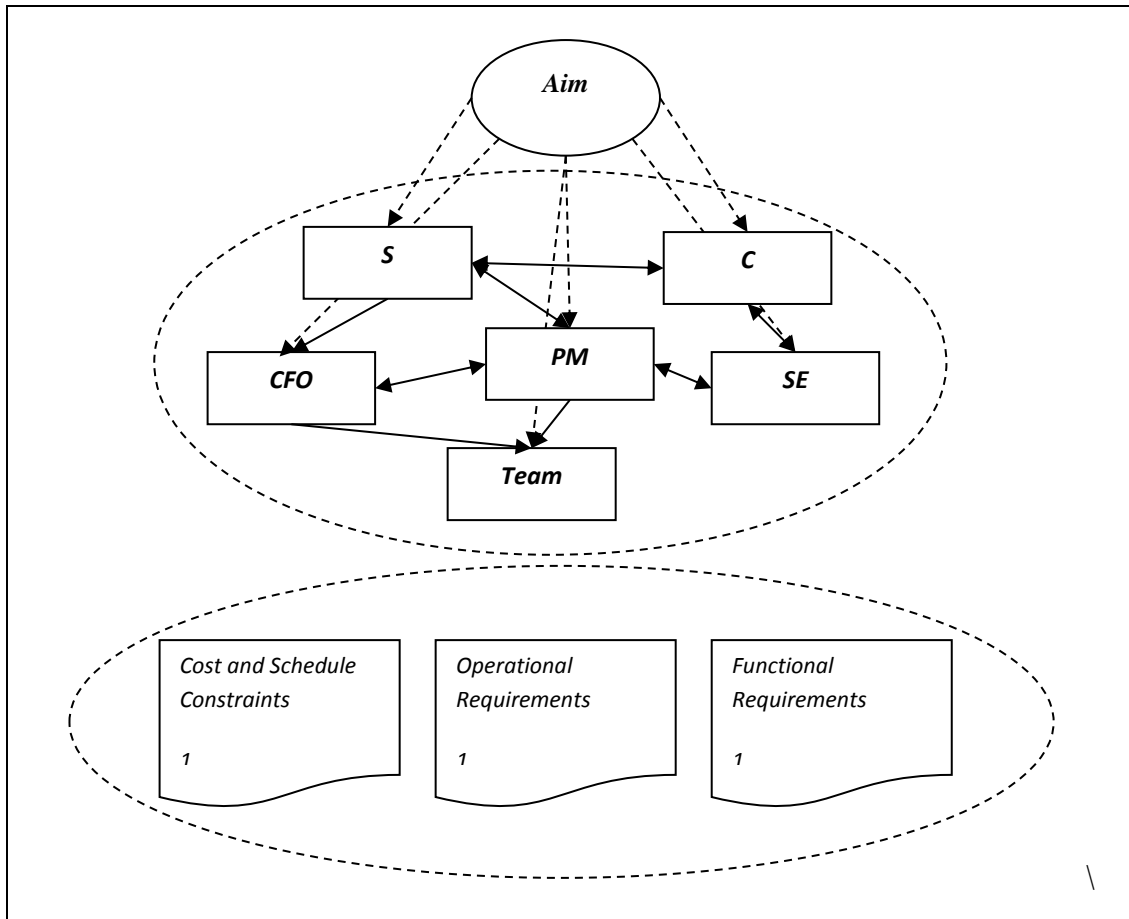
Table 2

Tabular method

Influencing stakeholder	List of stakeholders	Influenced stakeholder
	<i>Aim</i>	<i>S, C, PM, CFO, SE, Team</i>
<i>C</i>	<i>S</i>	<i>PM, CFO, C</i>
<i>S</i>	<i>C</i>	<i>S, SE</i>
<i>S, C, CFO</i>	<i>PM</i>	<i>S, CFO, Team, SE</i>
<i>S, PM</i>	<i>CFO</i>	<i>PM, Team</i>
<i>C, PM</i>	<i>SE</i>	<i>C, PM</i>
<i>PM, CFO</i>	<i>Team</i>	

Source: author's calculations based on (Saaty, 1996)

We have in clusters with stakeholder sponsor (*S*), client (*C*). There is also chief Finance Officer (*CFO*). We have team members (*Team*) and project manager (*PM*). There is also system engineer (*SE*). Figure 2 also shows cluster with requirements not considered in this work. In practical issues, cardinality of clusters may be bigger.



Source: author's construction based on (Saaty, 2005)

Fig. 2. ANP model structure

The proposed procedure consists of the following steps:

1. Identification of stakeholders
2. Grouping stakeholders in the cluster
3. Identification the relationships between stakeholders
4. Definition of dependency network
5. Perform paired comparisons of clusters.
6. Perform paired comparisons on the stakeholders within the cluster.
7. Collecting requirements
8. Grouping requirements in clusters
9. Constructing initial supermatrix and weighted supermatrix
10. Calculating limited supermatrix

Grouping requirements in clusters can be done by type of requirements or by requirement's owner.



Table 3 shows an exemplary relationship between stakeholders, as measured by Saaty's scale. Super Decision software was used in calculations. Level of Inconsistency is 0.031.

Table 3

Comparisons with respect to “Aim” element in “Stakeholders” cluster

Elements	<i>S</i>	<i>C</i>	<i>PM</i>	<i>CFO</i>	<i>SE</i>	<i>Team</i>
<i>S</i>	1	1/3	3	3	3	5
<i>C</i>	3	1	5	5	5	7
<i>PM</i>	1/3	1/5	1	1	1	3
<i>CFO</i>	1/3	1/5	1	1	1	3
<i>SE</i>	1/3	1/5	1	1	1	5
<i>Team</i>	1/5	1/7	1/3	1/3	1/5	1

Source: author's own calculations in Super Decision

Comparisons with respect to Client (*C*) element in “Stakeholders” cluster is presented in Table 4 (Inconsistency is 0.037).

Table 4

Comparisons with respect to Client element in “Stakeholders” cluster

Elements	<i>S</i>	<i>SE</i>	<i>Team</i>
<i>S</i>	1	3	5
<i>SE</i>	1/3	1	3
<i>Team</i>	1/5	1/3	1

Source: author's own calculations in Super Decision

Comparisons with respect to Chief Financial Officer (*CFO*) element in “Stakeholders” cluster is presented in Table 5 (Inconsistency 0.000)

Table 5

Comparisons with respect to *CFO* element in “Stakeholders” cluster

Elements	<i>S</i>	<i>SE</i>
<i>PM</i>	1	5
<i>Team</i>	1/5	1

Source: author's own calculations in Super Decision

Comparisons with respect to Project Manager (*PM*) element in “Stakeholders” cluster is presented in Table 6 (Inconsistency 0.058).

Table 6



Comparisons with respect to *PM* element in “Stakeholders” cluster

Elements	<i>S</i>	<i>CFO</i>	<i>SE</i>	<i>Team</i>
<i>S</i>	1	3	5	5
<i>CFO</i>	1/3	1	1	5
<i>SE</i>	1/3	1	1	5
<i>Team</i>	1/5	1/5	1/5	1

Source: author’s own calculations in Super Decision

Comparisons with respect to Sponsor (*S*) element in "Stakeholders" cluster is presented in Table 7 (Inconsistency is 0.000)

Table 7

Comparisons with respect to *S* element in “Stakeholders” cluster

Elements	<i>C</i>	<i>PM</i>	<i>CFO</i>
<i>C</i>	1	3	3
<i>PM</i>	1/3	1	1
<i>CFO</i>	1/3	1	1

Source: author’s own calculations in Super Decision

Comparisons with respect to System Engineer (*SE*) element in “Stakeholders” cluster is presented in Table 8 (Inconsistency 0.000).

Table 8

Comparisons with respect to *SE* element in “Stakeholders” cluster

Elements	<i>C</i>	<i>PM</i>
<i>C</i>	1	5
<i>PM</i>	1/5	1

Source: author’s own calculations in Super Decision

The matrices shown in Tables 3-8 were used to construct the initial supermatrix. Weight for this only one cluster was 1, so weighted supermatrix was the same. Then, using method presented in equation (2), limited supermatrix was computed in Super Decision software. Columns of this supermatrix are the same. They represent priorities of stakeholders. They are presented in Table 9.

Table 9

Priorities

Stakeholders	Priorities
<i>S</i>	0.2799
<i>C</i>	0.2808
<i>PM</i>	0.1667



<i>CFO</i>	0.0979
<i>SE</i>	0.1155
<i>Team</i>	0.0591

Source: author's own calculations in Super Decision

We can see that most influential is Client, then Sponsor. Less influential are Project Manager and System Engineer. According to relation between stakeholders at the end we have CFO and project team members.

Conclusions

In presented paper ANP method was used to finding influence stakeholders on project. There was considered also relations between them. The resulting impact priorities will be used in further work to prioritize requirements.

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THE RELATIONSHIP BETWEEN DYNAMIC CAPABILITIES AND PROJECT PORTFOLIO RISK MANAGEMENT: THEORITICAL FRAMEWORK

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Abstract

To achieve business success and competitive advantage, attaining project portfolio success plays a vital role for project based companies (Meskendahl, 2010, Killen et al., 2008). This further reflects on the importance of project portfolio management domain which yields project portfolio success within a company (Jiang et al. 2000; Wang et al., 2010; De Reyck et al., 2005; Teller, 2013). One of the components within the project portfolio management domain that is essential to yield project portfolio success is project portfolio risk management (Teller et al., 2013; Olsson, 2008). Consequently, the management of risk is an important objective that needs to be fulfilled for successful project portfolio management. Risk is as an uncertainty which can be both an event or a condition which if occurs causes a negative impact on at least one strategic objective of the project portfolio (PMI, 2008; Chapman et al., 2003). Dynamic capability is a well established strategic management concept that anticipates an uncertainty and has methods to react to it (Garrido et al., 2005). It's also realised as the capacity of a company to purposefully create, extend, or modify its resource base to manage that uncertainty (Helfat, 2007). Therefore, on observing the objective of project portfolio risk management and dynamic capability, there seem to exist an association between the two. However, there is a lack of sufficient theoretical literature establishing the relationship between project portfolio risk management and dynamic capabilities.

This research article aims to establish the relationship between dynamic capabilities and project portfolio risk management. This will be carried out with the help of theoretical analysis of the dynamic capabilities and project portfolio risk management constructs. Finally, this research paper will contribute project portfolio risk management theory providing a relationship chart between dynamic capabilities and project portfolio risk management. This research article will form the platform for future research portraying dynamic capabilities involvement to develop project portfolio risk management empirically.

Key words: *Project portfolio risk management, dynamic capabilities, portfolio management.*

JEL code: M10

Introduction

Companies operate in a highly turbulent environment with changing competitive pressures and customer needs. They need to frequently implement practices that address these arising challenges. These practices include companies resorting to operate using projects and project based activities to create the particular deliverables complying with the cost, time and quality objectives, that construct the company's major strategic competitive factors (Pellegrinelli, 1997; PMI, 2008; PMBOK, 2008). To effectively handle the multiple projects and maximise its value, a system that specialises to allocate resources and maintaining a synergy between the individual projects, becomes critical to the company performance (Blichfeldt et al., 2008; Killen et al., 2008; Teller et al., 2014). This necessity yielded the management of projects in the form of a portfolio (Biedenbach et al., 2012; Costantino et al., 2015; Daniel et al., 2014; Killen et al., 2010; PMI, 2008).

The term portfolio was primarily introduced into the financial investment domain and it focused on maximising the investment returns by selectively grouping the investments. Consequently, many authors have viewed the portfolios from financial point of view (Archer et



al., 1999; Caron et al., 2007; Cooper et al., 2001; Kendall et al., 2003; Levine, 2005; Sanchez et al., 2008). However, this concept was incorporated into the project management domain in the form of project portfolio management (PPM) and functions as a collection of individual project, grouped selectively to maximise its value (Costantino et.al, 2015; Daniel et.al, 2014; De Reyck et al., 2005).

One of the most important objectives of the PPM system is its risk management (De Reyck et al., 2005). Within the portfolio scope, two levels of risks can be identified. They are project risks which are represented by the risks arising within the individual projects and portfolio risks that arise due to the interaction between the individual projects within the portfolio (Sanchez et al., 2008, Teller 2013). Multiple authors demonstrated that it is insufficient to address solely the risks within individual projects to fulfil the PPM objectives (Olsson, 2008; Arto et al., 2000, Lee et al., 2009; Teller et al., 2013; Sanchez et al., 2008). A portfolio-wide risk management approach which is regarded to as a combination of project portfolio risk management (PPRM) and project risk management constructs the optimum solution (Kitchenham et al., 1997), as it facilitates the adjustment and reallocation of resources among the projects and allows for the consideration of additional portfolio risks and interdependencies between risks. However, we will exclusively view PPRM, which Sanchez et al. (2008) claims is still in its infancy and take into account the portfolio level risks which are uncertainties that form threats to the company.

Dynamic capability is a well established strategic management concept that anticipates an uncertainty and has methods to react to it (Garrido et al., 2005). Therefore, on observing the objective of project portfolio risk management and dynamic capability, there seem to exist an association between the two. The closest associating direct correlation in literature was substantiated by Killen et al. (2008) and relates organisational learning mechanism, a dynamic capability to project portfolio management. But, there is a lack of sufficient theoretical literature establishing the relationship between project portfolio risk management and dynamic capabilities. However, there were rarely any implication associating the various dynamic capabilities constructs and project portfolio risk management and its process.

This research article will mainly focus on substantiating the relationship between project portfolio risk management and dynamic capabilities. Theoretically, this study will make meaningful contributions to the field risk management, project portfolio management and strategic management. Furthermore, a better understanding of portfolio risk management with its main constructs, underlying mechanisms and most importantly, its relationship with dynamic capabilities will be obtained.

1. A literature review on portfolio risk management

1.1. The conception of Project portfolio management (PPM)

A company's PPM system provides a holistic approach to make the right decisions while ensuring the portfolios comprising of the projects and programs are aligned in accordance with the company's strategic objectives (Killen et al., 2008). The first introduction of the concept of the modern portfolio theory was in 1952 by Harry Markowitz and it enabled to determine a specific mix of investments generating highest return on a given amount of risk (De Reyck et al., 2005; Sanchez et al., 2008).

More recently, PPM carries dissimilar comprehension due to a divergent understanding of 'project portfolio' and 'portfolio management' (Milosevic et al., 2006). As a result, using the project management institute (PMI) definitions is appropriate as they are constructed in relation to the PPM objectives and scope. PMI defines a portfolio as: "a collection of projects or



programs or other work that are grouped together to facilitate effective management of that work to meet strategic business objectives. The projects of programs of the portfolio may not necessarily be interdependent or directly related” (PMI, 2008). This clearly means that in PPM, a company’s portfolio is solely a strategic grouping of projects and need not represent an evident relationship between them.

On viewing the obtained definition of PPM and summarising the idea of the authors that contributed to the theory of PPM, there are five main objectives (De Reyck et al., 2005) that are prominent in literature. The following are: (1) Constructing a clear definition for the project portfolio in accordance with the strategic goal that is expected to be achieved. (2) Making specific decisions and compromises on the basis of understanding and accepting circumstances. (3) Identifying and classifying the particular risks involved while trying to eliminate or minimise them. (4) Monitoring the portfolio by assessing its performance on the basis of its progress towards achieving the enlisted goals and objectives. (5) Obtain project portfolio success by establishing confidence in the desire to achieve particular objective (Teller, 2013; Meskendahl, 2010).

This research will view PPM as a central management system that manages individual projects in a portfolio to meet strategic objectives and consequently maximising the returns on each portfolio.

1.2. The conception of Project portfolio risk management (PPRM)

As discussed previously, PPM focuses on aligning projects to the company’s strategy. While doing so, the balancing of the risks should necessarily be carried out to fulfil the PPM objectives (PMI, 2008, De Reyck et al., 2005). Risk in accordance with PMI (2008) is defined as an uncertainty which can be both an event or a condition which if occurs causes a positive or negative impact on at least one strategic objective of the project portfolio. This definition illustrates the dual nature of risk revealing that opportunity is a positive implication of risk (Sanchez et al., 2008; Teller et al., 2013; Hillson, 2002; Jaafri, 2001; Olsson, 2008; Ward et al., 2003). Although, it is argued that the opportunity can viewed as a by-product of risk management and not risk itself (Chapman et al. 2003). However, risk refers to the probability of a potential outcome that can be known contrary to uncertainty where the probability of the potential outcomes is unknown (Knight, 2012). The materialisation of the risk can be uncertain, subsequently, in the uncertainty management domain, risk is viewed as an uncertainty (Perminova et al., 2008). So the claims that reflect solely on the characteristics uncertainty cannot be full implied on risk itself (Jaafari, 2001; Ward et al., 2003). To keep clear, the definition of risk within this research, it is considered that risk highlights the negative outcome that can probably materialise and its management either is a necessity to avoid a potential damage or a tool achieve an opportunity.

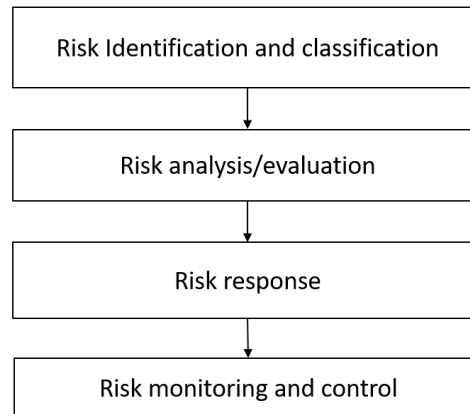
Within the PPM domain, risk remains to be negative probability that can impact on the objectives of the portfolio (Archer et al., 1999). While managing the risks within the portfolio reduces the failure of the individual projects and more importantly further assist the balancing of the portfolio by eradicating any negative uncertain probability (Caron et al., 2007; PMI, 2008; Perminova et al. 2008). Arguably, the management of individual project risks is sufficient to attain overall portfolio risk management. However, the dependencies between the individual projects may yield new kinds of risk which are beyond the scope of project risk management (PMI, 2008). Consequently, it can no longer be sufficient to address solely the risks of individual projects within a portfolio to maintain the PPM objectives (Olsson, 2008; Artto et al., 2000, Lee et al., 2009; Teller et al., 2013; Sanchez et al., 2008).



The conceptualisation of PPRM is carried out by few authors as well as represented in the three editions of “The standard of project portfolio management” (PMI, 2013). In the first edition (PMI, 2006a) represented the risk-related criteria while performing the portfolio balancing processes. Further, in the second and third edition (PMI, 2008; PMI, 2013) the elaboration of portfolio risks were carried out by integrating the risk management process within the PPM framework. Caron et al. (2007) used the concept of ‘value at risk’ for balancing the projects within the portfolio. Olsson (2008) presented a methodology for risk analysis and portrayed the benefits of doing so. Sanchez et al. (2008) introduced a risk opportunity identification framework that decreases the uncertainty of achieving the portfolio’s strategic goals. Teller et al. (2013) demonstrates the importance of PPRM and methods to improve risk management quality and its direct relationship with project portfolio success. Some authors have indirectly contributed to the portfolio platform through a program conceptual format. Nevertheless, it has significant relevance in the field of PPRM (Sanchez et al., 2008). Examples of such authors are Lycette et al. (2004) who portrayed the focus of risk management on portfolio strategically by improving the success rate and competitive advantage while Pellegrinelli (1997) proposed benchmarking for competitor analysis to manage the risk associated with that with a program or portfolio. Belingheri et al. (2000) researched on the understanding of risk to assist risk treatment and control. Ray (2000) introduced a knowledge based approach to perform risk planning in cost effective manner. The representation of project risk management can be seen in the guide created by PMI, which is ‘Guide to the project management book of knowledge’. There are claims the generic approach can be adapted to every organisational level such as within programs or portfolios (Woods, 2007). Although Cooper et al. (2001) and Miller (2002) quite early on demonstrated the importance of requiring a dedicated risk management construct for PPM because of the missing focus on strategic portfolio objectives demonstrated by project management constructs. Additionally, it is difficult to specify guidelines to analyse the risk from portfolio decision and the manner it affect its strategic goals (Sanchez et al., 2008). This is because the single project management approach helps to identify and manage the risk contradicting the project objectives of time, quality, cost and scope. It rather become necessary to need a specific risk management system because of the difference in objectives of a single project and a portfolio. Although individual project management can be complementary to PPRM as it ensures the management of individual risks within the projects of a portfolio but a dedicated PPRM system will ensure the balancing of projects and program and project success (Teller, 2013; Sanchez et al., 2008).

1.3. The project portfolio risk management process

The objectives of PPRM as discussed in the previous section is to increase the probability and the impact of positive events while reducing or eradicating the impact of negative events (PMI, 2008; Cooper et al., 2001). Risk management is a systematic way of identifying, analysing and dealing with risks which is a potential threat to the company (Chapman, 1997). The PPRM is best represented as a process which is constructed of methods and tools that are required to carry out the various steps in the process. There may be similarities between project risk management process and PPRM process. But, these similarities are only structural and exist because of a risk management process. Although major customisation requirements are necessary owing to the different scope and area of an individual project and a portfolio (Olsson, 2008).



Source: PMI,2008; Chapman, 2001

Figure 5 **Portfolio risk management process**

Figure 1, demonstrates the general process of PPRM. This consists a four step approach portraying (1) risk identification and classification, (2) risk analysis or evaluation, (3) risk response and (4) risk monitoring and control.

Risk identification and classification is one of the most critical activities for portfolio risk management and is essentially considered as a necessary capability (Kwak et al.,2004; Teller et al.,2013;). However, there has been a lack of emphasis on the identification (Chapman, 1997) and classification process which needs to be further addressed. To engage the process of risk identification the two main questions that arise are (1) where to look and (2) how to search for the risk. To wholly satisfy the portfolio risk identification, the structural risks, component risks and overall risks in addition to the individual project risks (Teller et al., 2013; PMBOK, 2008) needs be identified. These become the areas where the risks are looked for. Prior to the portfolio risk identification process, the portfolio itself needs to be well defined. The portfolio definition is represented by its plan and scope (Chapman, 2001). This is quite similar to that of the individual project definition however, the portfolio definition focuses to portray the interdependency within the various projects with distinct characteristics, predetermination of the portfolio variables and overall profitability and growth (Benko et al., 2003). Once the portfolio objectives are clearly defined, the risk areas will assist the PPRM identification to not only view all the potentially risky areas but also can help with cross-referencing not to miss a potential risk (Drake et al. 2006; McFarlan, 1981).

Defining the risk area is quite significant as it would provide the knowledge about the probable area within the portfolio where the risk could be identified. However, it is true that there are specific risks that are associated with different projects (Elkington et al., 2002; Kwak et al., 2005; Tesch et al., 2007), so is the case with portfolios. Nevertheless, the significance of risk area sustains as it eases the risk identification process and also can be used to eliminate chance to avoid identifying a risk. In accordance to prior literature substantiation, the risk areas in technological firms are identified to be organisational/ management risk, culture/ climate risk, strategic alignment risk, projects relationship risk and financial risk (Drake et. al., 2006; Xenidis et.al., 2005; Cervone, 2006; Sanchez et.al., 2009).

To find the particular risk within the portfolio the use of risk identification methods can be used (PMI, 2008). Quantitative research allows the manager to familiarize with the risk related problem or concept to be studied, and perhaps generate hypotheses to be tested.



Qualitative research is used to gain an understanding of underlying reasons, opinions, and motivations in relation with the portfolio risk. It provides insights into the problem or helps to develop ideas or hypotheses for potential quantitative research. Qualitative searching methods are employed for the risk identification (Chapman, 2001; Olsson, 2008).

Risk analysis or evaluation: The risk identification stage portrays the list of potential risks within the portfolio and the further steps in the process is designed to react to the risk. But it would be rather difficult to react to all the risks simultaneously. It may not only increase costs, time and waste resources but also result in inefficient risk management (Akintoye et.al., 1997). This is where the risk analysis or evaluation becomes significant and this is where the interdependencies between the individual project risks are also assessed (Lee et al., 2009).

The risk analysis methodologies present a hierarchy of the risk based on the negative impact and probability of the risk occurrence within the portfolio sphere (PMI, 2008). Subsequently the risks breakdown structure can be established indicating a map able schedule of the individual project portfolio risks (Skec et al., 2012). Many authors have worked on the prioritisation of the risks in project management framework (Kristensen et al., 2004; Cervone, 2006; PMBOK, 2006). Additionally, the use of the probability and impact is functional in prioritising portfolio risks so that relevant risks can be focused (Sanchez et al., 2009; Lyytinen et al., 1997). This is a matrix based model which allows the managers to visualise the risks in accordance with the probability of occurrence and the impact it can have. In these models the risk impacts are distinguished based on some criteria such as mission essential and mission critical and the probability of occurrence (Cervone, 2006). A combination of Lansdowne's (1999) five-point scale of evaluating risk impact and Kendrick's (2003) contributed to the probability context of evaluation allows the manager to prioritise the portfolio risks and create precise schedule. Incorporating qualitative tools such as sensitivity analysis, probabilistic analysis influence diagrams and decision trees (Chapman, 2001; PMBOK, 2006) further consolidate probability and impact matrix.

Risk response is the development of appropriate measures to handle the risks enhancing the company's capacity to manage the risk (Lyytinen et al., 1997) The main objective of the PPRM response system is to make the impact of the risk not affect the objective of the portfolio in a way the balancing of the risks occurs (PMI, 2008). To do so there are certain response strategies which are deployed after the analysis of the risks. Four strategies are widely discussed in literature to act on risks affecting portfolio objectives if they occur. These primary strategies actions are to avoid, transfer, mitigate or diversify the risk (PMI, 2008; Fiet, 1995; Chapman, 2001; Ward, 2003). However, the use of these strategic actions needs to be based on the characteristic of the risk materialisation (Teller, 2013). There are three questions describing this: (1) Is the risk already materialised (ex-post) or will materialise in the future (ex-ante) (Hiriart et al., 2010)? (2) Can the risk be brought under control and is within the company's capability (Miller et al., 2001)? (3) Will the risk be managed either by addressing the source (etiological risk management) of the risk or otherwise (palliative risk management) (Zang, 2007)? The first question points out the proactive nature of risk response. Either it can be deployed after the risk has materialised or before. It has been specified to deploy the risk response regardless the case before or after (Chapman et al., 2003). However, it is of higher convenience if the anticipation of the risk and response unlike the risk repair (Miller et al., 2001). The second question deals with the controllability of the risks. Here it needs to be seen that in case the particular risk is not able to be managed by the company it needs to be still outsourced in a way that the risk response is carried out under a second party responsibility. The third question deals with the manner the risk needs to be tackled at. Either it is the source itself by changing the plan of



project schedule etc. or it is by deploying further actions to reduce the particular risks (Thun, 2012).

Monitoring and control: The importance of the monitoring and control step is associated with the reviewing risk management process in a manner trying to improve the process simultaneously keeping check on the risks by periodically identifying newly occurring risks and create a response plan for it (Deutsch, 1991). The responsible managers should constantly monitor and communicate risk management results to the stakeholders (De Meyer et al., 2002). A regular review of the risks is supposed to improve the company's ability to respond to the risk because the regular practice prepares the company to foresee the risks and appropriately respond to them (Schon, 1983). The portfolio wide reviewing and reporting allows the portfolio manager to reallocate resources when and where required (Salomo et al., 2007). Moreover, facilitating the transfer of gained experience and transfer of knowledge between project (Perminova et al., 2008). The development of the risk register enhances the company's knowledge gain and lessons learned as a result improves the risk management overall.

To precisely achieve the objective portrayed by PPRM within the PPM domain and further more achieve project portfolio success, there should be an assessable quality which needs to be portrayed by the PPRM (Teller, 2013). The PPRM quality and efficiency criteria dimensions generally tries keep check on the objective of the PPRM process. Teller (2013) demonstrated two dimensions to PPRM quality criteria. They are (1) risk transparency and (2) risk coping capacity.

Risk transparency is meant to enable the manager to solve and clarify certain risk problems as a result of deep understanding of the problem at hand and the manner it could affect the business objective (de Bakker et al., 2010; Lyytinen et al., 1997). The risk transparency is more evident when the information about the risk and risk response methods are well known as a result the management of these risk can occur quickly (McFarlan, 1981; PMI, 2008). This can yield a realistic expectation to estimate the potential risks and the appropriate risk management. Consequently, the portfolio deliverables can be achieved precisely (Raz et al., 2001).

Coping capacity. An increased risk coping capacity enables managers to manage high priority risks as well as low priority risks in a controlled manner. This can positively assist the project portfolio to better balance more profitable projects with higher risks (Teller, 2013). The risk coping capacity reduces the potential impact of risk materialisation and increase the efficiency of the projects in the portfolio. Additionally, controlled risk management allows the manager to focus less on the individual project risks and subsequently allowing focusing on the core strategy of the portfolio (Sanchez et al., 2008).

2. The concept of dynamic capabilities as a resource based view

Companies in the changing environments need to anticipate uncertainty and react to them (Garrido et al., 2005). The ability to systematically and strategically change has been referred to as dynamic capabilities (Teece et al., 1997).

DC was primarily introduced by Gary Hamel in 1989 who demonstrated the multinational strategic re-search leading to Core Competences of the Corporation (Prahalad et al., 1990), although shortly after, in 1995, it was described by Ikujiro Nonaka and Hirotaka Takeuchi in their book on innovation strategy "The Knowledge-Creating Company" (Nonaka et al., 1995). Finally, dynamic capability was referred to as "the capacity of an organization to purposefully create, extend, or modify its resource base" by Helfat (2007). Although in it is explained that the capacity to renew competences so as to achieve congruence with the changing business



environment is Dynamic Capability too. This involves strategic management in appropriately adapting, integrating, and reconfiguring internal and external organizational drawbacks, resources, and functional competences to match the requirements of the changing environment. In line with Helfat (2007) we use the term „resource“ in its broad sense as in (Barney, 1991), and hence it includes activities, capabilities, etc., which allow the firm to generate the rent.

There is some conceptual discussion related to these constituent processes: they are assumed to include both organisational and managerial processes aimed at identifying needs or opportunities for change, and at accomplishing that change to maintain a competitive advantage (Helfat, 2007).

So, essentially looking at resource based view (RBV) in the company's perspective, Daneels (2002) concludes that to understand how a firm evolves over time the dynamic RBV is kind of essential. In this case the firm over time tries to continuously renew and reconfigure itself to survive in the market while deploying its available resources.

Dynamic Capabilities are built rather than being bought in the market (Makadok et al., 2001). They mainly consist of organizational process or routines (Helfat, 2007; Zollo et al., 2002) which were imbibed by the firm over time and consequently used to reconfigure the firm's resource base by removing decaying resources or by recombining old resources with new ones using new methods or ways.

This thereby shows that Dynamic Capabilities are viewed in accordance with the path taken (Dierickx et al., 1989). This path is shaped by the decisions the firm has made in the past and the stock of assets it holds currently (Zollo et al., 2002). Path dependency “not only defines what choices are open to the firm today, but also puts bounds around what its internal repertoire is likely to be in the future” (Helfat et al., 2003). Path dependency could be grounded in knowledge, resources familiar to the firm, or influenced by the social and collective nature of learning (Teece et al., 1997). Learning plays an important role in creation and development of Dynamic Capabilities. Winter (2002) demonstrate that learning is the base of dynamic capabilities and guides their evolution. Learning is also considered as a dynamic capability itself, rather than an antecedent of it. As such, learning as a dynamic capability has been identified as “a process by which repetition and experimentation enable tasks to be performed better and quicker” (Teece et al., 1997). In Zollo & Winter (2002) authors attempted to meld these two positions by explaining that “dynamic capabilities are shaped by the co-evolution of learning mechanisms”.

Helfat and Peteraf (2003) emphasise that to qualify as a dynamic capability, the capability not only needs to change the resource base, but it also needs to be embedded in the firm, and ultimately be repeatable. Dynamic capabilities are argued to comprise four main processes: reconfiguration, leveraging, learning and integration (Teece et al., 1997). Reconfiguration refers to the transformation and recombination of assets and resources, e.g., the consolidation of manufacturing resources that often occurs as a result of an acquisition (Ambrosini et al., 2011). Leveraging refers to the replication of a process or system that is operating in one area of a firm into another area, or extending a resource by deploying it into a new domain (Ambrosini et al., 2011), for instance, applying an existing brand to a new set of products. As a dynamic capability, learning allows tasks to be performed more effectively and efficiently, often as an outcome of experimentation, and permits reflection on failure and success. Finally, integration refers to the ability of the firm to integrate and coordinate its assets and resources, resulting in the emergence of a new resource base.



3. The relationship between dynamic capabilities and project portfolio risk management

The management of risk is an important objective that needs to be fulfilled for successful project portfolio management. It's also realised as the capacity of a company to purposefully create, extend, or modify its resource base to manage that uncertainty (Helfat, 2007). Therefore, on observing the objective of project portfolio risk management and dynamic capability, there seem to exist an association between the two. This section aims to describe the dynamic capabilities constructs and associate its similarity with PPRM process.

Sensing. The capability of sensing is defined as the ability to identify and interpret the opportunities and treats in the environment (Pavlou et al., 2011). Sensing is needed especially when the environment is hard to be predicted (Glaunic et al., 1998). The new opportunities or threats can be sensed through the investment in researches and other activities as the information gathered from these activities may create new knowledge that may well be open for new opportunities. There are many ways in sensing the opportunities and threats such as through research and development (R&D) activities, and competitors', customers', and/or suppliers' actions that may spot or cause the change to happen.

In the sphere of PPRM, it can be realised that identification and the classification highly requires the sensing capability in order to spot the risks and sort them to the appropriate risk area. Additionally, in the monitoring and control discovering of further risks requires the sensing capability. Although, sensing can affect other steps in the process of PPRM there cannot be seen a direct correlation. The other steps reap the benefits of sensing capability as an output of the risk identification and classification step as well as monitoring and control step.

Learning. It mainly signifies the ability to improvise existing operational capabilities with new knowledge. The four main underlying routines of learning capability is acquiring, assimilating, transforming and exploiting knowledge (Zahra et al., 2002). Firstly, acquiring new knowledge relates to developing and obtaining new knowledge (Cohen et al., 1990). Secondly knowledge assimilation is knowledge articulation (Zander et al. 1995) and knowledge brokering (Eisenhardt et al., 2000). Thirdly, transforming knowledge means innovative problem solving (Iansiti et al., 1994), brainstorming (Pisano, 1994) and creating alternative thinking (Henderson et al., 1994). Finally, exploiting knowledge means to puersue new initiatives (Van den Bosch et al., 1999) and improving operational capabilities (Grant, 1996).

The company's learning capability is one of the important and is applicable to all the processes of portfolio risk management. In the identification and classification step, the learning is represented by the understanding new methods to find the risk. As it is common among technological companies to have emerging new unknown risks and complex situations, learning new methods to identify these risks is quite necessary. In the risk analysis and evaluation step its necessary to learn about the risk itself in order to set a priority for it. This not only allows risks of high treat levels not go unnoticed but also allows the company not to overindulge in low level threats and misuse resources. In the risks response step, learning is signified by the understanding of the suitable methods to tackle the risks efficiently. Finally, in the monitoring and control step the experience that is learned from the whole process improves the company's response and trains the managers to foresee potential treats (Schon, 1983).

Renewal and replication. To improve the current capabilities by providing new alternative of capabilities to respond to the crisis. The renewed capabilities are for the same object, majorly or slightly modified and deployed (Helfat et al., 2003). The accurate replication of a portion of a manufacturing process to another plant within a firm provided the basis for subsequent adaptation and renewal of the capability within the recipient plant (Maritan et al.,



2000). Moreover, completely accurate replication of a capability followed by adaptation to local conditions results in better performance than adaptation prior to attempted replication (Szulanski et al., 2002).

With respect to PPRM, the renewal and replication focuses mainly on the risk identification and classification, risk response and risk monitoring and control. In the identification and classification phase, it is quite important to adapt new identification methods and efficiently replicate it in the future in order to tackle the existence of new unknown treats. The risk response step views the renewal and replication step to apply the newly acquired knowledge in relation to it and immediately putting it to action. Similar is the case with monitoring and control where the new knowledge gained that deals with methods to keep check on the risks are deployed.

Integration. It signifies the ability to combine new knowledge into the new existing capabilities. It contributes collect and combine individual inputs and also builds a shared understanding creating a common ground and new perceptual schema (Weick et al., 1993). The integration highly assists in routinization abilities. It is essential for a company to work as a single unit and sharing of information as well working together improves the overall deliverables and integration capability is responsible for that.

Integration of the portfolio risk management process to the project portfolio management is lacking in many ways (Olsson, 2008; Sanchez et al., 2008). Risk management is highly relied upon to make the appropriate decisions and to do so, it needs to be integrated into the decision making process of the project and portfolios (Dey et al., 2007). Thus it can be portrayed that better integration of the PPRM process into the portfolio management system can improve the PPRM quality and obtain PPM success.

Seizing/ utilization. It takes place after the technologies or markets opportunities have been sensed and identified. Seizing involves decision making in what to invest especially when the domain designs is still not very clear. The firms should seize the opportunities that is solving the customers' problems and when thing getting clear, firms must ready with the right timing to give full commitment to the related resources by grasping the technologies that is most likely to be accepted by the marketplaces. The seizing of particular opportunities can be secured through the commitment and loyalty building of the customers.

Whilst, seizing represents utilising the obtained new knowledge to achieve the particular opportunity, in relation to portfolio risk management this is highly related to the risk response and the monitoring and control steps. In the risk response seizing is of utmost importance because this step of the PPRM process delivers the removal or reduction of the risk impact. This act can also be referred to as an opportunity if in case the threat no longer impacts the portfolio (Ward et al., 2003). While in the case of monitoring it keeps a check seeing no further threats arise and consequently needs to use the new acquired knowledge accordingly.

Coordination. New configurations of operational capabilities require to effectively coordinate tasks and resources and synchronise their activities (Iansiti et al., 1994; Helfat et al., 2003). Moreover, coordination capability is the ability orchestrate and deploy tasks, resources and activities in the with the new operations. Coordination capabilities are namely assigning resources to tasks (Helfat et al., 2003), appointing the right person to the right task (Eisenhardt et al., 1999), identifying the synergies among the tasks (Eisenhardt et al., 2000) and resources and have collective activities (Henderson, 1994).

Coordination capacity is realised in the whole process of portfolio risk management and also essential in the transition between the various steps in the process as a result improving the overall quality of PPRM.



Reconfiguration involves recombination and reconfiguration of the firms' assets and organizational structure based on the market opportunities that have been identified and selected. The process of creating alignment of the firms' assets and structures with the changing environments are to create fitness for the sustainability of profit growth. The redeployment and reconfiguration also involves redesigning the business model, and realigning the activities and routines of the firms.

As being able to alter the standard set of risk management process is a necessity as the number of new threats are increasing as a result the reconfiguration capability is quite required for PPRM to increase the overall PPRM quality.

Table 1 portrays the theoretical relationship between project portfolio risk management and summarises the above explanation.

Conclusion

In conclusion, the literature reviews on PPRM and DC was carried out. Furthermore, the relevance of PPRM and DC were carried out followed by their definitions. PPM was defined as a managements system comprising of projects and aligned in accordance with the company strategy. Whilst, PPRM is the risk management system within the portfolio management system and also focuses on the risks arising for the interaction between the projects within the portfolio and not the individual project risks alone. The description of Dynamic Capabilities was presented as the ability of the firm to purposefully create, extend, or modify its resource base in congruence with the changing business environment

Finally, the relationship between PPRM and DC were also theoretically established PPRM needs to be further developed in order to better function and assist portfolio management. Although as a part of integration and customising already existing project management tools into the PPRM framework, in literature, risk management methodologies are sparsely associated with DC within the PPRM domain. Thus, it can be considered that incorporation of DC which is a strategic tool to anticipate the changing environment and systematically change accordingly (Garrido et al., 2005) could vastly contribute to the PPRM domain and improve PPRM quality.

As noted by multiple authors, the challenge of conceptual research is to develop empirical measures. The next possible step for this research is to carry out the empirical study on the demonstrated contents. The proposal to observe the relationship between DC and PPRM should be carried out empirically. Based on the empirical results, further discussion can be made in relation to using DC to develop PPRM.



Project portfolio risk management							
Dynamic capabilities		<i>Risk identification and classification</i>	<i>Risk analysis/evaluation</i>	<i>Risk response</i>	<i>Risk monitoring and control</i>	<i>Portfolio risk management quality</i>	
	<i>Sensing</i>	Sensing capability positively relates to portfolio risk identification and classification.	Not applicable	Not applicable	Not applicable	Sensing capability positively relates to portfolio risk monitoring and control	Not applicable
	<i>Learning</i>	Learning capability positively relates to portfolio risk identification and classification.	Learning capability positively relates to portfolio risk analysis/evaluation.	Learning capability positively relates to portfolio risk response	Learning capability positively relates to portfolio risk monitoring and control.		
	<i>Renewal and replication</i>	Renewal and replication capability positively relates to portfolio risk identification and classification.	Not applicable	Renewal and replication capability positively relates to portfolio risk response.	Renewal and replication capability positively relates to portfolio risk monitoring and control.		
	<i>Seizing/ utilization</i>	Not applicable	Not applicable	Seizing/ utilization capability positively relates to portfolio risk response.	Seizing/ utilization capability positively relates to portfolio risk monitoring and control.		
	<i>Integration</i>	Not applicable					Integration capability complements project portfolio risk management process and positively relates to portfolio risk management quality.
	<i>Co-ordination</i>	Not applicable					Coordination capability complements project portfolio risk management process and positively relates to portfolio risk management quality.
	Reconfiguration	Not applicable					Reconfiguration capability complements project portfolio risk management process and positively relates to portfolio risk management quality.

Table 1 Relationship between Dynamic Capabilities and Project Portfolio Risk Management



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ATTITUDES AND PERSONALITY TOWARDS RISK MANAGEMENT IN THE CONSTRUCTION INDUSTRY

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Abstract

This research paper looks at the attitudes and personality of people who deliver construction projects. The study was performed using an online questionnaire which encompassed aspects of risk decisions and personality questions. In total, 50 responses have been collected and analysed. The results of this study show that people who have experience in the delivery of projects in the construction industry are aware of the risk in projects and prefer not to take on the risk in most cases. In the aspect of personality, the results were compared to the Carl Jung personality theory and shows that the participants are extroverts, judging, more intuitive than sensing, and are equally thinkers and feelers.

Keywords: *Construction Projects; Project Risk Management; Personality Profile; Risk Decisions.*

JEL codes: D20, D81, L10, M19

Introduction

As one of the biggest sectors, the construction industry is one that entails all the activities from project initiation to the final demolition of developed infrastructure. Being a service industry, the construction sector is interlinked with other sectors. The industry is the largest employer than any other (World Market Intelligence, 2010). The report by the Global Construction Perspectives and Oxford Economics (2015) states that the cumulative volume of construction will reach US\$ 212 trillion over the period to 2030.

Project success is a topic of great focus and one that is currently being researched in project management (Alexandrova & Ivanova, 2012). The global construction industry is one of competition and constant innovation. Companies invest heavily in innovation to improve performance and capabilities. All projects are accompanied by a variety of risk. Previous research by Tsiga et. al (2016) has identified the critical success factors for the construction industry and their research also highlights the importance of risk management in the delivery of projects for the construction industry.

There are currently gaps in research for the construction industry which has led to the implementation of generic project management techniques. Risk management in projects has been researched and improved in recent times, but still, project success rate failed to improve in a similar pattern (Mir & Pinnington, 2014). Studies by Johansen et. al. (2014) have suggested that project risk managers and their teams are poorly equipped to handle risk and uncertainties. Katz (1991) suggest the need for the development of human, conceptual and technical skills of project managers. This has led to researchers such as Montequina et. al. (2015), Fisher (2011) and Tsiga et. al (2016) to take the first steps in identifying the ideal skills for project managers. El-Sabaa (2001) also suggest a framework for the selection of perfect project managers.

This research study identifies the attitudes and personality of project participants towards risk management in the construction industry. The decision scenarios implemented in this study have been derived from well documented past projects (Tsiga, Emes, & Smith, 2016), some of the decisions have led to project success and others to failure. In the aspect of the personality section of this study, it was derived from Carl G. Jung's work on psychological theory (Jung,



1988). The theory looks at how people behave differently in different situations. The differences depict how individual use mental reasoning in justifying their individual reasoning. The Carl G. Jung’s psychological preferences are shown in **Table 1**.

There are currently various psychometric questionnaires that have been derived from the Carl G. Jung’s work, an example of such is the Temperament Sorter II (KTS II) (Keirsey & Bates, 1984) and Myers-Briggs Type Indicator (MBTI) (Briggs & Myers, 1977). Various studies have highlighted the importance and need of such tool (Clinebell & Stecher, 2003). The approach implemented in this research has been used to identify the attitudes of project participants for the Petroleum Industry (Tsigas, Emes, & Smith, 2016) and Space Industry (Tsigas, Emes, & Smith, 2016).

Table 1

Carl G. Jung’s Preferences	
Focus of attention	
Extraversion (E)	Those set of people who tend to focus their attention on the outer world of people and things.
Introversion (I)	Those who tend to focus their attention on the inner world of ideas and impressions.
Seeking of information	
Sensing (S)	People who prefer to take information through the five senses and focus on the here and now.
Intuition (N)	People who prefer to take information from patterns and the big picture and focus on future possibilities.
Decision making	
Thinking (T)	People who prefer to make decisions primarily based on logic and on objective analysis of cause and effect.
Feeling (F)	People who prefer to make decisions primarily based on values and on subjective evaluation of person centred concerns.
Relationship with the world	
Judging (J)	People who prefer to like planned and organized approach to life and prefer to have things settled.
Perceiving (P)	People who prefer to like a flexible and spontaneous approach to life and prefer to keep their options open.

Source: (Tsigas, Emes, & Smith, 2016)

Methodology

In this research, the use of a questionnaire was implemented. This questionnaire consists of four sections. Each section collects a different set of data from the respondents. The first sections collect basic background information such as respondent location, educational qualification, project experience, project management experience, the number of projects participated, the percentage of successful projects, number and percentage of successful projects managed.

The second section of the study explored decisions scenarios derived designed to measure the if the respondents agree or disagree with the stated risk statement. **Table 2** lists the questions asked in this section. The third section was designed and implemented based on Carl G Jung’s



work on behavioural preferences. **Table 3** shows the statements implemented and its relation to the Jungian preferences is also shown.

Table 2

Decision Scenarios	
Number	Statements
1	It is common for there to be tension between the need to get something right and the need to make progress. I would prefer to accept an imperfect solution and make progress, than to wait to improve the solution.
2	I find face-to-face meetings a more effective way of communicating than email.
3	Projects often start without an adequate amount of time spent on planning.
4	My customer introduces challenging new requirements after the project has kicked off and offers to pay for any costs incurred. In this situation I would happily accept the new requirements.
5	Often customers don't really know what they want, so rather than going to the expense of making models such as prototypes and asking them, I usually find the project team is better off making assumptions by itself.
6	In a very risky project, I expect to spend more of the risk budget in the latter part of the project.
7	For project managers, specialist domain knowledge is more important than understanding generic project management good practice.
8	My 2-year project is running 3 months late with a year to go. I have discovered that by overlapping two tasks I should save 4 months, but there is a 10% chance of rework being needed, which would delay the project by 12 months. I would consider this a risk worth taking, and would therefore overlap the two tasks.
9	All stakeholders should be able to see a project risk register.
10	There should be two versions of a risk register – one for internal use and one for external stakeholders.
11	Very little effort should be spent on a project until there is a contract in place.
12	I would rather develop a close relationship with a single preferred supplier for each element of a system, than have multiple suppliers competing for business.
13	As a proportion of the total project budget, how much would you be willing to pay to guarantee on time and good quality delivery?

Source: (Tsiga, Emes, & Smith, 2016)

In the decisions scenarios, the respondents expressed to what extent they agreed with certain statements. The personality aspect was also implemented in a similar manner, but here individual preferences are judged based on their experience. These are the two main sections of the survey, and they were implemented with the aid of a 5-point Likert scale except for Question 13 in **Table 2**, this is because the manner of that specific question necessitated the need for an open-ended question. The question aims to determine the percentage of total budget they would be willing to invest in the project to ensure on-time delivery and project quality.

Table 3

Personality Questions		
Number	Statement	Carl Jung's Preference
14	I have a low level view more than a high level view	Seeking information
15	I prefer to make decisions based on logical rather than emotional arguments	Decision making
16	I am more sociable than reserved	Focus of attention



17	I prefer a structured organization rather than a flexible organization	Relationship with the world
18	I am more of a pleasing than firm person	Decision making
19	I have a long-term view rather than short-term view	Seeking information
20	I prefer having control rather than flexibility	Relationship with the world
21	I am pragmatic more than creative	Seeking information
22	I prefer to make a consensus team decision more than objective decisions	Decision making
23	I prefer to freeze the scope rather than leave it open for additional requirements	Relationship with the world
24	I prefer to respect deadlines more that adapt them to new circumstances	Relationship with the world
25	I prefer to show fairness to empathy	Decision making
26	I am more of an introvert than extrovert	Focus of attention

Source: (Tsigas, Emes, & Smith, 2016)

The final section of the study is compromised of two questions, aimed at gathering the contact information of the respondents who are willing to be contacted for further studies in this area and also notify them of the results once they have been published. The survey was conducted over a period of a 6-month period from the 1st of February 2016 and came to an end on the 30th of July 2016.

Results

The respondents of this study are geographically located in United States, United Kingdom and Nigeria. The participants work in various construction companies in the private sector. All the respondents are in full-time employment in the construction industry. **Figure 1** depicts the geographical location of the respondents. At the end of the study, a total of 50 responses have been collected, and their background information has been analysed in **Table 4**.

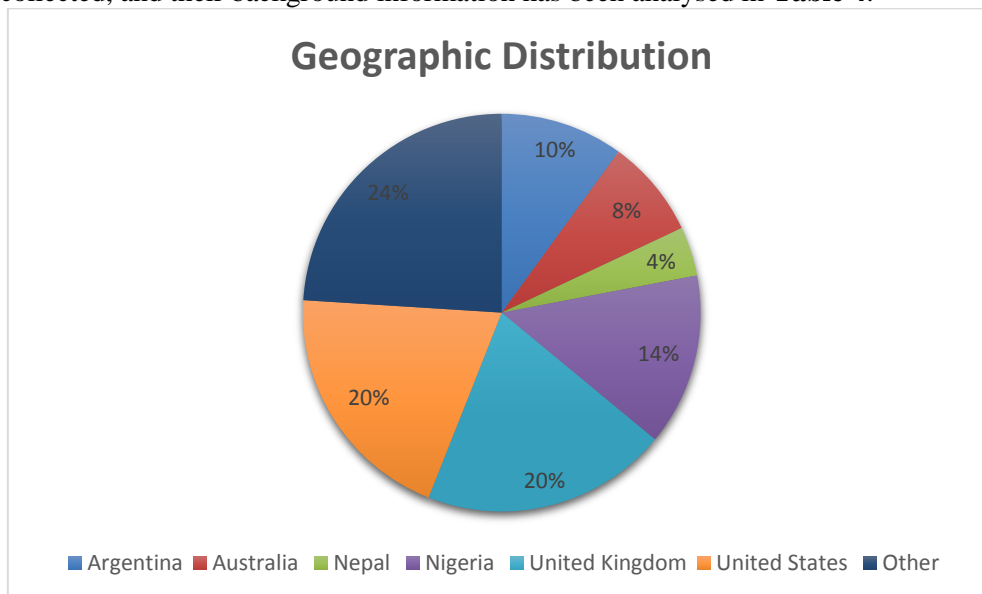


Figure 1: Geographical location of respondents.



Table 4

Characteristics of Respondents			
Characteristics of Respondents			
Background Question	Characteristics	Petroleum Sector	
		Number	Percentage
Education	Bachelor's	18	36
	Master's	17	17
	Doctorate	8	8
	Other	7	14
Project Experience	0 to 2 years	0	0
	2 to 5 years	8	16
	5 to 10 years	10	20
	10 to 15 years	7	14
	More than 15 years	25	25
Project management experience	None	4	8
	Less than 2 years	7	14
	2 to 5 years	9	18
	5 to 10 years	7	14
	10 to 15 years	6	12
No of projects participated	More than 15 years	17	34
	Fewer than 5 projects	6	12
	5 to 10 projects	6	12
	10 to 15 projects	8	16
% of successful project	More than 15 projects	30	60
	0 to 20	1	2
	20 to 40	3	6
	40 to 60	7	14
	60 to 80	24	48
Projects Managed	80 to 100	15	30
	None	5	10
	Fewer than 5 projects	15	30
	5 to 10 projects	8	16
	10 to 15 projects	6	12
% of managed successful projects	More than 15 projects	16	32
	0 to 20	3	6
	20 to 40	2	4
	40 to 60	6	12
	60 to 80	23	46
	80 to 100	16	32

From the background information in **Table 4**, the data shows that 53% have either a bachelor or master level education. 84% have over five years of project experience, and 60% have more than five years of project management experience. The data also shows that 88% have participated in more than five projects. 70% have managed more than five projects of which 76% were delivered successfully based on starting estimates.

The data collected from the respondents for the second and third section have been analysed for frequencies using the IBM SPSS Statistics version 23 software. The total number of answers given to the Likert scale questions have been converted into a 3-point scale by



grouping the “Strongly agree” and “agree” together and also for the “Strongly disagree” and “disagree”. The results of the decision scenarios and personality section are shown in **Table 5** and **Table 6** respectively. In the aspect of the personality section, the results have been linked directly to Jung’s work.

Table 5

Decision Scenario Results					
No	Question	Disagree	Neutral	Agree	Preferred
1	It is common for there to be tension between the need to get something right and the need to make progress. I would prefer to accept an imperfect solution and make progress, than to wait to improve the solution.	24	12	14	Wait for an Improved solution
2	I find face-to-face meetings a more effective way of communicating than email.	3	6	41	Face to Face meetings
3	Projects often start without an adequate amount of time spent on planning.	5	15	30	Plan more
4	My customer introduces challenging new requirements after the project has kicked off and offers to pay for any costs incurred. In this situation I would happily accept the new requirements.	4	14	32	Accept new requirements with conditions
5	Often customers don’t really know what they want, so rather than going to the expense of making models such as prototypes and asking them, I usually find the project team is better off making assumptions by itself.	18	16	16	Don’t make assumptions
6	In a very risky project, I expect to spend more of the risk budget in the latter part of the project.	10	15	25	Spend more later
7	For project managers, specialist domain knowledge is more important than understanding generic project management good practice.	16	20	14	Neutral
8	My 2-year project is running 3 months late with a year to go. I have discovered that by overlapping two tasks I should save 4 months, but there is a 10% chance of rework being needed, which would delay the project by 12 months. I would consider this a risk worth taking, and would therefore overlap the two tasks.	18	11	21	Proceed to save time in late project
9	All stakeholders should be able to see a project risk register.	2	9	39	All see risk register
10	There should be two versions of a risk register – one for internal use and one for external stakeholders.	18	9	23	Two versions
11	Very little effort should be spent on a project until there is a contract in place.	17	19	14	Neutral



12	I would rather develop a close relationship with a single preferred supplier for each element of a system, than have multiple suppliers competing for business.	13	14	23	Single supplier
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Table 6

Personality Section Results						
No	Question	Disagree	Neutral	Agree	Preference	Jung's Type
14	I have a low level view more than a high level view?	24	20	6	High Level View	Intuitive
15	I prefer to make decisions based on logical rather than emotional arguments?	4	0	46	Logical decisions	Thinkers
16	I am more sociable than reserved?	7	11	32	Sociable	Extrovert
17	I prefer a structured organization rather than a flexible organization?	25	2	23	Flexible Organization	Perceiving
18	I am more of a pleasing than firm person?	13	14	23	Pleasing	Feeling
19	I have a long-term view rather than short-term view?	0	9	41	Long term view	Intuitive
20	I prefer having control rather than flexibility?	15	17	18	Control preferred	Judging
21	I am pragmatic more than creative?	18	13	19	Pragmatic	Sensing
22	I prefer to make a consensus team decision more than objective decisions?	15	7	28	Team decision	Feeling
23	I prefer to freeze the scope rather than leave it open for additional requirements?	11	20	19	Neutral	Neutral
24	I prefer to respect deadlines more than adapt them to new circumstances?	18	9	23	Respect deadlines	Judging
25	I prefer to show fairness to empathy?	2	9	39	Fairness	Thinkers
26	I am more of an introvert than extrovert?	20	11	19	Extrovert	Extrovert



Conclusion

Once you look at the results of the decisions scenarios as shown in **Table 5**, one can conclude that the respondents prefer to have an improved solution before proceeding, prefer face to face meeting, prefer more planning before a project kick off, prefer to accept new requirements during a project with conditions, don't make assumptions and discuss with stakeholders on requirements, they believe more of the risk budget is spent later on the project, take risk to save time on a delayed project. The respondents also believe that all stakeholders should be able to see the risk register and they should be multiple versions of it. They also prefer to have a single supplier during in a project and the results respondents are neutral in the aspect of having a generic or specialist project management knowledge. The respondents are also neutral as to whether more effort should be put into a project on or before a contract is in place.

The results of the open-ended Question 13 in the decision scenario revealed that 50% of the respondents gave a figure below 20% of total project budget, 29.2% gave a figure above 20% and below 50% of total project budget. The remaining 21% gave a figure above 50%. As the question was designed to measure the percentage of total project budget, they are willing to spend to ensure delivery on time and budget. From the results of the question suggest that the respondents who gave a give above 50% did not fully understand the question or they are used to working in high cost.

In the results of the personality section as shown in **Table 6**, the generic personality of the respondents are people with high level and long term view, are fair and logical decision takers, are sociable and extroverts, they prefer to have control and respect deadlines, they are pleasing and prefer to make team decisions and finally they are pragmatic and prefer to work in flexible organizations.

A personality profile of the respondents can be derived once you correlate the results of the interviewees and Jung's work psychological types. The results show that the respondents are extroverts, judging (focus on attention), more intuitive than sensing (Seeking of information), and are equally thinkers and feelers (decision makers). In some quadrants of Jung's work e.g. decision makers, there is a balance of traits.

The results of this study can be seen to have both practical and theoretical implications. In the aspect of theoretical implications, the research helps in the understanding of risk management attitudes and personality of people in the construction industry hence this research could be the basis for further studies in risk appetite. In the aspect of practical implications, the research provides steps towards the development of frameworks for the improvement of risk management behaviour of project participants.

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MONTE CARLO SIMULATION AND AGILE METHODS IN PROJECT RISK MANAGEMENT

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Abstract

There are various methodologies in project management that are collectively known as ‘agile’ (like ‘scrum’ or DSDM), as they promote the values of the ‘agile manifesto’ and they are consistent with the principles mentioned there. One main idea is that new challenges require an adaptive, not anticipatory, project management. But if you follow this guideline consequently to the final end, risk management seems to be no longer needed in an adaptive and iterative process. In other words: You ignore risks until they manifest into issues!

We want to show in this contribution that it still makes sense to perform risk management even in connection with agile approaches. And especially Monte Carlo simulation should be mentioned here as an appropriate tool to use.

Key words: *project management, risk management, agile methods, scrum, Monte Carlo simulation*

JEL codes: G32, C53, O22

Introduction and Background

Although we can suppose that even the construction of the pyramids in Egypt must have had some kind of project management, modern project management came into being in the middle of the last century. Project management societies were founded (USA/Project Management Institute (PMI) in 1969, UK/Association for Project Management (APM) in 1972, Germany/Deutsche Gesellschaft für Projektmanagement (GPM) in 1979) in different countries and during the second half of the 20th century we could perceive a huge development in methods, tools, approaches, and models. The number of textbooks increased dramatically, some organizations established their own standards (like PMBOK, Prince2 etc.), and the topic ‘project management’ was omnipresent. On the other hand in some sense it evoked an impression that it became overloaded, inflated, inflexible, and too complex.

Since the focus of this paper is risk management in projects, let us look especially into that a little in detail:

- In the **late 50’s** PERT was introduced into project management (c.f. Kerzner (2009), Taylor (2010)), developed by the United States Navy together with the OR department of Booz, Allen, and Hamilton. The purpose of this development has been to support the deployment of the Polaris-Submarine weapon system (c.f. Fazar (1959)). PERT on the other hand is based on the Critical Path Method (CPM) that was invented by DuPont (c.f. Kelley/Walker (1959)). CPM assumes deterministic durations of the different activities, but in PERT we choose beta distributions for the durations, usually estimated by so-called three-point estimates (optimistic, most probable, and pessimistic durations). In that way, PERT was the very first – but tiny – step into the right direction. Later on, this PERT approach was varied to GERT (graphical evaluation and review technique) and SCERT (synergistic contingency evaluation and review technique).

- In the **early 90’s** there was a shift in the perception of risk: Risk was no longer seen as something that only leads to negative effects, but synonymous to “uncertainty”. Therefore, risks can be seen bad or good: a threat or an opportunity.



- In the **first decade** of the third millennium there was an increasing interest in risk management in projects. For example, the number of members of the RiskSIG (risk management special interest group, founded in 1986) of the APM grew between 2004 and 2011 from 350 to 2,700 (c.f. Campbell (2012)).

- **Nowadays** risk management in projects has become one of the 10 knowledge areas of PMBOK (Project Management Body of Knowledge, PMI (2013)) and covers 6 of the almost 50 processes. Like the whole discipline ‘project management’, risk management in projects tends to become overloaded, more complex, and more difficult to handle.

Agile Methods

In the light of that development in project management a group of 17 participants of a conference in Utah in the year 2001 discussed, compiled, and signed a manifest that later on became famous as the ‘**Manifesto for Agile Software Development**’ (c.f. Augustine (2005)).

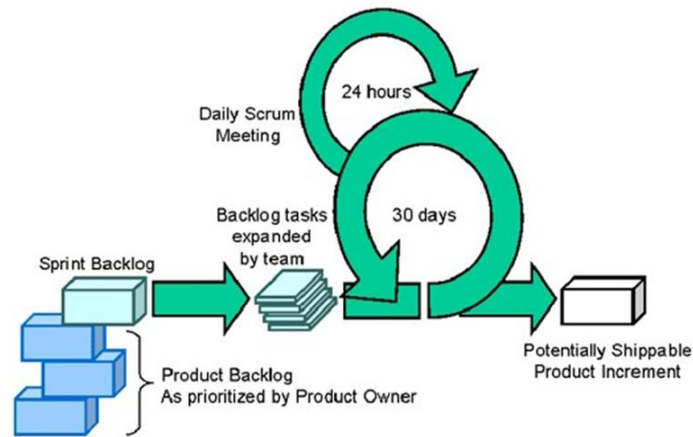
“We are uncovering better ways of developing software by doing it and helping others do it.

Through this work we have come to value:

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan

That is, while there is value in the items on the right, we value the items on the left more”.

Remarkable is the fact that the signatories mentioned in the postscript that they do not want to move into extremes, but want to focus more on the flexible aspect of processes. Afterwards several agile project management approaches were generated; one of the most popular of them seems to be the so-called “scrum” approach (c.f. McKenna (2016), Maximini (2015)). This approach is characterized by several presets (e.g. the different roles of the product owner, the team, and the scrum master) and especially a clearly defined time management.



source: adapted from Schwaber/Beedle (2008)

Fig. 1. The scrum framework

The whole workload of the project is broken down into work packages for the next 'sprint'. Such a sprint usually covers a period of 8 to 30 days. And within this period there is a daily 'scum' meeting. By this the main idea is the adaptive and iterative line of action. The whole team is able to permanently react to things that occur over time and therefore this approach is very flexible.

But it is quite irritating to find statements like the following on the internet:

- "This has led many to believe that **risk management is irrelevant in an iterative model**. Some follow the approach of ignoring risks until they manifest into issues; they then manage them through the natural sprint progression."
- "Risk management is an important part of both PMBOK/PMI and Prince2. Most agilists on the contrary find separate formal **risk management in agile practices unnecessary**, as agile inherently addresses risks and mitigates them continuously."
- "One can debate the need for spending additional amount of time in firming up schedules when **agile has the inherent flexibility** about keeping timeline fixed while ensuring only high priority items get delivered."

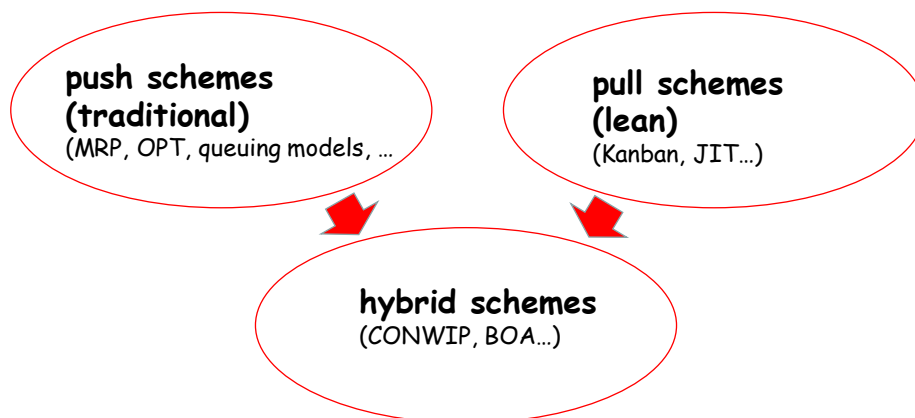
Obviously some people have not read (or forgotten) the last sentence of the 'agile manifest' and strongly believe that this iterative, adaptive approach substitutes an elaborated planning and especially risk management.

Comparison to Machine/Job Scheduling

In some sense this reminds those of us, who witnessed, followed, or tracked the development in production and operations management, that a similar process happened there. In the beginning the dominating perception was that everything can be analysed and planned and that it depends mostly on the available computer performance to calculate the optimal



schedule for the execution of a set of orders. The aim was to get via MRP (manufacturing resource planning) a totally integrated CIM (computer integrated manufacturing) in which each order is **pushed** through the production system. But because of the increasing complexity, the high fragility in relation to any disturbance (“butterfly effect”), and the handling of uncertain events, another development took place, mostly initiated in the Asian countries. In this approach orders were not pushed through the system, but rather **pulled**. This approach was characterized by terms like Kanban, just-in-time, and lean management. In some sense you can interpret the development as if you “overshoot the mark” and have to move back. But in the end you come to the conclusion that each situation needs its own individual approach and there is not one unique approach that always fits best. You have to decide this again and again and adjust your specific ‘hybrid’ approach to your specific environment.



source: authors' construction

Fig. 2. Development in production and operations management

But since these experiences have already been made in operations management, we can try to learn from them in project management.

Example: Pitfall Traps because of Blinders

To illustrate the necessity of planning and the danger of a purely adaptive approach, we adopt one of the examples that have been created in the context of the discussion in production and operations management and that are now known as “*Graham's anomalies*” (Graham (1968)). For the sake of simplicity, a deterministic case has been chosen, in the sense that no uncertainties of the parameters are assumed.

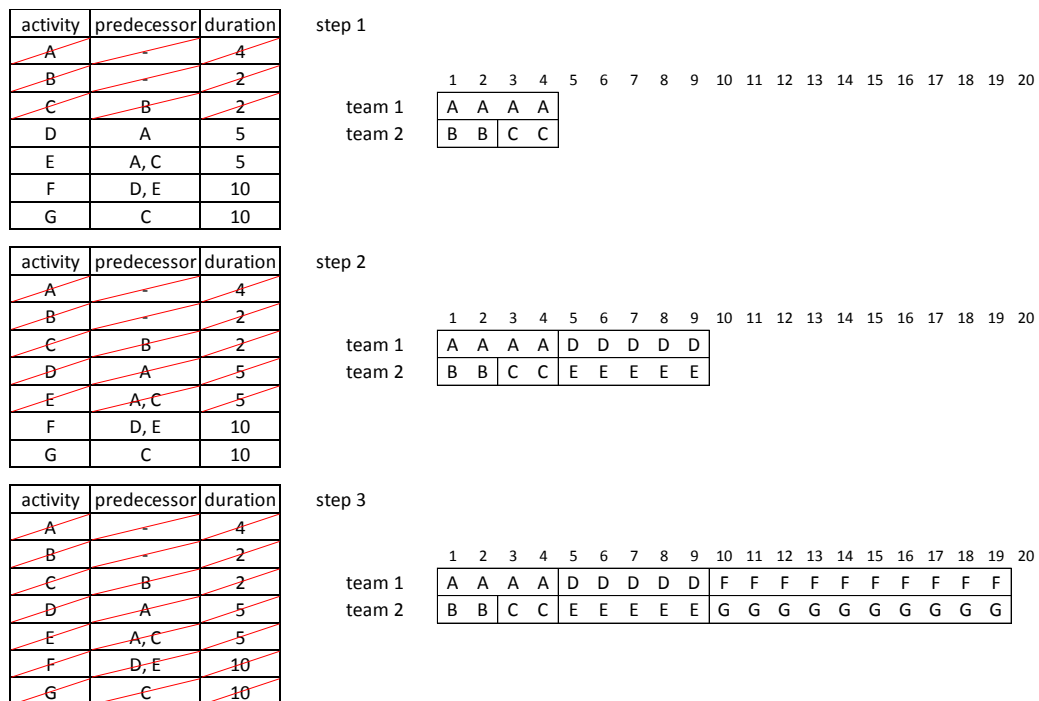
Suppose that we have a project that contains seven activities with the necessary (deterministic) durations and the predecessor relations given in fig. 3.



activity	predecessor	duration
A	-	4
B	-	2
C	B	2
D	A	5
E	A, C	5
F	D, E	10
G	C	10

source: authors' construction based on Graham (1968)

Fig. 3. The first example project



source: authors' construction based on Graham (1968)

Fig. 4. The first example with the adaptive approach

To handle this project we deploy two teams that are able to perform each activity, but only one activity per team at the same time. If these teams behave in an adaptive way, which means that each team consistently takes over the next available task, we get the schedule given in fig. 4 with a total duration of the whole project of 19 units.

If we now succeed in improving the project in that way that we can shorten the duration of each activity by 1 unit, we get the project that is shown in fig. 5.



activity	predecessor	duration
A	-	4
B	-	2
C	B	2
D	A	5
E	A, C	5
F	D, E	10
G	C	10
Σ		38

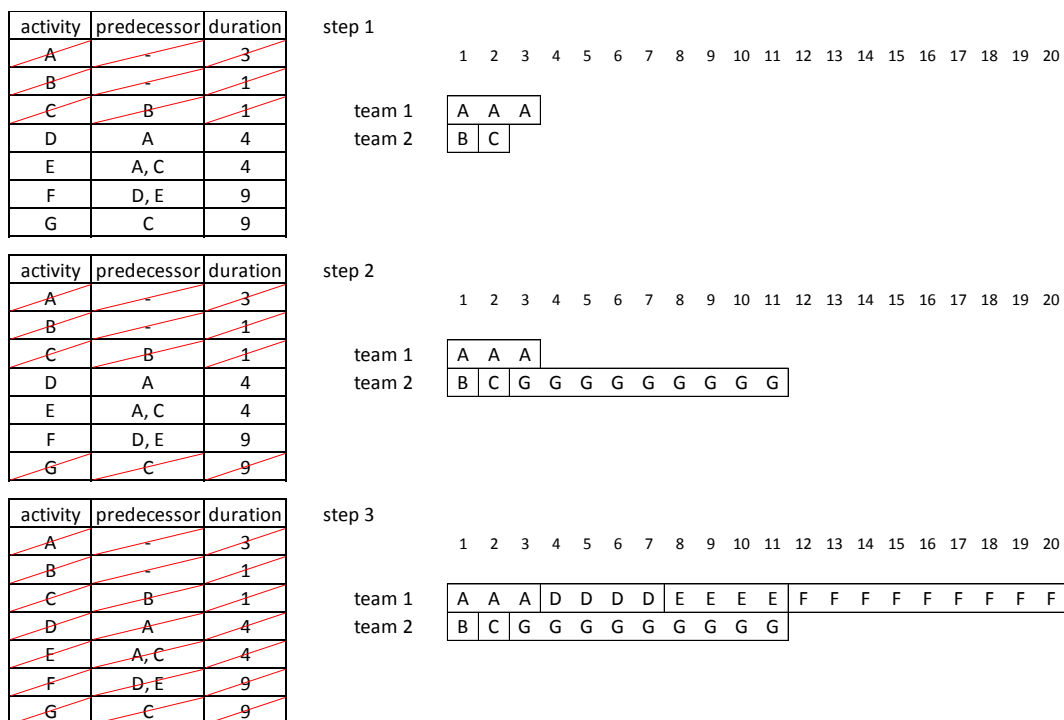
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activity	predecessor	duration
A	-	3
B	-	1
C	B	1
D	A	4
E	A, C	4
F	D, E	9
G	C	9
Σ		31

source: authors' construction based on Graham (1968)

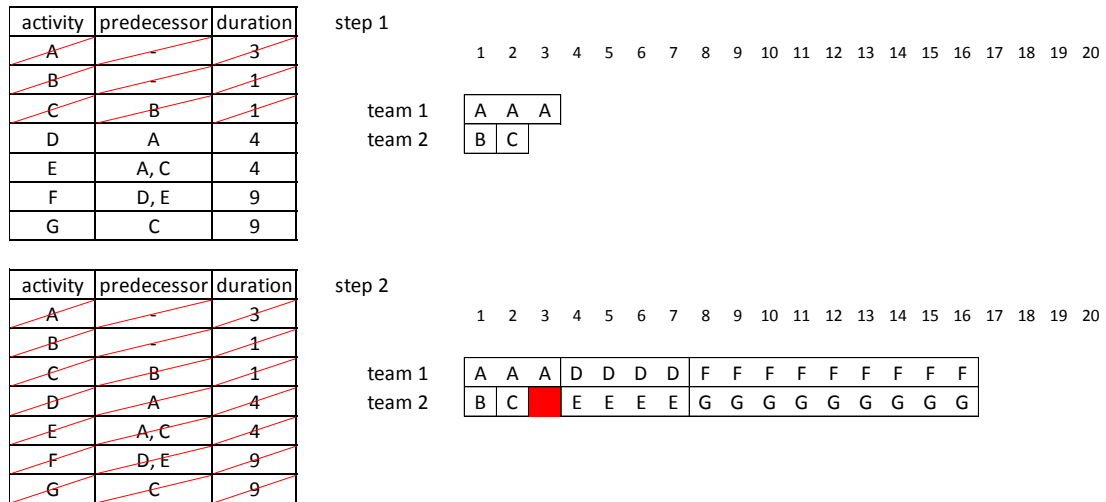
Fig. 5. Modification of the first example

Solving this modified project in exactly the same adaptive way, now leads to the schedule given in fig. 6. It can be seen that although the total workload decreased from 38 units to 31 units (c.f. fig. 5) the duration of the project increased from 19 units to 20 units. On the other hand one would have expected that having a workload of 31 units and 2 available teams, it would be possible to execute the project within 16 units. And indeed: This is possible! To achieve this, one team needs some idle time in the beginning in order that everything fits at the end (fig. 7). But unfortunately the adaptive approach is not able to handle this.



source: authors' construction based on Graham (1968)

Fig. 6. Solving the modified example with the adaptive approach



source: authors' construction based on Graham (1968)

Fig. 7. Optimal solution of the modified example

Monte Carlo Simulation and Risk Management

After having illustrated that a planning and especially risk planning process is quite useful - if not necessary – let us view, which kind of risk management might fit into an agile oriented process. Since agile oriented processes possess its special timing, the used tools have to be easily applicable with little effort in the sense that they can be used during a sprint or even within a scrum meeting, without the consultation of external specialists or the use of specific software. Therefore we favour Monte Carlo simulation, since it creates a plain output in form of distributions instead of non-transparent indices that need interpretation. Additionally these simulations have to be performed with a tool that is well-known to most of us and that can be handled by most – if not all – of the team members. Excel belongs to this kind of tools.

Let us try to give an impression of possible applications with the following more complex example project (fig. 8). Here the durations of the individual activities are assumed to be uncertain and given by three-point estimates (optimistic (OD), most probable (MD), and pessimistic durations (PD)).



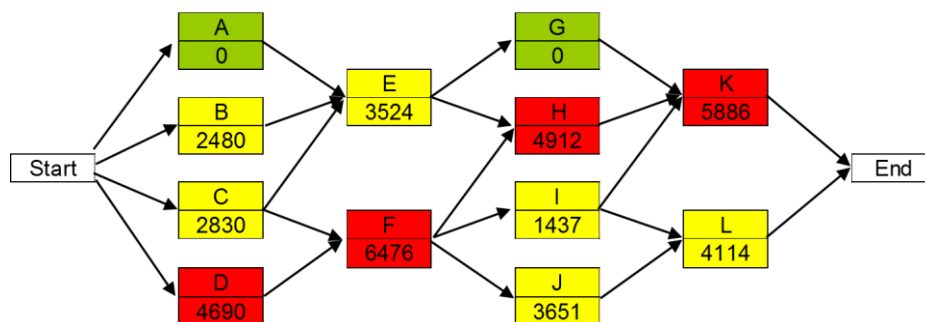
Activity	Predecessors	D	D	D
A	-			
B	-			
C	-			0
D	-			
E	A, B, C			0
F	C, D			
G	E			
H	E, F			
I	F			
J	F			0
K	G, H, I			
L	I, J			

source: Tysiak (2015)

Fig. 8. A fictitious project plan

With a little experience it takes approximately in the range of about one hour to create a Monte Carlo simulation model with Excel for this project. This effort might of course increase if the project becomes larger or more complex (e.g. if there are a lot of incorporated conditions or correlations (c.f. Tysiak/Sereseanu (2010), Tysiak/Tietz (2016)), but it remains manageable within a reasonable time. You also have to keep in mind that this generation of the model has to be done only once in the beginning. In this example we have chosen beta distribution for the expansion of the three-point estimates, which is quite easy because of the built-in functions of Excel. The employment of the model is of course as easy as any use of Excel sheets: You simply change parameters and notice the changes.

The first instance that can be shown with the model is the probability of an activity to be critical. Therefore we create 10,000 simulations (which only takes seconds) and calculate how often an activity belongs to the critical path (c.f. fig. 8).



source: Tysiak/Tietz (2016)

Fig. 8. The critical field (number of times (out of 10,000) that a node is critical)



Similar to the above given example with the two teams, we could be interested which activities overlap in time, so that they have to be executed (at least partly) simultaneously. In fig. 9 the probabilities of an overlap in time and the average lengths of these overlaps are given.

	B	C	D	E	F	G	H	I	J	K	L
A	1,00	1,00	1,00	0,00	0	0	0	0	0	0	0
B		1,00	1,00	0,66	0,37	0	0	0	0	0	0
C			1,00	0,34	0,29	0	0	0	0	0	0
D				0,43	0,71	0	0	0	0	0	0
E					1,00	1	0,53	0,53	0,53	0	0,00
F						0,47	0,47	1	1	0	0
G							0,95	0,94	0,95	0,00	0,06
H								0,99	1,00	0,78	0,44
I									1	0,22	0,22
J										0,48	0,78
K											0,99

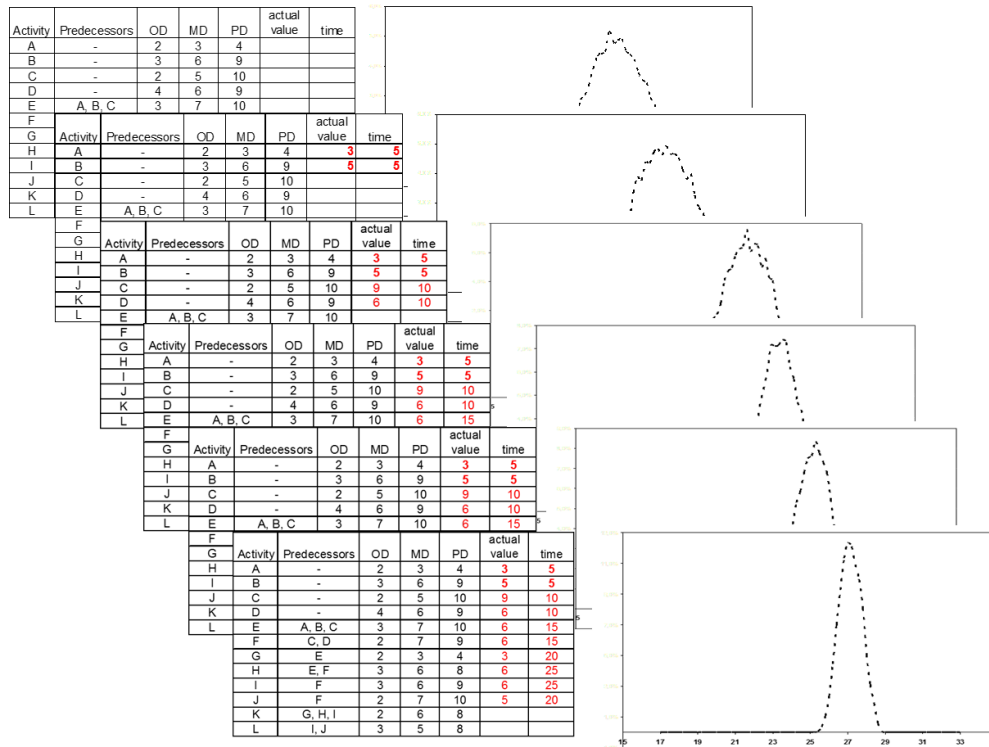
	B	C	D	E	F	G	H	I	J	K	L
A	3,00	2,99	3,00	0	0	0	0	0	0	0	0
B		4,92	5,55	0	0,89	0	0	0	0	0	0
C			5,00	0	0	0	0	0	0	0	0
D				0,97	0	0	0	0	0	0	0
E					5,49	0	0	1,64	1,65	0	0,44
F						1,35	0	0	0	0	0
G							2,49	2,31	2,41	0	0,93
H								4,30	5,03	0	1,50
I									5,11	0	0
J										1,321	0
K											3,95

source: authors' construction

Fig. 9. Probabilities and lengths of overlap

As a third illustration of the usage of such a model, we want to point out that you can permanently maintain the model and update the parameters over time and look for the consequences. In fig. 10 the actual values are updated each 5 days and show the change in the distribution of the duration of the whole project. Obviously the standard deviation decreases over time.

These are only three possible applications to show that these models may provide very useful information in a very short and easy way. Each project will of course generate its own desirable or required analyses.



source: authors' construction

Fig. 10. Development over time

Conclusions

Although sometimes people argue that a sophisticated project planning and especially risk management planning can be substituted by an agile approach, we illustrated that a pure adaptive line of action might be quite dangerous. Therefore, even in agile oriented approaches planning is still useful.

Especially in the context of risk management planning, everybody should be aware that ignoring risks also means the omitting of chances, because uncertainties always cover both tails of the distribution: threats and chances.

Additionally, the fact that one approach moved too far into an extreme direction, should not lead to an attitude to move into the opposite extreme. It normally makes more sense to mitigate the extreme approaches: There are a lot of interesting colours between black and white – we need hybrid models that use a mix of the best tools of all known approaches.

One tool that fits quite well into the agile methodology is the Monte Carlo simulation, especially performed with Excel. It is well-known; most people are familiar with it. It is very flexible; analyses can be done very fast and by the team members themselves.



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THE EPISTEMOLOGICAL ANALYSIS OF THE CONCEPT “RISK” IN PROJECT RISK MANAGEMENT

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Abstract

The aim of the current research series is to examine the risk registers of real projects to find correlations between the project management theory, especially project risk management, and practical results of the risk management of real projects – the risk registers publicly available in the Internet.

In the current research the author analysed the concept “*event*” that defines the content of the concept “*risk*”. The use of the concept “*event*” was analysed in 9 different sources to find out how to use the concept “*event*”. Epistemological analysis of the concepts “*event*” in the “*risk*” definition was used to answer the question what the risk in project management means.

In the previous studies the author concluded that the methods used for the analysis of the definitions of the concept are insufficient because the theoretical risk registers do not coincide with the risk registers of real projects. However, we can conclude that the risk registers of real projects are not sufficiently substantiated theoretically if we assume that the risk registers of real projects comply with the documents governing project management.

Key words: *project, risk, concept, event, epistemological analysis.*

JEL code: M00, M10, M190

Introduction

Project management history is a relatively new science characterized by dynamic development. Defining precise, unanimous and generally accepted concepts is important for any branch of science. In project management as a new branch of science many concepts are under construction, many concepts differ both in the content and scope. One of such project management concepts is “*risk*”. The genius concepts of the risk definitions are different. The most common concepts are “*event*” and “*uncertainty*”. The concept “*event*” is widely used in different areas, in philosophy, mathematics, and physics or away from the scientific definition. The same is true in the case of the concept “*uncertainty*”. The content of the concepts “*event*” and “*uncertainty*” is very different and maybe the analysis of the ontological, epistemological and methodological and real project risk register of the definitions of “*event*” and “*uncertainty*” will provide the analysis, which reveals relationships, which could not be identified by the methods used in previous studies.

Methodology of Research

The research was conducted in two stages. The goal of the first stage was to find out if the selected methods of research can be used to carry out the ontological, epistemological and methodological analysis of the concept “*risk*”. The author assumed that the selection of at least three sources in each kind of sources will be sufficient for the assessment of the validity of the selected methods. In the second stage of the research a wider use of the sources is intended. It is also planned to compare the results of the theoretical analysis of the sources with the results of the project risk analysis. The article deals with the results of the first stage which analysed how to use the concept “*event*” in 9 different sources, 3 project management guidelines of



international project management institutions, 3 project risk management guidelines, and 3 author books.

One of the definitions of the term “epistemology” in the Merriam-Webster dictionary is “the study or a theory of the nature and grounds of knowledge especially with reference to its limits and validity”, in the Cambridge Dictionary epistemology it reads “the part of philosophy that is about the study of how we know things” and in the Collins dictionary epistemology there the definition: “the theory of knowledge, esp the critical study of its validity, methods, and scope”. Stanford Encyclopedia of Philosophy states that “Defined narrowly, epistemology is the study of knowledge and justified belief” and lists several questions: “As the study of knowledge, epistemology is concerned with the following questions: What are the necessary and sufficient conditions of knowledge? What are its sources? What is its structure, and what are its limits? As the study of justified belief, epistemology aims to answer questions such as: How we are to understand the concept of justification? What makes justified beliefs justified? Is justification internal or external to one's own mind?”.

The definitions of epistemology differ, each of them stressing some of the epistemology aspects. The author offers the following formulation of the research question: is the concept “*event*” chosen to determine the scope of the risk definitions in the selected sources described and used in the text in the way that lets conclude that the knowledge about risk in the selected sources is well-grounded, truthful and reliable.

In the “*risk*” definitions selected by the author, the concept determining the scope of the concept “*risk*” is the “*event*”, in 2 definitions of 9 the scope of “*event*” was limited by another concept. In two of the selected sources there are definitions of “*event*” – “A point in time when an activity(s) is started or completed. It does not consume time” (Larson, Gray, 2011) or “A point in the progress of the project after total completion of all preceding activities” (Young, 2007). The author believes that both definitions of “*event*” do not relate to the concept “*risk*” and that let the author assume that in the selected sources a generally accepted meaning of “*event*” is used that corresponds to the definitions of “*event*” in the dictionaries of the English language.

In the selected dictionaries “*event*” has several meanings. The author chose one or several definitions where it can be concluded that their meaning is close to the one in the dictionary definitions. In Cambridge Dictionary one of the “*event*” definitions is “anything that happens, especially something important or unusual”. In Macmillan Dictionary “*event*” is “something that happens, especially something that involves several people” or “used in a general way to talk about a combination of things that happen”. In English Oxford Living Dictionaries “*event*” is “a thing that happens or takes place, especially one of importance”. In Merriam-Webster dictionary “*event*” is “a postulated outcome, condition, or *eventuality*”, “something that happens” and “a noteworthy happening” as well as “a subset of the possible outcomes of an experiment”. Collins English Dictionary “an *event* is something that happens, especially when it is unusual or important. You can use events to describe all the things that are happening in a particular situation”, “anything that takes place or happens, esp something important; happening; incident” “the actual or final outcome; result”, and American English “a happening or occurrence, esp. when important”.

When analysing definitions it can be found that there are two kinds of definitions. Table 1 summarizes the terms featuring in definitions and their relationship.



Table 1

The terms featuring in definitions and their relationship

Concept	Relation to other concepts
Definitions of the first kind	
Anything, something,	Happen, happening
Thing, combination of things	Happen, takes place
Noteworthy	Happening
Anything, something,	Important, unusual, involves several people, incident
Thing	Importance
Thing	Particular situation
Definitions of the second kind	
Outcome	Postulated, actual, final
Outcomes	Possible, set

Source: author's calculations based on "event" vocabulary definitions

The first kind of definitions does not have preconditions, anything can be an event, the main aspect is the act of happening and its consequences. The second kind of definitions has preconditions, after the identification of which it is possible to identify the result. The second kind of definitions can be considered similar to the definition of "event" in the probability theory, similar to Merriam-Webster definition "a subset of the possible outcomes of an experiment". It can be concluded that according to the definitions of the first kind identification of risks must be started from identifying the influence as only after that it can be assessed which events have an effect on the project as anything can be an event.

In the research the author has used quantitative methods of research: analysis of the concept frequency, connection of the concept with other concepts or terms; and qualitative research methods: the way of using the concept "event" by finding out how "event" is used together with the concept "risk" and the kinds of events, properties of "event" and actions in relation to "event".

The sources used in the research

In the research the author used the same 9 sources: 3 project management guidelines, 3 project risk management guidelines, and 3 author books which were used in the ontological analysis. The criteria for selecting the sources were the definition of the concept "risk" and the application of the concept "event" in defining the concept "risk".

The three project management guidelines are "A Guide to the Project Management Body of Knowledge. Fifth Edition", or PMBOK® Guide, "The New York State Project Management Guidebook, Release 2", and "Practice Guide to Project Management for IT Projects under an Outsourced Environment, Government of the Hong Kong Special Administrative Region". PMBOK® Guide is not publicly available online. In the electronic edition, pdf file format, there are 616 pages, in the manual there are 13 chapters, 4 appendices, references, glossary and index. In the Index section there is no "event". The definition of "event" is not. PMBOK® Guide describes 10 areas of project management; one area is the risk management. The concept "risk" is mentioned in the descriptions of all areas of project management. "The New York State Project Management Guidebook, Release 2" is publicly available online as an electronic edition



in 19 pdf format files, the manual has 3 parts and 3 appendices, in the so-called glossary, there is no definition of “*event*”. In the first part there are 5 chapters, 298 pages, in chapter 2 there are 6 chapters, 67 pages, in part 3 there are 6 chapters, 192 pages, appendices consist of 144 pages. “Practice Guide to Project Management for IT Projects under an Outsourced Environment” is publicly available online as a pdf file, there are 616 pages, the manual contains 123 pages, 2 parts, in part 1 there is one chapter, in part 2 there are 5 chapters, in the so-called glossary, there is no definition of “*event*”.

The three project risk management guidelines are “Project Risk Management Handbook. Threats and Opportunities, Second Edition”, “North Dakota Project Management Guidebook – Risk Management Supplement”, and “Risk Management Guidelines. Managing project costs through identification and management of risks”. The sources are publicly available online. “Project Risk Management Handbook. Threats and Opportunities” as a pdf file contains 65 pages, 3 chapters, 3 appendices, the so-called Index, in the Index section “*event*” does not appear, neither there is a definition of it in the Glossary. “North Dakota Project Management Guidebook – Risk Management Supplement” as a pdf file contains 93 pages, 7 chapters, 13 appendices, in section Risk-Related Definitions there is no definition of “*event*”. “Risk Management Guidelines. Managing project costs through identification and management of risks” as a pdf file contains 68 pages, 6 chapters, 3 appendices and the list of individual terms with definitions, there is no definition of “*event*”.

The three author books are “Identifying and Managing Project Risk”, Tom Kendrick, “Project Management: The Managerial Process”, Erik W. Larson, Clifford F. Gray, and “The Handbook of Project Management”, Trevor L Young. “Identifying and Managing Project Risk” by Tom Kendrick (third edition) and “The Handbook of Project Management” by Trevor L Young are publicly available online through Google Books, the availability extent of the content is 10-15% of the total size. “Identifying and Managing Project Risk”, Tom Kendrick has 369 pages as a pdf file, 13 chapters, an appendix and index. There is no mention of “*event*” in the Index section. “Project Management: The Managerial Process”, Erik W. Larson, Clifford F. Gray in the pdf format there are 691 pages, 18 chapters, 2 appendices and a glossary. In the glossary there is a definition of “*event*”, however, it cannot be referred to risk management. In the Index there is one mention of “*event*” and one mention “*event node*” (Larson, Gray, 2011). “The Handbook of Project Management”, Trevor L Young in the pdf format contains 303 pages, 12 chapters, 2 appendices, one of them is a glossary which contains the definition of “*event*”, in the Index section there is no mention of “*event*”.

Findings/Results

In the 6 chosen sources the concept defining the scope of the concept “risk” is “*event*”, in 3 definitions there is a different concept that determines the scope that is connected with the concept “*event*”. The author believes that the inclusion of different definitions of “risk” will provide for the opportunity to compare the application of the concept “*event*” in the selected sources. Table 2 summarizes the definitions of “risk”. Definitions D3, D6 and D9 are the ones with an additional concept.



Table 2

The definitions of “risk”

Definition	Source
1. Project management guidelines	
D1. An uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives.	A Guide to the Project Management Body of Knowledge.
D2. An anticipated event with the potential to positively or negatively affect the project.	The New York State Project Management Guidebook.
D3. One of the dimensions of the project management methodology which is the possibility of an event occurring that will have a negative impact on the achievement of objectives. Risk is measured in terms of impact and likelihood.	Practice Guide to Project Management for IT Projects under an Outsourced Environment.
2. Project risk management guidelines	
D4. An uncertain event or condition that, if it occurs, has a positive or negative impact on at least one project objective. A risk may have one or more causes and, if it occurs, one or more impacts (“project risk” definition).	Project Risk Management Handbook. Threats and Opportunities.
D5. An uncertain event or condition that, if it occurs, has a positive or negative effect on a project’s objectives. Risk is often a measure of the inability to achieve overall project objectives within defined project requirements and constraints and has three components: (1) the probability of occurrence, (2) the impact of the risk on the program, and (3) the time horizon during which the consequences will occur if the risk is not mitigated.	Risk Management Guidelines. Managing project costs through identification and management of risks.
D6. The combination of the probability of an uncertain event and its consequences. A positive consequence presents an opportunity; a negative consequence poses a threat.	North Dakota Project Management Guidebook – Risk Management Supplement.
3. Author books	
D7. In projects, a risk can be almost any undesirable event associated with the work.	Kendrick T., Identifying and Managing Project Risk.
D8A. An event that has been identified as potentially threatening the project’s integrity if it actually happens. D8B. A risk is any uncertain event that, if it occurs, could prevent the project realizing the expectations of the stakeholders as stated in the agreed business case, project brief or agreed definition. A risk that becomes a reality is treated as an issue.	Young, Trevor L. The Handbook of Project Management.
D9. The chance that an undesirable project event will	Larson, Erik W., Gray, Clifford, F.



occur and the consequences of all its possible outcomes.	Project Management: The Managerial Process.
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Source: author's calculations based on sources definitions

Table 3 provides the comparison of the dictionary definitions of “*event*” with the use of the concept “*event*” in “*risk*” definitions.

Table 3

The comparison of the “*event*” uses

Definition	Analysis
D1	Compared to the dictionary, the first kind of “ <i>event</i> ” definitions have correspondences and an addition about significant consequences of the event, which have an influence regarding the project. The difference is that the “ <i>event</i> ” has a property or kind – <i>uncertain</i> and the “ <i>risk</i> ” has one or several causes.
D2	Analogous to D1, the property or kind is <i>anticipated</i> .
D3	One of the different definitions when the defining concept is the <i>event</i> “possibility”, the rest is similar, “ <i>event</i> occurring” and the influence that is connected with the project.
D4	Analogous to D1.
D5	Analogous to D1.
D6	Partly analogous to D3, the defining concept is <i>event</i> “probability and consequences” and in addition to the <i>event</i> , there is a property or kind – <i>uncertain</i> .
D7	Specific definition, as it does not mention the happening of “ <i>event</i> ” and has a specific kind of influence – associated with the work, besides, the event has a property or kind – <i>undesirable</i> .
D8	D8A Analogous to D1, difference: the influence is <i>potentially</i> . D8B Analogous to D1, with a wider description of the event consequences.
D9	Partly analogous to D3, the defining concepts are “ <i>chance</i> ” and “ <i>consequences</i> ”, “ <i>event</i> ” has the property “ <i>undesirable</i> ” and a limited scope “ <i>project event</i> ”. In the definition provided by the source there is the second kind dictionary definition as there are “all possible outcomes”.

Source: author's calculations based on sources definitions

It can be assumed that by not defining the concept “*event*” the authors of the sources used a generally accepted definition of the concept. In the “*risk*” definitions of the sources the authors used a generally accepted definition of the concept. In the “*risk*” definitions of the sources there are no contradictions between the dictionary definitions of “*event*” and the meaning of “*event*” in the risk definitions of the sources, an “*event*” takes place, “*event*” has consequences, and consequently the use of “*event*” corresponds to dictionary definitions and is reliable.

To assess if the concept “*event*” is substantiated, the application of “*event*” in the selected sources was analysed. The results are summarized in table 4.



Table 4

The application of “event”

Source	Frequency of terms “event” and “events”			Distribution of application
	Total number ²²	The application is connected with risk management	Application has no connection with risk management	
A Guide to the Project Management Body of Knowledge.	46	Event – 10 Events – 14	Event – 7 Events – 15	In the chapter on risk management “event” is used 4, or 8.7% and “events” is used 10 or 21.7%. All together 30.4% of the total number are used in the section on risk management. In 52% “event” and ”events” are used in connection with risk management and in 48% are not connected with risk management.
The New York State Project Management Guidebook.	64	Event – 13 Events – 18	Event – 24 Events – 9	Non-applicable as in the manual there are chapters about the project processes rather than areas of activity. “Event” and ”events” in 48% are used in connection with risk management and in 52% are not connected with risk management.
Practice Guide to Project Management for IT Projects under an Outsourced Environment.	17	Event – 1 Events – 5	Event – 4 Events – 7	Non-applicable as in the manual there are chapters on the project management processes rather than the domains of activity, “event” and “events” 35% are used in connection with risk management and 65% are not related to risk management.
Project Risk Management Handbook. Threats and Opportunities.	14	Event – 10 Events – 3	Event – 1 Events – 0	Non-applicable as the manual is on risk management, “event” and ”events” 93% are used in connection with risk management and 7% are not connected with risk

²² The search was conducted by using application Adobe Acrobat Reader DC Advanced Search by searching “event” and “events”, case sensitive was not selected. Other forms of “event” were not identified and therefore were not searched.



				management.
Risk Management Guidelines. Managing project costs through identification and management of risks.	89	Event – 40 Events – 49	Event – 0 Events – 0	Non-applicable as the manual is on risk management, “event” and “events” 100% are used in connection with risk management.
North Dakota Project Management Guidebook – Risk Management Supplement.	70	Event – 48 Events – 17	Event – 0 Events – 0	Non-applicable as the manual is on risk management, “event” and “events” 100% are used in connection with risk management.
Kedrick, T. Identifying and Managing Project Risk	49	Event – 26 Events – 12	Event – 6 Event – 5	Non-applicable because the book is on risk management, in 78% “event” and ”events” are connected with risk management and in 22% are not connected with risk management.
Young, Trevor L. The Handbook of Project Management.	52	Event – 2 Events – 1	Event – 25 Events – 24	Non-applicable as in the manual there are chapters on the project management processes rather than the domains of activity, “event” and “events” 6% are used in connection with risk management and 94% are not connected with risk management.
Larson, Erik W., Gray, Clifford F. Project Management: The Managerial Process.	255	Event – 58 Events – 35	Event – 115 Events – 47	In the chapter on risk management “event” is used in 49, or 19% and “events” is used in 33 or 13%. In total 32% of the total number are used in the chapter on risk management and 64% are not connected with risk management.

Source: author’s calculations based on sources definitions

The application of the concept “risk” in relation to risk management and without the connection with risk management. By selecting four cases – three when the application of the “event” is 100% or near to 100% related to risk management and one where the application of the “event” only in 6% of cases is connected with risk management, it can be found that there



are several differences from the definition of “*event*” in dictionaries. The differences are summarized in table 5.

Table 5

Differences from the definition of “*event*” in dictionaries

Term	Comments
Project Risk Management Handbook. Threats and Opportunities	
uncertain event	Used in the definition of “ <i>risk</i> ”. Additional information about the “ <i>event</i> ” as there is a kind of event called “ <i>uncertain</i> ” and in the additional definition there is information that an “ <i>event</i> ” can have one or more causes and one or more impacts, according to the definition that “ <i>risk</i> ” is an “ <i>event</i> ”.
near-certain event	Used in the definition of triggers and represents symptoms and warning signs, which indicate changes leading to the alternations in the properties of “ <i>event</i> ”. Symptoms and warning signs are not defined.
trigger event	A new kind of “ <i>event</i> ”, is used in “trigger event indicates that the risk” (18). As in the risk definition “ <i>risk</i> ” represents an “ <i>event</i> ”, it can be concluded that there are two connected events one of which influences the other.
real event	Used only once, the need for application is not clear.
risk event	Used twice, the need for application is not clear.
positive events, adverse events	It is established that there are only two kinds of events in accordance with the consequences of the event, corresponds to the “ <i>risk</i> ” definition.
Risk Management Guidelines. Managing project costs through identification and management of risks	
potential risk event	The need for application is not clear.
risk event, risk events	The need for application is not clear.
adverse risk event	Used only once, the need for application is not clear.
unforeseen risk events	Used only once, the need for application is not clear.
potential risk evens	The need for application is not clear.
individual and combined risk events, individual risk events	The need for application is not clear.
cumulative and related risk events	The need for application is not clear.
North Dakota Project Management Guidebook – Risk Management Supplement	
uncertain event, uncertain events	Used in the definition of “ <i>risk</i> ”. Additional information about the “ <i>event</i> ”, as there is a kind of event named “ <i>uncertain</i> ” and there is information in the additional definition that an event can have one or more causes and one or more impacts, according to the definition that “ <i>risk</i> ” is an “ <i>event</i> ”.



risk event, risk events	The need for application is not clear.
particular risk event	Used only once, the need for application is not clear.
adverse events	The need for application is not clear.
negative events, positive events	It is established that there are 2 kinds of events by the consequences of the event, it complies with the definitions of the concept “risk”.
The Handbook of Project Management, Trevor L Young	
uncertain event	Is used for defining the concept “risk”. Additional information about the “event” as there is a kind of event named “uncertain”.
unforeseen event, unforeseen events	Is used for defining the term “issue”.
unpredictable events	The need for application is not clear.

Source: author’s calculations based on sources definitions

Conclusion

In the three sources that are comparable because the sources are regulatory documents of risk management in analogous organizations and contain similar definitions of “risk”, the use of “event” is different. When analysing each of the sources separately, it can be stated that knowledge about the concept “event” in risk management is not consistent, well-grounded, and reliable regarding the definitions of “event” in dictionaries because the sources do not offer the definition of “event” with the exception of one source where the definition of “event” is not connected with risk management. However, the analysis of the application of “event” in the sources suggests that the assertion about the correspondence “consistent, well-grounded, and reliable” is not that well substantiated as “event” is applied differently. For example, the collocation “risk event” is used. The author did not gain the confidence that the application of “risk event” is substantiated in accordance with the definitions of “risk” in the sources. If “risk” is an “event”, then it is not clear what a “risk event” is. The use of “event” enlarges the scope of “event” with regard to the scope of “event” in the dictionary definitions. Moreover, the author has found that the application of “event” within one source cannot be considered compliant with the criteria.

However, it can also be found that the selected research methodology is insufficient for acquiring substantiated conclusions about the compliance or lack of compliance with the selected criteria: inconsistent, well-grounded, and reliable and for designing recommendations for designing risk registers. There might be a need for an in-depth analysis of the different kinds of the applications of “event” in the sources by analysing the sentence and paragraph with “event” and selection of more definition of “event”, not only the definitions from the English language dictionaries. Possibly, by following this approach it will be possible to find out the need for using the collocation “risk event”, for example, in the tables of “North Dakota Project Management Guidebook – Risk Management Supplement” where both “event” and “risk event” are used.

It has also been found that epistemological analysis is a method that can be used for analysing the experience of the authors of the sources. The analysis of the experience plays an important role in project management as an applicable science.



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BASES FOR ORGANIZATIONAL COMPETITIVENESS: PROJECT MANAGEMENT IN THE LIFE OF THE CORPORATIONS

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SUPPORTED THROUGH THE NEW NATIONAL EXCELLENCE PROGRAM OF THE MINISTRY OF HUMAN CAPACITIES

Abstract

“Bases for organizational competitiveness” is a research project that evaluates the competitiveness and the management practices of the Hungarian enterprises. In the course of the program several hundred Hungarian small, medium-sized and large companies filled the questionnaire and answered its questions about their own competitiveness and actual economic situation. The study endeavours to briefly assess what condition the Hungarian enterprises are in after the economic crisis, and to what extent these enterprises have managed to adapt to the changes that have accompanied the operation of the business organizations in the past few years. The study focuses on the relationship between project management and competitiveness, and it builds on the assumption that the more efficient management of the projects might bring potential competitive advantages for the organizations. The study is willing to examine what efforts the enterprises have made during the recent years to turn into a lot more competitive and more successful organization. For that reason I have evaluated the companies’ project routine, willingness to cooperate, and the relationship of the latter two with competitiveness management.

Key words: *project management, leadership, questionnaire research*

JEL code: L2, M2

Introduction

Living is about constantly solving problems. The more fulfilled our life is, the more sophisticated and complex the problems become that need to be solved. The same rule applies to the organizations too. In order to lead an organization, one must continue to solve problems all the time. The only time an organization does not have problems is when there are no ongoing changes in it, but that can only occur if the organization is already dead (Károlyi, 2012). The thoughts of Ichak Adizes perfectly demonstrate the true nature of the entrepreneurial existence.

The changes in the business environment have not made the operation of the enterprises simpler. While almost every aspect of our life has turned more complex and more varied, the enterprises also have to deal with newer and newer challenges for maintaining the successes on a long term. In this continuous dilemma and struggle project management evolves into a huge asset by creating the opportunity for the companies to tackle the relatively new tasks with specific management solutions.

The usage of project management is not compulsory for the enterprises, since a business organization can be successful with or without it. On the other hand, we can see that an adequate project management multiplies effectiveness and efficiency, and it increases corporate competitiveness as well.

Up till now there is still no generally accepted definition to describe what a project and project management is. Although there are conceptual differences between the certain definitions, most of them still agree about the basic characteristics of a project. It can be considered a non-repeatable activity that has an identified goal and an expected result, it can be



outlined by a defined budget and deadlines, and it requires a well-determined demand for material and human resources for the sake of carrying the project goal out. The project assists to the long-term successfulness of the organization in a way that whatever the original goal of the project was, it essentially fits within the goals of the organization.

According to certain approaches, project management helps to adapt to the environmental changes. The more changes require more innovation, which can most effectively be executed under projects (Verzuh, 2006). Gareis used similar words when he said that project management provides the possibility of being able to initiate the flexibility of the organization, and all this paves the way for the improvement of quality (Gareis, 2007). Project management also facilitates the development of the organization's knowledge management with high efficiency, as during the project work we can learn from the mistakes, and the methods that can later be introduced for the management of new projects become improvable.

Likewise, the Project Management Guide (PMBOK Guide) draws attention to the practical applicability of project management too. By the application of project management, the organizations come to be able to use knowledge, skills, processes, means and methods, increasing the chances of success in a wide range of projects. Project management focuses on the implementation and provision of goods and services (PMI, 2013, p. 34). Considering that the vast majority of the enterprises sell their goods or services on the market, which is the source of their profit, the question of what could make the enterprises more effective in the course of this activity cannot be ignored at all, since more projects could lead to more profits.

Another reason why project management is able to be more and more significant for the enterprises is because the life cycle of the products became a lot shorter. The issue of bringing new products and services to the market as fast as possible in order to maintain their competitive positions will be crucial to an increasing number of organizations. The strengthening of the global competition put quality to the centre as well, and therefore meeting the expectations cannot be justified by any means anymore. With the application of project management, we can achieve major successes in improving quality, which will inevitably result in the increased satisfaction of the buyers/customers. The development of our knowledge and information boosts the complexity of the projects, given that the latest developments – that actually need plenty of knowledge capital – are realized under these projects. The enlargement of knowledge capital brought with it the complexity, which can only be manageable if we endeavour to make the complex processes more transparent and easier to use through targeted solutions and approaches (Jebrin, 2013).

In this regard, we can even say that today project management is deemed the management of the most significant developments.

However, project management helps us to be more effective in fields like for example planning, management or resources, financing, time management, information management, risk and conflict managements, etc.

Research results and discussion

The goal of this study was to examine the project orientation of the Hungarian enterprises. Project orientation (management by projects or project-based management of the organizations) represents how well a certain enterprise is committed towards project management and how typical it is of the organizations to carry out the task (problems) and

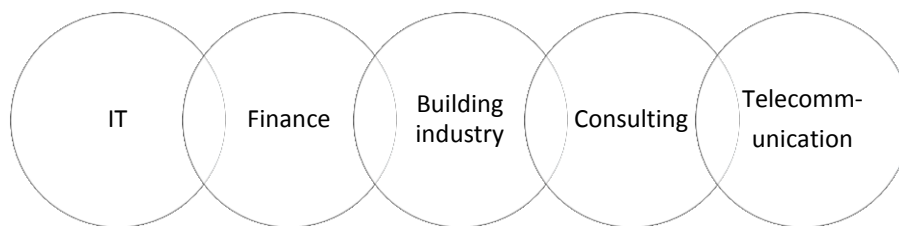


challenges mostly in the form of projects. Project orientation also indicates the level of project intensity.

Project orientation = susceptibility and commitment towards project management
Project intensity = number of executed projects

The higher the project intensity of an organization is, the more projects it might carry out. Project orientation is reflected in the management recognising the potential of project management and trying to apply it to most of the organization's tasks. At the same time project orientation also means the organizational culture supporting the project, which will definitely be important for the successful implementation of the projects. Project orientation is such a conviction of the management that makes them believe in reaching much better results with the projects in cutting costs or in fulfilling the customer's expectations. Project orientation can just as well be such a commitment of the organization and the management towards the projects that they are even prepared to adjust the organizational structure to certain individual projects. This makes it clear how essential the projects are for the organizations, since the project will prove to be the primary work-sharing principle.

The change of project orientation almost goes hand in hand with the change of project intensity. The more important role project management will play in the life of an organization, the more likely it is that it will carry out more projects. Project intensity can be examined on the level of industries or corporations as well. The industrial analysis can give us the answer to the question which sectors execute the most projects. The high number of projects leads us to the conclusion that within these sectors we'll be able to find the enterprises where the project management approach – and thus the higher level of project orientation – is the most detectable.



Source: author's construction

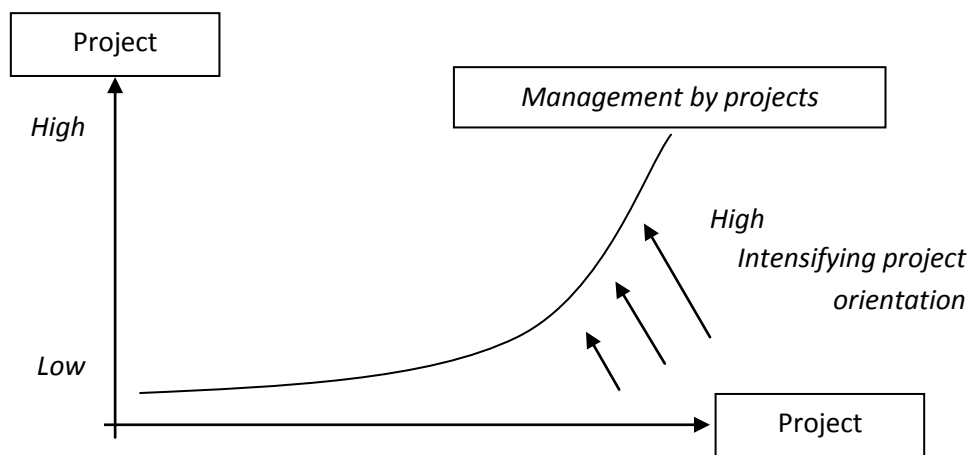
Fig. 1. Project intensive sectors in Hungary

On the other hand, project intensity is also about how the number of projects changed at the organization during the examined period of time. If the project intensity is higher, it means that more projects were initiated to solve a certain problem or task.

The project-based management of the organization (management by projects) is necessarily accompanied by the change of project intensity too. There is a linear relationship between the project orientation and project intensity of the organization. If the commitment



towards project management grows from the side of the organization or its leadership, they will find themselves interested in the execution of more and more projects. The organizations are much keener to implement projects or establish project teams for the certain resolvable tasks after they realise the benefits and usefulness of the management by project strategy. After experiencing the advantages and opportunities of project management, they will think in project terms in the future more often, which enhances the growth of the number of projects as well.



Source: author's construction

Fig. 2. The effect of project orientation on project intensity

Nevertheless, it does not mean that everything should be carried out under projects. The projects shall only be started if their implementation is justified²³. We don't have to involve always and everything in projects, but most of the times the organizations do not even solve the tasks under projects for which a project-based solution would actually be reasonable.

The research called "The bases for organizational competitiveness" was launched to investigate the factors that have an influence on the competitiveness of the business organizations. The research also tried to collect information regarding project management.

According to the PCT model of the ProSci Institute, 3-3 factors can be named among both the features and conditions of the project success. The project success is realised when the purpose of the project is finally aligned with the expected quality, so in other words when the goal of the project meets the expectations of the customer in an appropriate quality. On top of that, the success of a project also means that the project was able to be carried out within the deadline and the budget. And last but not least, the project success can be expressed by the expected development of the ROI (return on investment) index as well.

The success of a project can be interpreted through these three cumulative factors coming true, and basically that is the main goal of project management too. However, to be able to talk about successful projects, at every success-oriented organization special attention has to be paid to three sectors. These are graphically illustrated on the following diagram.

²³ Do not start a project if, for instance, the task is too easy or the necessary conditions and abilities are not available.

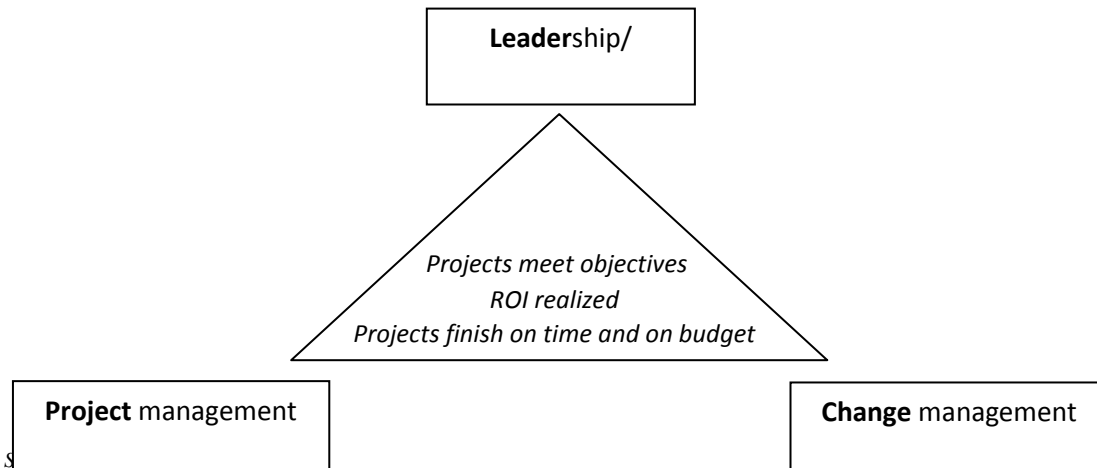


Fig. 3. ProSci PCT Model

The research called “The bases for organizational competitiveness” analysed these three sectors. During the research I wished to examine to what extent the conditions necessary to strengthen competitiveness are present at the Hungarian enterprises. Based on the PCT model, the questionnaires were principally aimed at the quality of leadership²⁴, change management and the existence of innovation and project managements.

The main pillar of the research was the questionnaire survey. I approached the enterprises on paper (in the form of a printed questionnaire) and asked for their participation in the research. I expressed the expectation that at least 1,000 enterprises should constitute the sample, which can serve as the basis of the statistical evaluations and the production of results. The questionnaire can be divided to two major parts. In the first part we can find the questions related to the characteristics of the enterprises. These questions help us determine the specific sizes and types of the enterprises participating in the research. In the second part the focus shifted to the operation of the organizations and to the examination of their management. At the time of writing the study the number of the filled and evaluable questionnaires was N=949. The characteristics of the sample are itemized below.

The questionnaire contained 20 questions, including closed questions, rating scales and open questions too. The latter were only asked occasionally in the survey. The respondents were able to describe chiefly on rating scales to what extent the certain preformulated statements were typical of them. I assessed the results cumulatively and reflected the occurrence of the most popular answers with basic statistical examinations. Prior to the start of my research I had set up several hypotheses, of which at this point the ones connected to project management will be introduced:

H₁: I make the assumption that project orientation is less typical of the Hungarian enterprises. Although the Hungarian companies also have to face numerous challenges and new (unique) tasks, innovation and the project approach helping its implementation only have limited presence. In most of the Hungarian enterprises the innovation performance and project

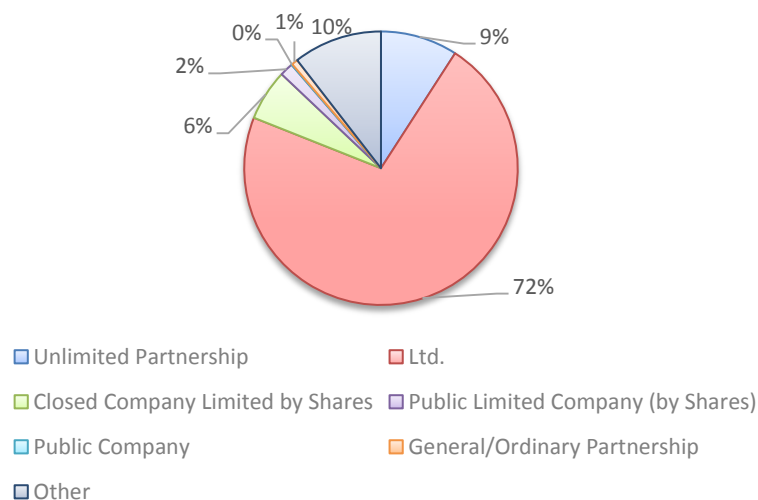
²⁴ Boss-onomics, quality of leadership



orientation cannot be characterized at a high level either. The majority of the Hungarian companies like the new challenges and tasks less.

H₂: Moreover, it can be assumed that most of the Hungarian enterprises are considered to be less competitive due to not only the lack of project or innovation approach, but also because of such factors as for example the lack of adequate strategic work. In this regard the companies do not know the requirements of the buyer/customer well enough, do not analyse their mistakes methodically and regularly, from which they could actually learn and develop, and to the larger part of the enterprises even risk management is a serious problem, since they do not possess enough and sufficiently grounded information to make decisions.

For the sake of demonstrating and analysing these hypotheses, I highlighted the questions that could provide assistance for proving the assumptions right or wrong. The questions that reveal more information about the features of the sample will be presented first. In connection with the characteristics of the enterprises participating in the survey, I started assessing the respondents on the basis of their legal form. Figure 4 makes it clear that nearly three-fourth of the companies participating in the survey operated as an Ltd, while at the same time it also introduces this legal form of business that can be deemed the most popular under the Hungarian circumstances²⁵. Limited partnerships and limited liability companies were engaged in the research at a much lower percentage.



Source: www.prosci.com

Fig. 4. Distribution of the examined enterprises by their legal form

The second analysis point was the number of employees. More than half of the companies participating in the survey have less than 10 employees. On the other hand, we can find quite a lot of enterprises in the sample that employ more than 50 people. This can be said about 182 enterprises. The research did not focus solely on the micro-enterprises, which will be demonstrated through not just the employment figures but through the sales revenues as well.

²⁵ In Hungary the majority of all the registered and operating companies operate as an Ltd.



Table 1

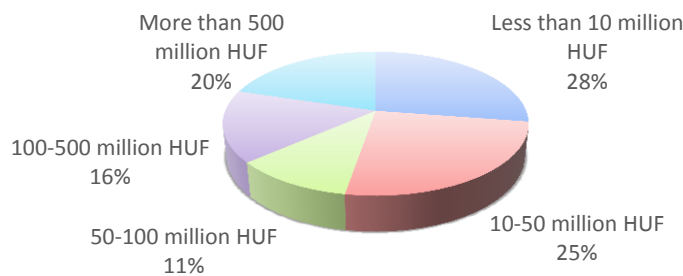
Distribution of the examined companies in the sample by the number of employees

Number of employees	Answers
1-9	501
10-49	217
50-249	101
more than 250	81
no employees	44

Source: author's construction based on own research

The majority of the enterprises taking part in the survey have no foreign markets (65.9%). The ones that do (34.1%)²⁶ are mainly concerned on the European markets. Only 80 enterprises have Asian, 62 have North American, 48 have South American, 39 have African and 17 have Australian market interests.

In addition to employment, the sales revenue can also tell us a lot about the size of the enterprises entered into the research. It can be seen on Figure 5 that 20% of the sample has annual sales revenues higher than 500 million forints. Considering that according to the EU regulations the annual sales revenue of a micro-enterprise is maximum 2 million euros (about 600 million forints), more than three-fourth of the sample would be categorized as a micro-enterprise, if we determined the size of the organizations participating in the research only by their sales revenues. However, the size of a company is not solely defined by that.



Source: author's construction based on own research

Fig. 5. Distribution of the companies participating in the research by their sales revenue

Based on the number of employees and the sales revenues it can be stated that the SMEs are in the majority within the sample, but there is no sharp movement towards the micro-enterprises. This is mainly confirmed by the number of employees. In my opinion the turnover of 2 million euros (600 million forints) is a considerably high limit for the micro-enterprises, since that would be a significant sales revenue even for a small or a medium-sized enterprise, let alone for a family firm. Although the micro companies seem to dominate the sample on the basis of their sales revenue, with knowledge of the Hungarian circumstances and opportunities,

²⁶ 321 respondents



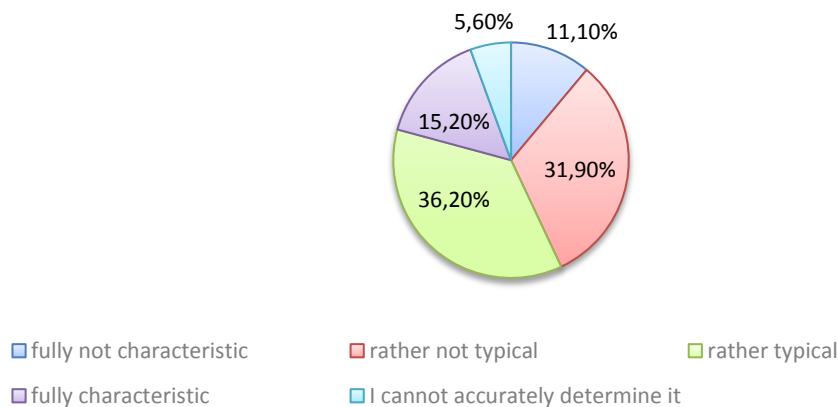
and due to the high limit and the number of employees, it can be established that this majority is not as straightforward after all. Several small and medium-sized enterprises don't reach the 2 million euros' limit in Hungary, and for the micro-enterprises this type of annual sales revenue is basically unachievable.

A much clearer distribution can be found when examining the enterprises by the scope of their activities. Half of the responding companies (346 companies) operate in the trade sector. They are followed by the companies doing construction and transportation/storage activities with the second highest distribution level. Information technology, industry and business consultancy are on the third place (with about 100-100 responses). Enterprises from the other sectors participated in the sample in a smaller proportion. The lowest response rate came from enterprises that are engaged in social work activities.

The companies participating in the research can be grouped by their place of business too. Most of the enterprises carry out business activities in Budapest (634 respondents). Central Hungary is second behind them (400 responses), while the enterprises from the rest of the country's regions are represented in the sample roughly evenly with regard to their place of operations (about 150-200 answers from the rest of the regions). The research wished to collect information from every single region of the country, and we have managed to reach this objective.

Results - project orientation and project intensity at the Hungarian enterprises

The most obvious way of examining project intensity is to ask the enterprises to what extent the companies' innovation potential and the number of their projects grow.



Source: author's construction based on own research

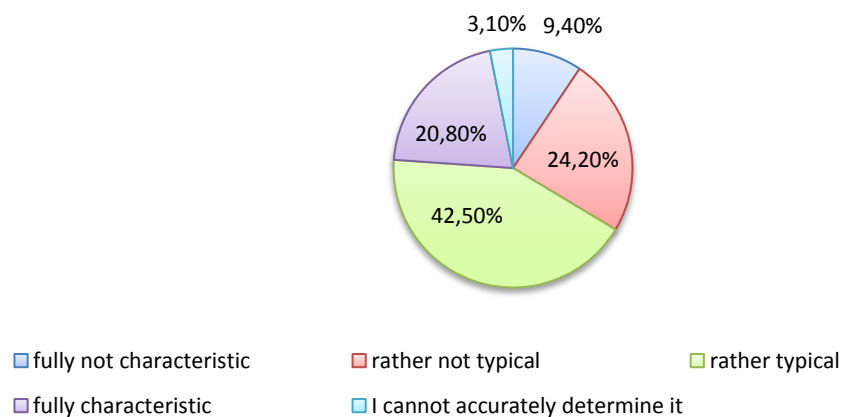
Fig. 6. Is it typical that the innovation performance of the companies grows?

Eric Verzuh wrote in his book 'Project management' that the enterprises have to continuously renew their products and services for the sake of survival or achieving business success. This can be carried out through a constant innovation activity, which can be managed much more successfully and effectively under projects (Verzuh, 2006). The companies must react to the environmental changes with innovation, which would foresee the implementation of even more projects. Given that there are larger and smaller changes in every company's life, we



could presume that at the companies the number of projects increases proportionately too. In reality this is hardly the case.

One of the questions of the questionnaire asked the respondents to assess on a scale from 1 to 4 how typical the growth of innovation performance was at their company. One meant that the improvement of innovation performance was *not typical at all*, while four represented the rating *fully characteristic*. In every case the rating scale was supplemented by a fifth choice, which was the option of choosing the answer *I cannot accurately determine it*. Figure 6 (above) illustrates it perfectly how the 949 enterprises think about the changes of their own innovation performance. The responses reveal that only 15% of the companies considered their innovation performance to be significantly higher, whereas half of the respondents thought it was rather not typical of them (or not at all). This gives us a clear picture of the innovation efforts of the enterprises participating in the survey, since only few of them marked the answer according to which the enhancement of the innovation efforts is unambiguous. It is also well-demonstrated within the project intensity of the approached companies. More innovation would require more projects, but even this is only completely characteristic of 20.8% of the enterprises.



Source: author's construction based on own research

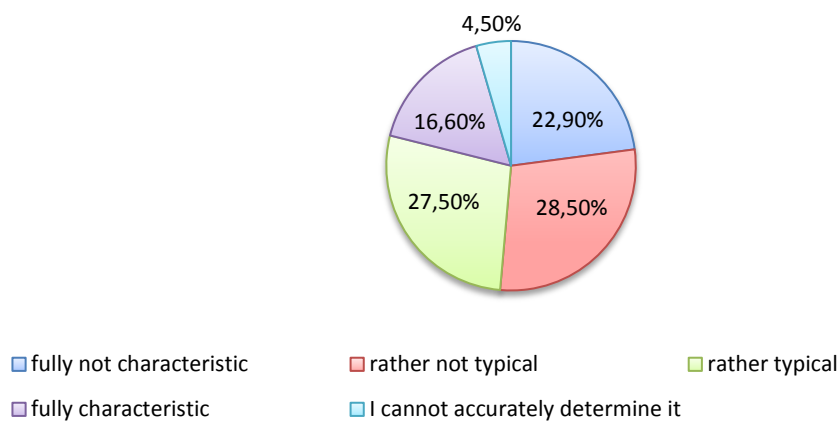
Fig. 7. Is it typical that the project intensity of the companies grows?

Although the approached enterprises did not present an overly positive opinion regarding their innovation performance or the growth of their project intensity, I have experienced a much greater consensus in the context of customer or client orientation. The majority of the companies claimed that the increase of buyer/customer orientation was completely typical of them (57.7%). This could be exploited incredibly well for the innovations or the projects, because both are addressed to someone, both have their own “targets”, hence the buyer or customer will require priority treatment always and in any circumstances. Based on the research, in this direction the companies do make the efforts needed, meaning that they endeavour to get closer to the buyers/customers and to get to know their needs and expectations better. According to 33.7% of the approached companies this is more characteristic of their operation, while we could barely find a respondent who said it was rather not typical or not at all. The results are probably not surprising, as everybody originates its income from the buyers,



so an organization that does not give priority to buyer or customer orientation will basically work against its own profit.

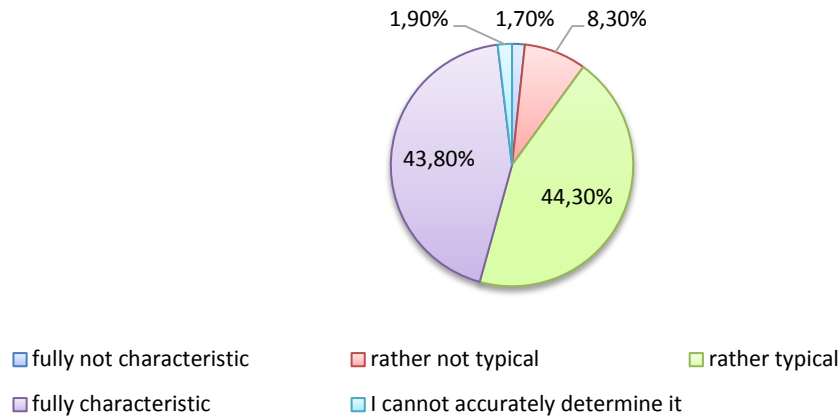
Figure 7 has already illustrated it well that only a small proportion of the approached companies can be characterized completely by the growth of project intensity. Naturally, a critical note could say why a company should increase the number of initiated projects by all means when it carries out many projects anyway. This is why it was important to ask the enterprises how typical it was to create a project team to solve the emerging individual problems. Only less than one-fifth of the respondents chose the answer *fully characteristic*. However, more than half of the sample responded in a way that suggests that they rather do not (or definitely don't) set up a project team for the individual problems. In my opinion this can be associated with the fact too that 501 enterprises out of 949 have less than 10 employees, and therefore in these companies it would not really be feasible to set up separate project teams.



Source: author's construction based on own research

Fig. 8. How typical is it of the enterprise to set up a project team in order to solve the certain problems?

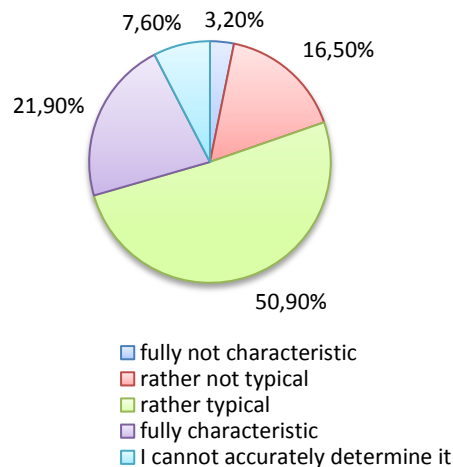
It would be imperative for the implementation of projects or innovations that the enterprises had all the conditions that can be necessary to achieve the goals. From that perspective the approached companies performed well, since nearly 80% of the companies participating in the sample considered that they could completely or typically provide the necessary work conditions. This could also serve as a great basis for the companies to carry out more innovation or more projects (Figure 9).



Source: author's construction based on own research

Fig. 9. How typical is it of the enterprise that every necessary work condition is in place to complete the tasks?

Only one-fifth of the approached companies became definitely more efficient regarding the management of risks. 50% of the respondents answered that it was rather typical. At the majority of the enterprises taking part in the survey the risk management had improved somewhat, but only one-fifth of the companies could confirm a clear progress.



Source: author's construction based on own research

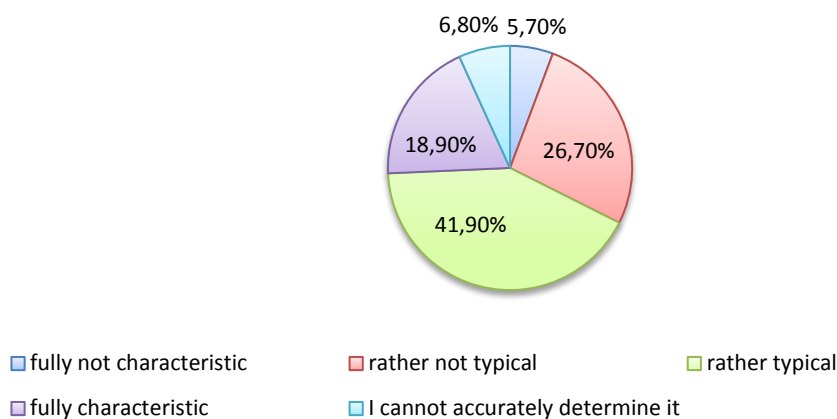
Fig. 10. How typical is it of the company to recognise and manage risks more and more efficiently?

Although Figure 10 proves that the risk management practices of the companies show a mostly improving trend, only one-fifth of the enterprises could definitely acknowledge this. The risk is the entrepreneurial activity, one of the constraints of the projects, which we have to pay



more attention to in any event in order to reach our goals. The risks can cause problems in the case of regular entrepreneurial activities as well, and not just in relation to project management. A more effective project management would be needed not just for the sake of project success, but the business organizations should demonstrate a continuous and spectacular improvement on this field in general. Only slightly more than 20% of the companies in the sample were able to show this kind of progress.

Projects are normally initiated when the enterprises face new tasks, challenges and problems that cannot be managed successfully enough with the formerly used solutions anymore. The fact how much an enterprise likes the new tasks and challenges tells a lot about the extent of its project orientation. The following diagram makes it clear that it is fully characteristic of less than one-fifth of the enterprises participating in the survey that they increasingly prefer the new tasks. If a company does not like new things that much, then it is not a surprise that the high level of project initiatives cannot be expected from this company either. Project orientation basically assumes the existence of a business culture, in which the enterprises are not reluctant to embrace new challenges.



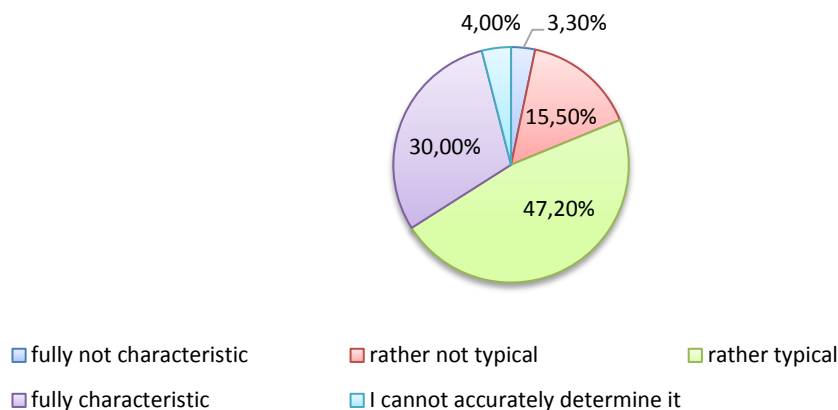
Source: author's construction based on own research

Fig. 11. How typical is it of the company to like the new tasks and challenges better and better?

During the management of projects one of the biggest benefits derives from the fact that the enterprise can improve its project management practices on its own as a result of the constant feedbacks and control. However, in order to do so, it will have to go through a special learning and self-evolving process. We are only able to develop our methods, if during the implementation of a project we systematically explore and document our mistakes, and from these mistakes we make an assessment and draft improvement proposals at the end of the project. The first step for this is to realize where we went wrong and to find the faults' actual place of occurrence. We can learn from our own mistakes the most, because it enables us to figure out what the best practice is that will bring us closer to achieve the project goal. It is absolutely typical of 30% of the companies taking part in the survey to analyse their mistakes



on a regular basis. From this aspect the enterprises would need a significantly bigger improvement, since the analysis of mistakes could be important not only in the case of executing projects or initiating new projects, but also by the so-called regular entrepreneurial activities too (for example production or logistics).



Source: author's construction based on own research

Fig. 12. How typical is it of the company to continuously analyse its mistakes?

Conclusions

Table 2 undertakes the summarization of the above results. The questionnaire included such questions, from which the development of project orientation of the companies participating in the survey may be inferred. Based on the received answers we can say that it was rather the enterprises' strategic point of view that made a progress, and not their commitment towards project management. The H₁ hypothesis – that assumed the project orientation of the Hungarian companies to be not at a high level – has proven to be true. Table 2 emphasizes the percentage of the enterprises engaged in the survey selecting the option 'fully characteristic' with regard to the statements linked to the individual projects. Only 20% of the companies reported that their project orientation clearly grows, meaning that they fulfill more and more tasks through projects. A lot fewer companies confirmed the improvement of their innovation performance. Less than one-fifth of them are truly fond of new opportunities and new challenges. Slightly more than 15% of the approached companies set up project teams to solve specific tasks or problems. This indicates that the project management approach is only typical of a limited number of the enterprises, and the PBA (project based organization) approach is rather not characteristic of the majority of them. Considering the sizes of the enterprises this is probably not a surprising result, but on the other hand project management could have a positive impact on the smaller companies as well, provided it is used appropriately.



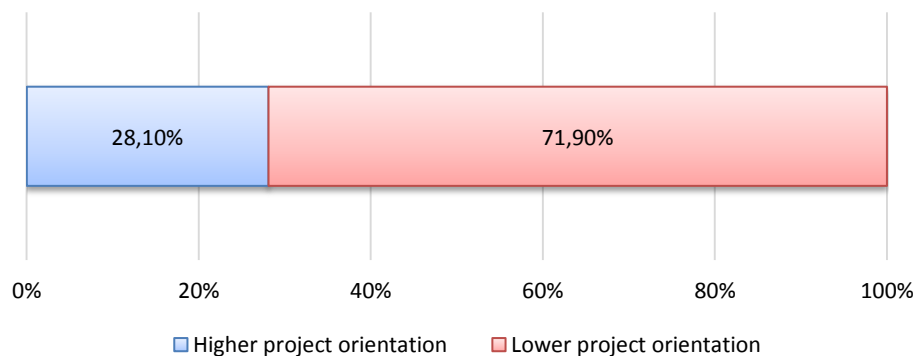
Table 2

Summary of the project orientation of the examined enterprises

The innovation performance grows	Fully characteristic	15,2%
The project intensity grows	Fully characteristic	20,8%
The buyer/customer orientation grows	Fully characteristic	57,7%
Project teams are set up for an increasing number of problems	Fully characteristic	16,6%
Every work condition is in place	Fully characteristic	43,8%
Risk management is more and more effective	Fully characteristic	21,9%
The company prefers the new tasks and challenges	Fully characteristic	18,9%
The company continuously analysis its mistakes	Fully characteristic	30,0%
AVERAGE RATING	Fully characteristic	28,1%

Source: author's construction based on own research

According to the H2 hypothesis the companies do not have an adequate strategic point of view, and therefore they interpret the customer requirements incorrectly (low customer orientation), they do not analyse the faults regularly and their risk management cannot be deemed competent enough either. This hypothesis has not been confirmed. Most of the companies are getting better and better at improving their customer orientation and their regular fault analysis, and even their risk management has become somewhat more effective. To these questions the companies reported progress most of the times. However, the result would have been really spectacular if the majority of the participating companies had marked the rating 'fully characteristic', but that was not the case.



Source: author's construction based on own research

Fig. 13. Level of project orientation at the examined enterprises

In general it can be concluded that the project orientation of most of the companies has not developed, although the strategic point of view shows some progress. Table 2 highlighted the questions that can be related to the project management approach of the companies. Had there been truly more project oriented organizations in Hungary then a lot more enterprises would have given 'fully characteristic' answers to the above statements. Taking a simple statistic average it can be asserted that on the basis of the preset question only about one-fourth



of the companies achieved a notable level of development on this field (Figure 13), which can definitely be considered to be an unfavourable result. It is true even if smaller organizations constitute the majority of the sample, because project management would be an applicable and feasible option for them too. The more widespread use of the project approach should be enhanced for the SMEs, since it can improve the efficiency, productivity and competitiveness of the companies, regardless of their size.

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WOMEN IN THE PROJECT MANAGEMENT

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SUPPORTED THROUGH THE NEW NATIONAL EXCELLENCE PROGRAM OF THE MINISTRY OF HUMAN CAPACITIES

Abstract

Project management is very important element of successful companies in the 21th century. We can find different types and methods if we talk about the managing projects by firms. Nowadays managers and many professionals try to define the best solution to manage our projects succesful but it is not always too easy. There are significant differences between the management of the companies because the female leadership is often different than the leadership style of men. The succesful project and efficient project management depend on the quality of leadership, the characters of project manager and the interaction of project manager and his/her team. This study tries to answer one of the most important questions in the context of leading projects. Who is a most suitable person for this position (project manager) and how to characterize the best project manager? Are the women or men leaders better by managing projects? Is there any significant relationship between the management by projects philosophy and the gender roles? In order to prove this the project practices of the companies, the quality of their leadership and the commitment of the employees to participate in the projects have all been analysed based on a questionnaire research in Hungary.

Key words: *project management, leadership, questionnaire research*

JEL code: L2, M2

Introduction

The inequalities determined the daily life of people already at the dawn of civilization. As time went on, inequalities between people appeared in various forms, since it would have been hard to put the pharaos and the slaves working on the fields, the Roman emperors and the citizens of the empire, or the monarchs and regulary people on equal terms. These were not the only forms of differences, as history provided a great diversity of examples of their presence. Imagine how equal the conquerors and the conquered, the black and white people, or the intellectuals and the workers were, or how the developed and undeveloped countries, the rich and the poor, the locals and the migrants, and last but not least the men and the women can be viewed in the same manner.

There is a constant fight against inequalities. Basically our history and development have been defined by it, and what's more, according to certain experts – like Yuval Noah Harari – the inequalities have even induced development and shaped our history (Harari, 2012). Just think about all the events that occured against the repression, for the sake of acquiring basic human rights or in the hope of a better life, etc. Series of revolutions, wars and new laws indicated that people were fighting to end the inequalities, but on the other hand there were several events that actually enhanced them, like for instance slavery, conquests, colonialism or globalization. The same double standard can be detected these days too, because while people of the modern era try to eliminate the inequalities, numerous economic and cultural factors are still maintaining these differences.



Are we really equal, or are we only able to talk about this in a restricted sense? In fact, what is equality and can it be well-defined? The subject of this study is not the definition of inequality, and it does not deal with the reasons of its development either. Inequalities take several forms today as well, and they are apparent economically, culturally and socially too. The present study is looking for the answers to whether these differences can also be discovered in the field of project management, whether there is a distinctness between male and female project leaders, and how the participation of women in projects have changed in the past decades. In order to answer these questions, many research materials have been viewed over that can prove the two essential hypotheses of the study right or wrong.

H₁: We made the assumption that practically there is no difference between male and female project leaders. The successfulness of a project is not determined solely by whether a man or a woman is responsible for the project management. Women can be just as good project leaders as men. The project success is not subject to the gender of the project leader, but much rather depends on the leader's abilities, expertise and people-centred approach.

H₂: It can be assumed that men still have a dominant role in project management, although in the last decade many efforts have been made to reduce the inequalities between men and women. There is hardly any industry – or none at all – in which the management of the projects is carried out mostly by women. It can be stated that project management is still a masculine profession.

For the sake of examining these hypotheses, the results of secondary researches dealing with the situation of women or with their role in project management have been reviewed and summed up. In our hope these results will be able to conclude and highlight the accuracy of the above hypotheses. The subject seems to be of a particular relevance because project management and the implementation of successful projects might serve as a serious source of competitiveness for the companies.

Research results and discussion

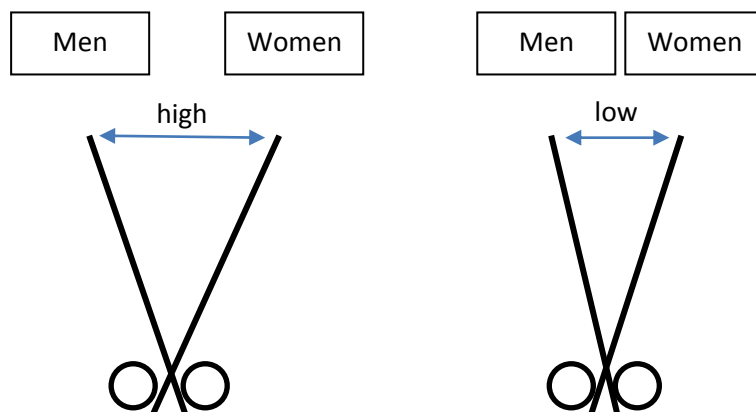
One of the most straightforward manifestations of the inequalities can indeed be detected in the differences between men and women. Albeit we might think that in the 21st century there is no substantial disparity between men and women, but the truth is that it can be at present in numerous countries markedly.

Women constitute half of the population, yet gender equality still doesn't apply in reality in many aspects. We can't talk about substantive equality on the labour market either. The position of women in the workplace hierarchy can be described as the lower the level of the occupation is, the more women we find in jobs with lower salaries and lower prestige (this is known as occupational segregation), while the incredibly low percentage of the female executives suggests vertical segregation within the organization (pályázat.gov.hu, 2009).

The World Economic Forum also draws the attention to gender inequality. In its annual publication it ranks the countries on the basis of how successful they can be considered in reducing inequalities between genders. The publication of the WEF – Global Gender Map Report – points up unfortunate facts. Among the examined 144 countries there are several



where even the interpretation of gender inequality is very problematic, since they don't grant basic rights to women with regard to for example political activities or social commitments. In 2016 the Global Gender Map Index set up a ranking of the examined countries through the assessment of four subindexes²⁷. The WEF mentions that there are only five countries on the list that have managed to create the tiniest difference between men and women. According to the WEF's report, gender inequality resembles to a pair of scissors. The wider it opens, the bigger the gap is between men and women.



Source: author's construction

Fig. 1. Inequality scissors between men and women

When the scissors close completely, there is a perfect equality between the genders. In its report the WEF ranks the countries based on ratings from 0 to 1, where one stands for perfect equality (100%) and zero shows inequality. The international organization emphasizes that only five countries were able to provide equality between men and women in a rate higher than 80%, therefore in their case the scissors of equality opens the least. It is quite interesting that many European countries are situated in the middle of the list, which certainly does not indicate that men and women receive equal treatments in these states. It is clearly demonstrated on the following table.

²⁷ Economic Participation and Opportunity Subindex, Educational Attainment Subindex, Health and Survival Subindex, Political Empowerment Subindex



Table 1

Ranking of certain countries in 2016 according to the Global Gender Map Index

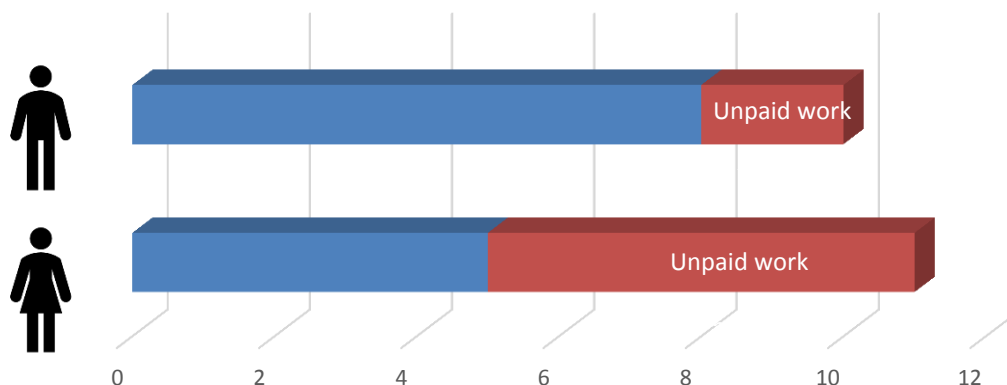
Rank	Economy	Score
1.	Iceland	0,874
2.	Finland	0,845
3.	Norway	0,842
4.	Sweden	0,815
5.	Rwanda	0,800
13.	Germany	0,766
18.	Latvia	0,755
20.	Great-Britain	0,752
45.	USA	0,722
101.	Hungary	0,669

*Source: author's construction based on WEF Global Gender Map Report
Number of examined countries in the list: 144*

It can be noted about the countries of the European Union that there are differences between the constituent states of the integration regarding not just competitiveness or incomes, but in connection with gender disparities as well. We can see from the numbers of the table that Germany and Great Britain are much higher on the list than the also EU-member Hungary. From the aspect of the future development of the EU, the member states must endeavour to convergency in an economic, social or cultural viewpoint too, hence a great deal of measures would be needed to lessen gender inequality.

The WEF report detects gender inequality not just in relation to the countries. The best proof of this is the statement of the international organization, claiming that women work significantly longer hours during their workday, yet they don't receive the same remuneration for the same work as men (Figure 2.). It is a lot harder for women to get promoted, as the higher we look on the employment hierarchy the fewer women we find in decision-making positions.

Nancy Adler said that women would be just as qualified to be executives of international companies as men. Adler's researches also confirmed that it is a mistaken belief that women do not want to work in international positions. On the contrary. According to Adler, 2/3 of the women with MBA degrees would love to take jobs in another country. It is, however, a completely different story what opportunities can develop for a woman to hold an executive position as the leader of an international organization even. Experience has shown that the majority of these positions are rather filled with men (Adler-Izraeli, 1996).



Source: author's construction based on WEF Global Gender Map Report

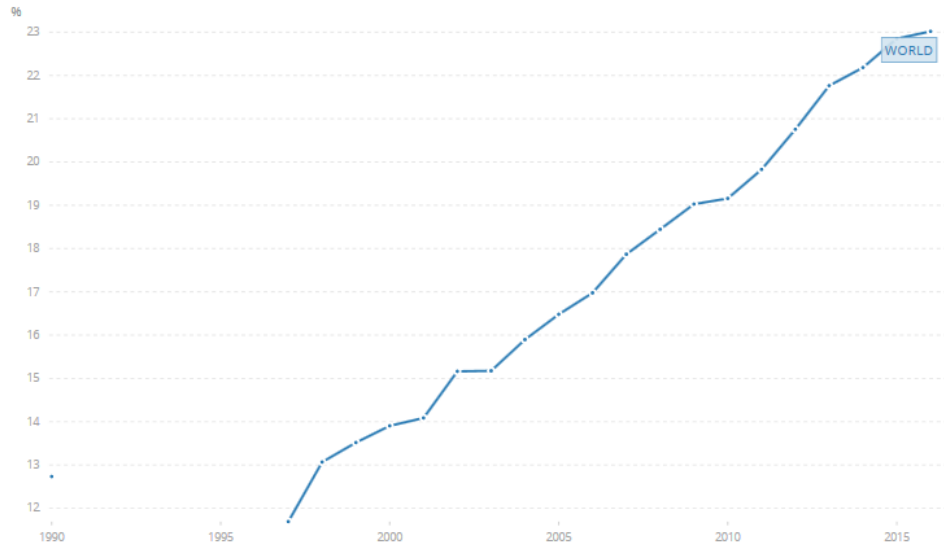
Fig. 2. Working day for men and women

We can make a similar point about political participation as well. Based on the database of the World Bank, after the middle of the 90s there has been a tendency towards the enhanced participation of women in political decision making. Nevertheless, not every country contributed to this development equally. In certain countries exponentially more women are holding political positions than ten years ago, but there are countries where the role of women in politics has not changed considerably.

Table 1 illustrates the spots of a few chosen states from the ranking made on the basis of the World Economic Forum Global Gender Map Index. The research analysing 144 countries disclosed that equality can be deemed the highest in Iceland. As reported by the World Bank, in that country women account for nearly 50% of the political decision makers this year. There is also a close correlation between gender equality and participation in politics in the case of countries like for instance Rwanda and Hungary too. In a big surprise, Rwanda occupies the illustrious fifth position according to the Global Gender Map Report. The World Bank puts Rwanda among the countries where the role of women in politics has improved the most. This is readily illustrated on Figure 4, which marks Rwanda with green. The graph shows that in that country the proportion of women in the national Parliament is higher than 60%. Hungary, on the other hand, that is also a member of the European Union, is only 101st in the Global Gender Map Report in the opinion of the World Economic Forum, and as Figure 4 demonstrates, the political participation of women is by far the lowest as well among the examined countries. Obviously gender inequality is not solely determined by the political participation, but the connection is clearly detectable.

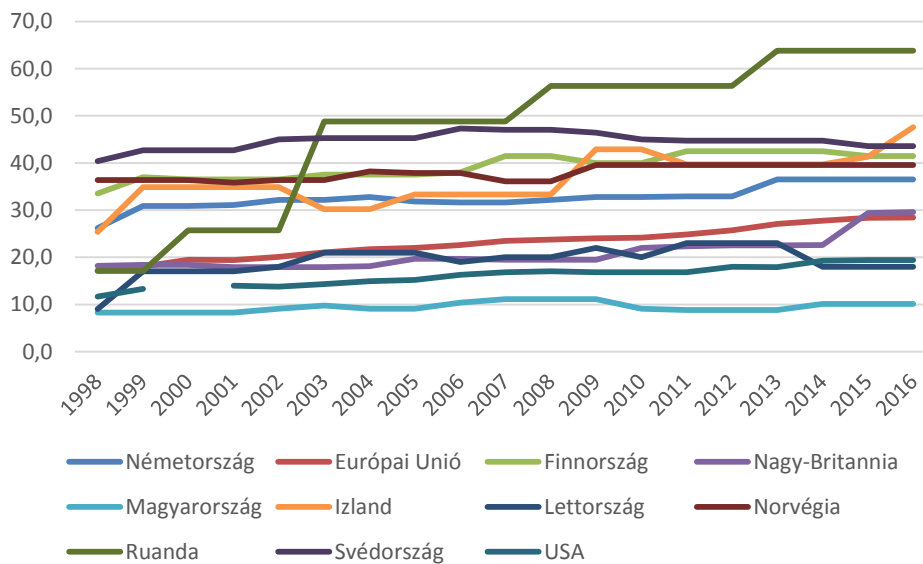
On top of the study of the World Economic Forum²⁸, the inequalities between men and women could be explained by other researches and results as well, but it is not the goal of this study to give further proofs to confirm these disparities.

²⁸ <http://reports.weforum.org/global-gender-gap-report-2016/>



Source: The WorldBank Group database

Fig. 3. Proportion of seats held by women in national parliaments (%) (all over the world, 1996-2016)

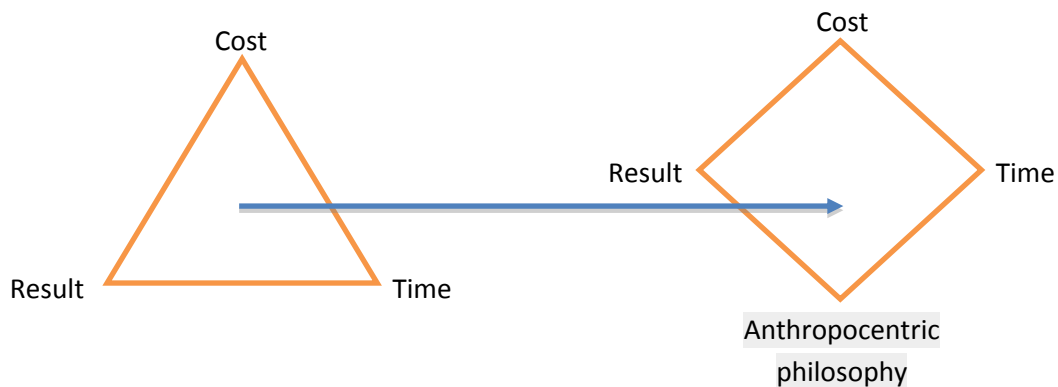


Source: The WorldBank Group database

Fig. 4. Proportion of seats held by women in national parliaments (%) (country comparison, 1998-2016)



The question is whether gender inequality is present in the field of project management too, and whether women are better or worse project leaders than men. This is why the below international research results have been reviewed and summarized. In the traditional approach project success means that the execution of certain projects is achieved by the simultaneous fulfillment of the cost-time-result (quality) requirements. These three factors are sometimes referred to as the criteria or golden triangle of a successful project. Today, however, it can be stated that in addition to the above three conditions, being people-oriented is just as important condition of success, since most of the problems might actually occur during the implementation of the project and most of the times they are based on human factors. The modern way of thinking gives way to the supplementation of the golden triangle of success by a fourth dimension, which could not be else than people-orientation.



Source: author's construction

Fig. 5. Project gold triangle versus Project gold quadrangle

A project management survey from 2016 reveals how crucial it is for the success of the project to be people-oriented. The survey conducted by Ernst and Young in Hungary²⁹ names all the factors that can be blamed for the failure of a project in the first place at the examined companies. According to EY the following factors result in the failure of a project:

Table 2

Factors determining the unsuccessfulness of the projects
Change in the project extent („scope“)
Underestimating the costs/deadlines and too optimistic planning
<i>Insufficient support from the senior management</i>
Misunderstanding about the end product of the project
<i>Change in the circumstances</i>
<i>Insufficient resources/resource-coordination</i>
<i>Personal resistance, non-acceptance of changes</i>

Source: author's construction based on Ernst and Young Report 2006

²⁹ <http://www.pmi.hu/index.php/publikaciok/felmeresek/89-pm-felmeres-ernst-young>
Varga János, Csiszárík-Kocsir Ágnes



In the above table the factors that should be solved or dealt with by the project managers are in italics. The rest of the factors are considered to be caused by unsatisfactory project planning. It becomes clear that among the factors causing unsuccessfulness there are quite a few that can be put down to inadequate project management or inadequate project environment. A good project manager is incredibly important to achieve success, as it is mentioned by the EY research as well. In its summarizing study the organization highlights the project leadership skills and points out that most of the companies hire full time project managers to lead the projects. The majority of the respondents said that most of the times the project managers have relevant knowledge and experience regarding the subject of the project, but a lot fewer of them think that they possess sufficient project management abilities and experience (EY, 2006).

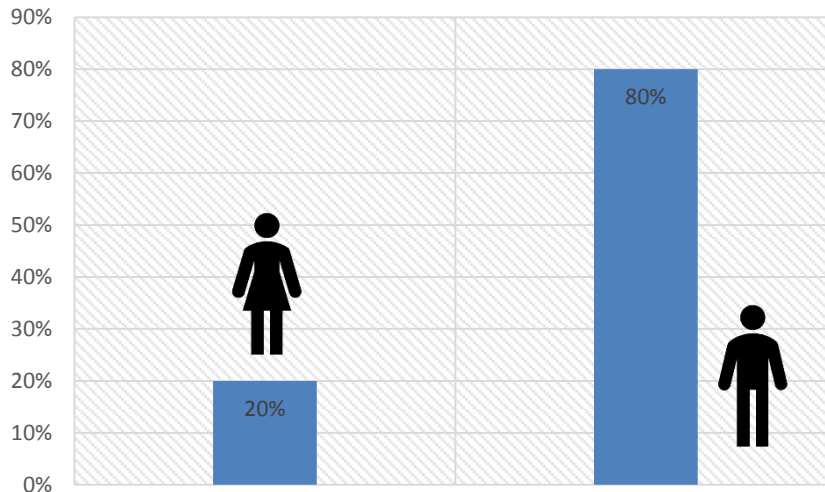
All in all, the success of the projects highly depends on the supporting corporate culture and on the identity of the project leader too. The project team that carries the project out could face various problems and changes during the implementation process. Managing changes, maintaining motivation, handling conflicts, keeping the deadlines and other similar tasks make the right project manager stand out. A good project manager can do a lot in order to keep the workteam together, make the relationship and activity harmonious of the ones involved in the project, motivate the workers with his/her personal energy and manage the processes of the project through a people-oriented approach in a way that can truly stimulate the relevant people to perform better. Project work is always about the cooperation of individuals, and enhancing the effective cooperation proves to be just as significant success factor as the previously mentioned fulfillment of the cost-time-result requirements. The success of the project demands the effective cooperation of the people involved in the project, and who the project leader is can tremendously contribute to this. The only remaining question is whether male or female project managers are able to keep the team together better and whether the gender of the project leader makes any difference with regard to the efficiency of the project team.

Although the significance of project management has greatly increased after the 1990s in the world, in Hungary such comprehensive researches that would analyse the role of women in project management still have not been conducted. There were smaller initiatives to examine the project management practices of the organizations, like for example by the Hungarian Project Management Association³⁰, but notable results have not been published about women taking positions in project management.

The international organizations are paying a lot more attention to gender inequalities in project management as well. According to the studies of the Project Management Institute (PMI) there is significantly higher percentage of men than women in the projects, although the international organization did note that this ratio is different in each country. This is strongly related to the country-specific³¹ cultural features too, since for instance in the Arab countries the participation of women in project management is much lower than in the Western-European states. The results of the PMI (2015) well reflect that on an average basis the 20/80 rule applies here as well, which means that – on average – women are four times underrepresented in the projects than men.

³⁰ PMSZ

³¹ the number of examined countries was 36, the number of approached project managers was 26.000



Source: author's construction based on PMI 2015

Fig. 6. Participation of men/women in project management (%)

In 2014 the Institute of Project Management in Ireland published research results in which it checked the proportion of men and women attending project management courses. The analysis showed that 41% of the participants in courses were women and 59% of them were men, therefore men were still in the majority, but the percentages had begun to get closer together (Ryan, 2014).

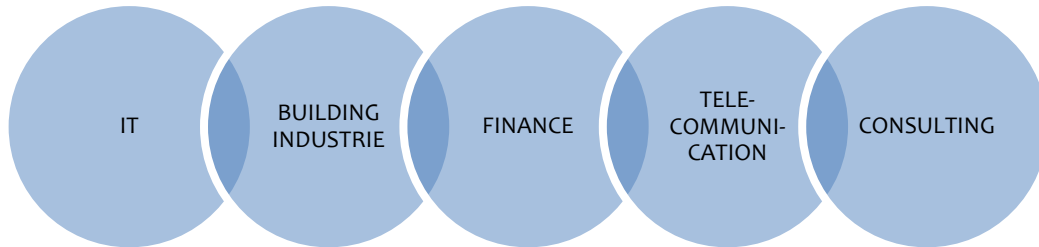
On the other hand, the research results claim that in the past decade there have been more and more industries where the number of female project managers has grown³². Among these, communications, information technology, construction, consultancy and financial services can be underlined. The above cited research of Ernst and Young from 2006 already came to the conclusion that in Hungary these industries were the ones with the highest project intensity³³. The majority of the organizations operating within these sectors carry out at least ten projects per year, and one project manager has to lead and manage up to 3-5 projects at the same time (EY, 2006). Former studies³⁴ confirm that women are usually able to concentrate on several things simultaneously³⁵, whereas men can typically focus on only one thing at a time. If we only considered this factor then we could declare that women would be better project leaders, because they are able to keep an eye on multiple project tasks with higher efficiency. However, this alone is not enough to deem them better project managers.

³² research of the Association of Project Management (APM)

³³ project intensity: number of projects carried out during a given period of time. The more projects are carried out in an industry or by a company, the higher the project intensity is considered to be

³⁴ According to American studies the reason for this is that between their two cerebral hemispheres there are a lot more sensitive nerve fibre connections.

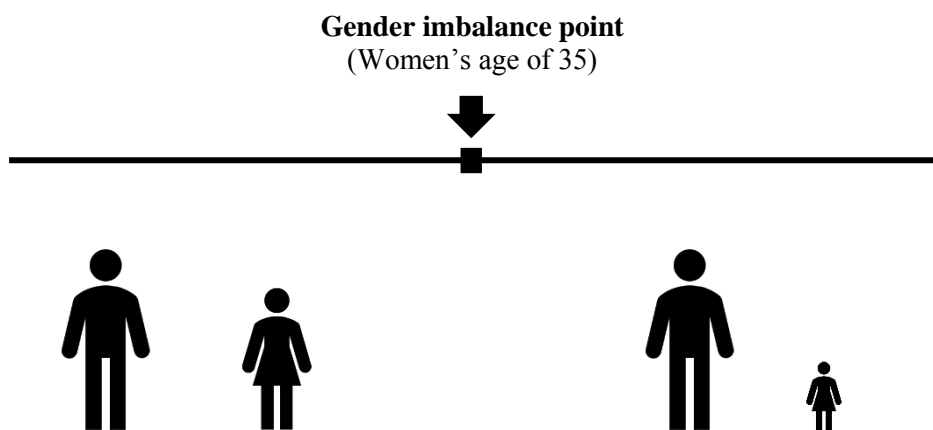
³⁵ multitasking



Source: author's construction based on Ernst and Young Report 2006

Fig. 7. Industries with high project intensity and high percentage of female project managers

The Project Management Institute has made numerous researches in the past years that tried to disclose the success factors of the projects. Based on its study from 2009, the increase in the rate of female project managers could be detected in the very sectors mentioned above. In addition, it needs to be emphasized that according to the researches there is a sharp cut-off line regarding the age, since above the age of 35 women appear in project manager positions in a much lesser extent than under the age of 35. It can even be considered as a gender imbalance point because from this age the gap between the percentages of male and female project managers starts to become wider, clearly in the favour of men. The researches investigating the place and role of women in the society – including the PMI – agree that the most important reason for this can be found in their willingness to have a child. After the age of 35 the tasks related to starting a family and raising children strongly determine the role of women in project management (PMI, 2009).



Source: author's construction

Fig. 8. Rate of female project managers above the age of 35 (infographic)

The difference between male and female project leaders is not only present in the context of their participation rate. As we could see earlier through the study of WEF, on average men



have a higher salary than women, and it is the same in the case of the income of project managers too. An English research of the Association for Project Management (APM) in 2015 pointed out that female project managers earn an average 30% less than the male ones. However, there is no clear evidence or correlation that would blame women for most of the project failures. The unsuccessful projects can be connected to roughly the same percentage of male and female project managers, hence it cannot be stated categorically that men are better leaders (APM, 2015).

The way has significantly opened to female project managers in the past decade, but we are still far from being able to say that the proportion of genders in this profession is equal. The previously mentioned 2009 study of the Project Management Institute serves as evidence of this. During that research some strategically important industries were analysed, that were also meaningful with regard to project intensity as well. Although we can find a growing number of female project leaders in these sectors, the percentage of women stayed below 50% in all the cases. It needs to be highlighted that in the fields of information technology, communication and consultancy the rate of female project managers were about 30%, and the highest percentage was detectable in the sector of financial services, but it was still under 50% even there (PMI, 2009).

Opinions differ, concerning whether men or women are the better project leaders. The famous culture dimensions of Geert Hofstede essentially define the features that might characterize the life of a certain society or community. Of these dimensions the so-called masculine and feminine features can be underlined, as they are partially related to the roles of men and women in management. According to Hofstede, in a community that has masculine features financial success and social advancement are the determining values. Performance is paramount, the central element of which is measuring performance in money. Characteristics that can mainly be attributed to women are pushed into the background, such as tenderness, concern and other social factors. The researches of Hofstede noted that Hungary bears with excessively masculine features. This can be associated with the fact that the participation rate of women in leadership – including project management – is significantly lower. In turn, the feminine cultural features mean that cooperation and caring for each other evolve into being dominant in the culture. Performance is not solely defined by promotion or the size of profit. Feelings, attention and understanding each other come to be important. Conflicts are tried to be solved by compromises instead of by the exploitation of the power hierarchy. Tenderness, caring and paying attention can generally be identified with women, who have mastered these skills during the course of history through their family and raising children. If we consider the effectiveness of the project team and project success to be about the harmonious cooperation of the ones participating in the project, then the feminine cultural features become extremely appreciated in project management. It is critical for the project leader to constantly care for the team members, to look out for their behaviour, to be able to motivate them and to provide them with the help and support they need at a given point in time. The feminine values are just as significant in the context of project management, so project leaders can only be truly successful when they are able to integrate both cultural features at the same time. The following table shows whether the masculine or the feminine features are in majority among the examined countries. All this is worth to compare with the previous Gender Map Index values too. The higher the value is in column 3, the more specific the masculine cultural features are to the society.



Table 3

The Gender Map Index and the masculine/feminine (M/F) cultural features

Economy	Rank	M/F cultural features
Iceland	1.	10 (F)
Finland	2.	26 (F)
Norway	3.	8 (F)
Sweden	4.	5 (F)
Rwanda	5.	no data
Germany	13.	66 (moderate M)
Latvia	18.	9 (F)
Great-Britain	20.	66 (moderate M)
USA	45.	62 (moderate M)
Hungary	101.	88 (excessively M)

Source: author's construction based on Hofstede Center

The above table perfectly proves the statements of the WEF as well. Gender inequality is lower in the countries that have the highest rates on the WEF list, and Hofstede's researches confirm that the feminine features are indeed brought to the fore in these countries.

In conclusion, for the sake of the project success it is not enough to possess only one or the other cultural dimension. For the interpretation of the role of a leader both features become essential, therefore we have to endeavour to find the balance between the masculine and feminine characteristics. It is nevertheless clear that the latter puts forward the prosperity of the community, teamwork and people-orientation, thus it is imperative for the leadership of a project team that the project manager has both the masculine and feminine features.

Another study stated that there is no considerable difference between male and female project leaders. In 2002 Gerard Mulenberg – with the assistance of NASA project managers – analysed the question whether male or female project managers can be deemed better. He involved 8-8 male and female project managers in the research and examined them in terms of various dimensions, such as their age, education and personal characteristics. In the end he came to the conclusion that the distinction between them as project leaders is miniscule. In his opinion it's just a common myth that women are better in leading projects because they are socially more sensitive, they communicate better, they are team players and they have a strong capacity to promote their interests. Reality is that it cannot be decided without doubt if men or women are the better project leaders. For that reason it is not entirely logical either why men still have an excessively large proportion in project management. The management of projects could be trusted on women just as confidently, since the skills, knowledge and experience of the project leader are the more determining factors when appointing someone for the position of project manager (Mulenber, 2013).

The same statement can be found on the online portal of the 20|20 Business Insight too. The website, offering project management courses and advices, noted that gender does not define the successfulness of the projects. The successful project management requires a wide spectrum of adequate skills and abilities, which can be possessed by both men and women.



According to the Business Insight the reduction of gender inequalities needs to be started in the education system. Girls need to be encouraged in school already, they need to be led towards the profession and they need to be provided with help in familiarizing themselves with the fields of mathematics', project management and the necessary sciences (20|20 Business Insight, 2017).

Conclusions, proposals, recommendations

When writing the study we wished to examine two basic hypotheses. The first hypothesis claimed that there's no fundamental difference between male and female project leaders. The success of a project does not depend solely on whether it was a man or a woman responsible for the project management. Women can be just as good project leaders as men. The project success is not subject to the gender of the project leader, but it is much rather based on the leader's personal integrity, expertise and people-centered approach.

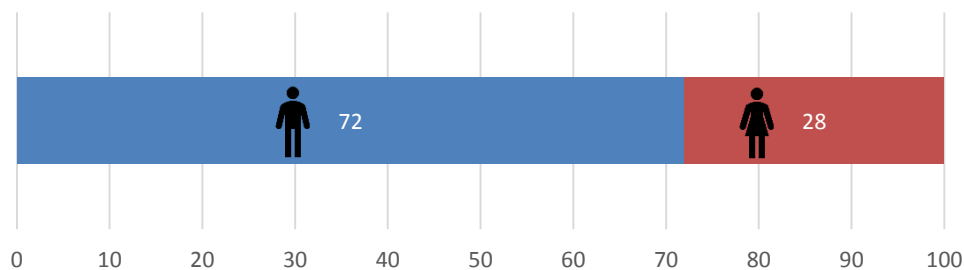
On the basis of the introduced results the first hypothesis has been proven to be true. Although there have not been too many researches in the recent years focusing on the role of men and women in project management, according to the results at hand women are not worse leaders than men at all. Albeit gender inequality is detectable in several countries, it has not been demonstrated anywhere yet that women are actually worse in project management than men. The 2015 survey of the APM stated that men and women are able to successfully manage projects to the same degree, and the gender of the project manager does not clearly determine the future success or failure of the project. Culture researcher Hofstede underlined that the performance of a work team can only be truly enhanced if in view of the cultural dimensions both the masculine and feminine characteristics can be identified. The latter are extremely important during team management, conflict management and motivation management, to name a few. On top of that, Muhlenberg's research showed that there is no significant difference between the male and female project leaders. In light of all this, we considered the H1 hypothesis to be accepted.

The second hypothesis said that although in the past decade several efforts have been made to reduce the distinction between men and women, in project management men still have a dominant role. There is hardly any industry – or none at all – where projects are managed by women in the majority of the cases. It can be stated that project management is still a masculine profession, and this has been undoubtedly confirmed by the introduced results. The WEF's Global Gender Map Index draws attention to gender inequality the best. However, gender inequality is detectable not only with regards to their place in society, but from the aspects of employment or income situation as well. According to the researches, female project managers are not paid as well either as their male counterparts, so the difference is present in the field of project management too. The 2015 work of the PMI revealed that on average there are four times as many male project leaders as women, though the percentages might differ in the certain countries and sectors. This proportion is highly influenced by how masculine or feminine the society is, and this is the reason why for example the cultural dimensions have been introduced (Geert Hofstede).

The international organization that analyses project management (PMI) also emphasized in another study that women undertake the leadership of projects in an increasingly lower rate typically after the age of 35. From that age there are more significant differences in favour of men. On the other hand, we have to mention that in the industries with high project intensity the share of female project managers has grown, but we cannot find a single sector where it exceeds



50%. Women do not manage projects in a greater proportion than man in any of the industries. As we could see in connection with the participation in politics, we can make the same general observation regarding project management: the role of female project leaders has become somewhat stronger, but we cannot talk about equality yet at all. In relation to the APM's research above from 2015, a survey needs to be noted as well, also conducted by the APM³⁶. In particular, The Salary and Market Trends questionnaire was filled by 2,717 people. This survey indicated that only 28% of the project professionals were women.



Source: author's construction based on Drake 2016

Fig. 9. Proportion of female project leaders based on the APM's research (%)

In the research of the APM the female project managers proved to be much younger. 46% of the male project professionals participating in the survey were younger than the age of 45, while this ratio was only 26% among women. This chimes with the results of the PMI's research from 2009 and with the content of Figure 8, which shows that after the age of 35 the proportion of the female project professionals decreases. On the other hand, under the age of 35 there are a significantly higher percentage of female project professionals, since women under 35 represented 36% of the sample, as opposed to the men's 24%. This survey also acknowledges that women in project management earn a lot less than men (Drake, 2016).

The 2014 survey of PMI Ireland³⁷ reflects advances in the proportion of female project leaders, which concluded that there are more and more women taking part in project management courses and the gap is closing on the gender ratio differences. The upcoming years will surely bring further progress in this field too, and the gender ratio will be equal not only in the courses but at the head of projects as well in the industries with high project intensity. The trend seems to point to the likelihood of reducing the inequalities, but still many years will have to pass before female project leaders can appear in the same proportion as men do today.

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³⁶ APM: Association for project management

³⁷ The Institute of Project Management in Ireland



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Management of an Industry-University-Cluster: ruhrvalley

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Abstract

The Ruhr Valley (or Ruhr Area – Ruhrgebiet) is one of Europe's largest and most important metropolitan regions. As the former industrial heartland of Germany it has undergone a tremendous structural change. It is an example of a multi-centre, diverse city cluster and therefore an excellent case study for urbanization as the pre-dominant organizational pattern for human ecosystems. The university-industry-cluster *ruhrvalley*³⁸ has been founded to foster the development of the Ruhr Valley with a focus on sustainable, efficient and modern mobility and energy by using the means of the digital transformation. For future metropolitan mobility and energy systems it is crucial to promote and support the cooperative work of interdisciplinary teams of scientists, engineers, but also business experts, ecologists, politicians, and – finally – the citizens. Therefore, a joint understanding of such systems and a development process with inclusion of all relevant stakeholders is a key issue. The joint efforts of *ruhrvalley* in doing so are based on a holistic view on mobility and energy systems inspired by a very general architecture model of socio-technical systems and a respective systems engineering methodology. The cooperation in *ruhrvalley* is orchestrated by a portfolio of cooperation projects of industry partners and university researchers. In addition, educational formats, information and communication activities and social engagement events with citizens are implemented. The finances are based on a combination of public and private funding. Consequently, the management of the cluster is based on a *projectized* approach and supported by project portfolio management, professional project management and controlling and the design of a variety of innovation and education formats. The management is conducted by a central project office which works in close interaction with the companies, the research institutes, the university administration, the public authorities and a high number of supporting organizations. In addition, formats for legal entities for the long term cooperation are developed. This paper will present the assumptions and the concept for the cluster management, as well as the different project and cooperation formats and the strategic portfolio and project management approach.

Keywords: *Public-Private-Partnership project management, university-industry-cooperation, triple-helix-systems, innovation projects*

Introduction

The Ruhr Valley has undergone a tremendous structural change in the past decades [10,18]. It used to be the steel and coal region of Germany, dependent on a few resource intensive industrial conglomerates. This socio-economic system went down already 50 years ago. Politics placed a number of universities and research institutes into the region, beginning in the 1970's. The aim of this approach was and is to transform one of the largest and most important metropolitan areas of Europe into a modern, science- and technology oriented region. Therefore, it is part of the mission of the Ruhr universities to participate in this development and to be a driver of change, transformation and innovation. Forming industry-university-clusters on certain topics and combining it with research, education and the so-called "third mission" of universities [1][3] is a proven way of fostering the necessary transformation. Universities of

³⁸ see www.ruhrvalley.de, the author is currently speaker of the university-industry-partnership



Applied Sciences (German: Fachhochschule (FH)) have a specific role within the innovation system, since they put a natural focus on third mission topics [15, 20]. Their main focus is the transfer of innovative scientific findings into application by educating people and doing transfer oriented research. With this mission they form a bridge between science and industry (and society). The educational profile put an emphasis on job-related programmes, mainly in Bachelor's and Master's education. This leads to an excellent employability of graduates and a strong stimulus into the regional innovation system. It is complemented with transfer oriented research in close cooperation with industry. The regional profile of the Fachhochschule lowers the barriers for technology oriented start-ups and small- and midsize enterprises (SMEs) in cooperation. Therefore, universities of applied sciences are strong in the main domains of the "Third Mission" [1,3] of universities: 1) Technology Transfer and Innovation, 2) Continuous Education and 3) Social Engagement.

For the transformation of the Ruhr Valley it is straightforward to assign the role of intensive industry-university-cooperation to the local universities of applied sciences. This assignment is not in competition but in addition to the strong research and cooperation activities of the much larger classical and technical universities of the region (e.g. TU Dortmund, RUB Bochum, University Duisburg Essen, who are members in the University Alliance Ruhr (UAR)) and the various research institutes. Universities of applied sciences can add to this elaborated regional innovation system due to their focus on applications of scientific results and their openness for smaller projects and partners. In addition, the common concern about commercialisation and profit taking precedence over the creation of wider societal value added [2] is usually easier to solve in the very concrete cooperation formats. Therefore, universities of applied sciences live the Triple Helix [4,13] system on a regional scale already since two decades. Nevertheless, they still need an institutional framework for these activities which allows them to change from regional educational institutions into real Mode 2 [4] institutions that put transdisciplinarity [6] into their DNA. Moving outwards of the university into the regional socio-economic system and becoming a real partner within the ongoing transformation and change process is a challenge even for the larger universities of applied sciences and therefore an interesting topic for research about how to approach this challenge.

Within the dense innovations system of the Ruhr Valley it makes sense to form alliances for that. The three largest universities of applied sciences in the Ruhr Valley (Hochschule Bochum, Fachhochschule Dortmund, Westfälische Hochschule) with 7 research institutes and together with more than 40 companies have formed an industry-university-cluster targeting both research and education – called *ruhrvalley* [20,21]. It addresses the great challenges of a metropolitan region since the Ruhr Valley is one of the largest agglomerations of Europe [19]. Urbanization is the pre-dominant organizational pattern for human ecosystems [18]. The focus of the ruhrvalley cluster is the transformation of mobility and sustainable energy for such de-central, highly diverse and distributed environments. The digital transformation is a major driver for this change. Apart from technical solutions, the aim of ruhrvalley is a more comprehensive approach integrating the citizens, the socio-economic change, the relevant business models and the respective target setting structures. At the end, ruhrvalley strives for a holistic systems engineering methodology for metropolitan mobility and energy system,

Management Process for Socio-technical Systems



The joint efforts of ruhrvalley in fostering innovations for future metropolitan development are based on a holistic view on mobility and energy systems inspired by [12][16]. Ropohl developed a very basic analysis and structuring of *systems* in his description of a systems theory of technical systems (called “Technology at large”) [16]. He provides a three-layer-model (see Fig. 1) of a general activity system – which can be a technical system, any ecosystem or even a biological system. The basic execution system deals with the “things” or the interaction with the “real world”. The information system could be IT or a nervous system in biology. We can easily guess that it would be the layer connecting the things in the Internet-of-Things (IoT). The target setting system is a kind of a “brain”. In technical systems, it can be seen as the place where data analytics (in some case with “big data” methods – another buzzword) or artificial intelligence methods find their place. It can be the place where the user or the socio-economic system comes in. In general – for a metropolitan mobility and energy system – the execution system would contain the producers and consumers (or prosumers, if combined) of energy and mobility, meaning the technical systems (things) as for example cars, solar panels, charging stations or heat pumps. The information system would deal with the secure and reliable exchange of information, e.g. where energy is needed, where cars are stuck in traffic jams, or who has to pay what to whom. This “system” contains technical parts but also business models. The target setting system is not necessarily just a technical analytical or decision making tool. It can be a political or regulatory system, too.

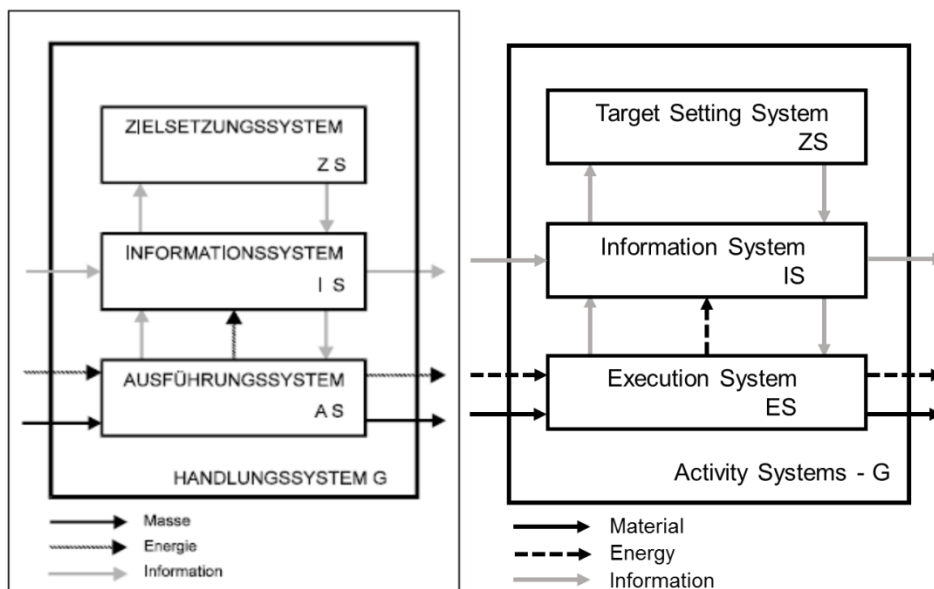


Fig. 1: **Original German version (left) of the technology stack according to Ropohl [16] and own English translation (right).**

The industry-university-cluster ruhrvalley is not only trying to develop such a systems engineering approach. The aim is transfer into application. Therefore, it is crucial to enable the players in the region to use the process and it is crucial to tailor and adapt the *ruhrvalley systems*



engineering [21] in a way that makes it applicable within different domains. In technology development, ruhrvalley systems engineering connects to model based systems engineering for intelligent technical systems, as described in [12]. The Operator-Controller-Module (OCM) system stack is a kind of an instantiation of the technology stack according to Ropohl. The connections to mechatronics systems development or to cloud- and IoT-based IT are clearly visible [21]. In addition, the Ropohl model connects very well to target driven innovation management [11]. For ruhrvalley – as a holistic approach – the connection to the management and change process for socio-economic systems is crucial, too. Especially modern participative methods for decision making, target setting and development have to find a seamless connection. Stakeholders such as customers, citizens and decision makers become co-producers [17] of the solutions. The management and development of the industry-university-cluster ruhrvalley needs to be synchronized with the systems engineering since ruhrvalley serves as a case study for the methodology, a training ground for all partners and a tool for promotion. The industry-university-cluster is the means to put the ruhrvalley systems engineering into application and to make it a success.

Requirements for the Management of an Industry-University-Cluster

The management of the industry-university-cluster ruhrvalley supports its role as a test bed and development environment, as an innovation incubator, as a training ground for the players and as a driver for cooperation. To make the cooperation successful, an intensive interaction between all partners within strategically chosen cooperation formats has been designed. It is orchestrated by a portfolio of cooperation projects of industry partners and university researchers. In addition, educational formats, information and communication activities and social engagement events with citizens are implemented. The finances are based on a combination of public and private funding.

The underlying operation principle of the industry-university-cluster ruhrvalley is following to some extent existing examples, e.g. the EIT Knowledge and Innovation Communities (KIC) [8] or the Germany's Leading-Edge Clusters/Spitzencluster [5]. The aim is to define cooperation and interaction formats for the partners, to get their commitment and involvement and to make them drivers of the cluster by assigning target setting and decision making to them. This leads again to the definition of a "system" which can be addressed with the 3-layer-model (Fig. 1).

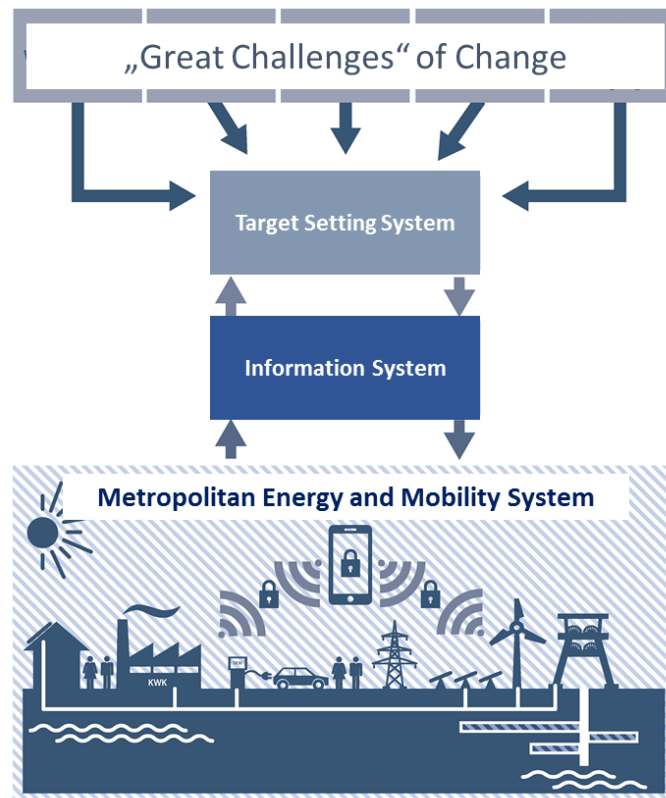


Fig. 2: System stack for “metropolitan energy and mobility systems” acc. to Ropohl [16]

For ruhrvalley, this leads to a number of requirements for the management system:

- ruhrvalley is organized in a “projectized” way. Reaching the goals is assigned as targets to projects. The partners interact in projects. Projects deliver results (to other projects, to the partners, to customers, to ruhrvalley). This leads to the requirement of having different types of projects and a professional, effective and efficient project management.
- The strategy is implemented into a project roadmap. Projects are defined, executed and controlled within a project pipeline. This project pipeline and the respective stage-gate-process for moving the projects through the pipeline serve as an innovation funnel (as successfully used in the previous PIMES research team [23]). A trend radar helps to identify and prioritize what needs to be fed into the project pipeline next.
- The ruhrvalley approach is not just about generating innovations. For a sustainable partnership development the innovation transfer via people development is a very important. Therefore, the industry-university-cluster is combined with the Ruhr Master School [22] and further programmes in continuous education.
- To develop the partnership, it builds practice and trust by generating a high density of interaction amongst the partners with tailored cooperation and interaction formats.



Projectized Management System

The projectized interaction and cooperation system of ruhrvalley is based on the assumption that consortia and partnerships are formed by the interaction of “circles” of partners which are quite often long-term, mature and trustful groups or systems. These circles have their specific procedures, traditions, standards and modes of operation and cooperation. Innovation is generated, if these circles are put into contact and cooperation in new ways. This can be done by setting up joint projects. Nevertheless, due to the different traditions and procedures of the involved circles, the project formats need to be tailored to fit to the cooperation. In the beginning, this can be a bit “artistic”. Managing the interaction of the circles with all the different project and interaction formats is a kind of “project circus” which is orchestrated by the management system of ruhrvalley.

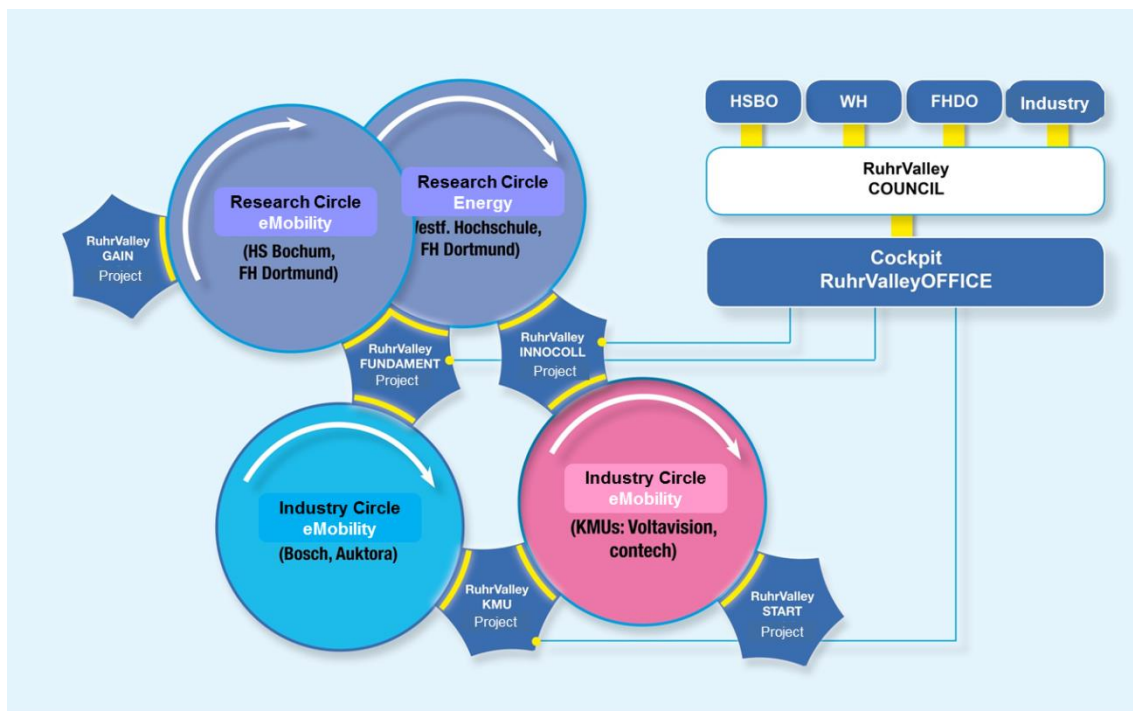


Fig. 3: „Project Circus“ as a projectized tool for university-industry cooperation [22]



<i>Project Format</i>	<i>Type</i>	<i>Description</i>
RuhrValleyFUNDAMENT	R&D	FUNDAMANT-Projects are typically 2-3 years R&D projects in consortia of industry and university partners. They have a clear development goal and a dissemination and exploitation plan to plan the transfer into application. The projects are also a training ground for cooperation amongst consortia.
RuhrValleyFLOAT	R&D	FLOAT-Projects have a strong research focus and are not necessarily close to application. They lay the foundations for later FUNDAMENT projects.
RuhrValleyGAIN	Recruit	The GAIN instrument puts a focus on getting the right experts into the ruhrvalley. It combines different instruments for attraction and recruitment.
RuhrValleyFREE	Experiment	The instrument FREE serves as a pool with several small tools for enabling innovations and projects. This can be headcount/time, money, technology (e.g. labs) and consulting.
RuhrValleyINNOCOLLEGE	Train	The INNOCOLLEGE is an instrument for training, continuous education and conversation. It is attached to the Ruhr Master School which serves as a major recruitment basis.
RuhrValleySTARTUP	Transfer	The format STARTUP combines consulting, training and finance for entrepreneurship and setting up new companies.
RuhrValleyKMU	Transfer	RuhrValleyKMU addresses small and midsize enterprises (SME) with specific project formats which allow the transfer of innovations from ruhrvalley into marketable products.
RuhrValleyMANAGEMENT-OFFICE	Manage	The MANAGEMENTOFFICE is the coordination centre of the activities in ruhrvalley. It is complemented with the RuhrValley CORE TEAM, the RuhrValley STEERING BOARD and the RuhrValley CONVENTION.

Table 1: Set of project and interaction formats for the orchestration of cooperation

The orchestration of the ruhrvalley is done by the MANAGEMENTOFFICE which serves as a project and programme office. The main duties are:

- The management of the project pipeline, including set up of new projects and doing reviews and decisions according to the stage-gate-process. This involves the reporting to the partners and to the public authorities in case of publicly funded projects. It involves reviews according to milestone checklists and release documentation.
- The controlling and monitoring of the activities including the financial controlling and reporting and the controlling according to the ruhrvalley scorecard.



- The support of the speaker of ruhrvalley who is the head of the CORE TEAM at the same time. He is supported by the managing director who is heading the MANAGEMENT OFFICE and driving the main operations.
- The support of the STEERING BOARD which involves representatives of the universities, the involved companies and public bodies (chambers of commerce, cities, foundations). It serves as a supervisory board and controls the activities of the speaker, the CORE TEAM and the MANAGEMENT OFFICE. It takes the strategic decisions for the further development of ruhrvalley.
- The support of the CORE TEAM which is headed by the speaker, with support of the managing director and relevant members of the MANAGEMENT OFFICE and the administration of the involved universities. Furthermore, the project managers of all projects in ruhrvalley are member of the CORE TEAM. It takes care of the operational tasks in managing ruhrvalley, e.g. granting milestone releases and submitting reports to public authorities. The vice presidents for science and research of the universities and the directors of the involved 7 university institutes are optional members of the CORE TEAM, too.

The 7 university institutes are the scientific foundation of ruhrvalley. They cover the whole technology chain of the 3-layer-systems architecture according to Ropohl [16] and also of the respective 3-layer Operator-Controller-Module (OCM) technology stack according to [12]. All institutes have a strong application driven R&D approach and all of them operate Master programmes within the Ruhr Master School [22]. They have set up more than 15 spin off companies in the past who are core members of ruhrvalley, too.

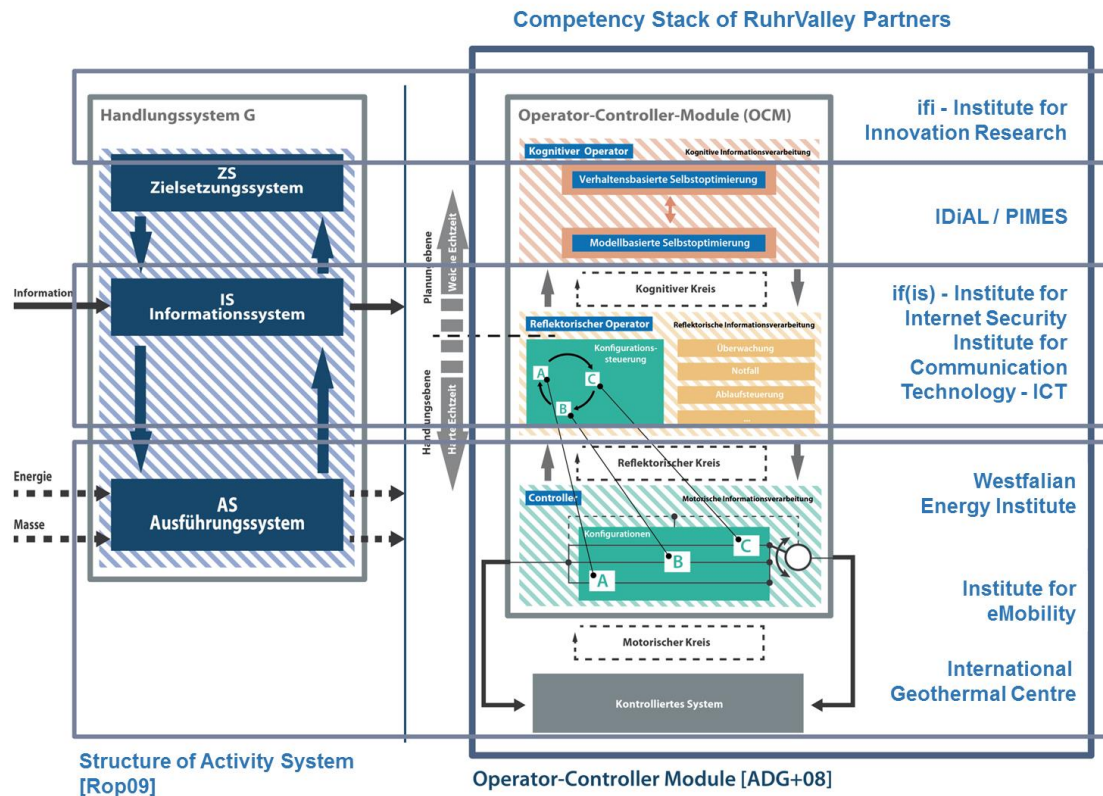


Fig. 5: **University-industry-cooperation “RuhrValley”**, based on 7 research institutes from 3 partner universities – covering the complete technology chain [21]

The management and organisation of ruhrvalley has several similarities to other industry-university-clusters or similar forms of cooperation:

- Germany’s Leading-Edge Clusters (Spitzencluster) set up by the Federal Ministry of Education and Research (BMBF) are (on a larger scale) combining national and regional enterprises with classical and technical universities and research institutes [5]. There are 15 clusters all over Germany addressing different technology domains and regions. The ruhrvalley cluster cooperates closely with two of the clusters, the EffizienzCluster on logistics in Ruhr Area and the cluster Intelligent Technical Systems OWL (where the OCM architecture models origins from). They have similar management structures with a management office and the different boards.
- The EIT Knowledge and Innovation Communities (KIC) of the European Research Area (ERA) [8] are larger than the German Leading-Edge Clusters and cover regions all over Europe based on an application domain (or great challenge). In addition to elaborated management structures they host Master Schools with a similar concept as ruhrvalley.
- The German Fraunhofer Institutes [9] form industry cooperations and put a strong emphasis on application domains. They organize similar concepts like ruhrvalley but usually within one institute and with a focus on commercial R&D. With the Fraunhofer-



Anwendungszentrum (application centre) they expand their regional footprint and address specifically SMEs.

- The Chinese Science and Technology Parks (e.g. with the Research Institute of Tsinghua University in Shenzhen (RITS) with their Leaguer Science and Technology Parks[14]) form a very elaborated pipelined system of innovation, finance and commercialisation. The finance component is much stronger than in the German clusters with a focus on successful IPOs of the start-up companies.
- The German “Gesellschaft für internationale Zusammenarbeit (GIZ)” has developed guidelines for innovation clusters formed by SME. Research institutes are additional partners while the SME govern and lead the cluster [7].

The industry-university-cluster ruhrvalley intends to learn from these examples and is striving to form an example, too. For that purpose, it is funded by the Federal Ministry of Education and Research (BMBF) after being selected as one amongst ten German clusters headed by universities of applied sciences (Fachhochschule) within the BMBF programme FH IMPULS. Nevertheless, ruhrvalley is not only funded by public money. In addition to the 5 Mio EUR from BMBF (for the first 4-year-cycle, afterwards another 4-years-cycle with the same funding) another 2.5 Mio EUR are provided by the company partners and a foundation. This combination of public and private funding is the basis for an intensive public-private-partnership going beyond the usual publicly funded university research.

Conclusion

Based on the experience of several successful examples of industry-university-clusters the 3 largest universities of applied sciences of the Ruhr Valley have set up long term cooperation with more than 40 company partners. The aim is to contribute holistic solutions for the future mobility and energy systems for metropolitan areas. To organize and manage the joint efforts, a system of project and interaction formats has been established which is orchestrated by a governance system based on a project-oriented approach. The cluster started beginning of 2017. It will evaluate and measure its effectivity and efficiency based on a score card and a number of key performance indicators. Within the first funding cycle it will develop sustainable institutions for long term cooperation and for the professional management towards commercialisation of the resulting innovations.

Acknowledgement

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LIFE IS A PROJECT: ENABLING LIFE SKILLS IN CROSS-CULTURAL TRANSITIONS

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Abstract

This paper introduces the concept of project management as an enabling skill for individuals in the process of cross-cultural transition. It explores theoretical models of cultural adaptation, research into psychological and socio-cultural impacts of cross-cultural transitions, the challenges of being a non-native English language speaker, the concept of “skills for life” training and studies on the impact of project-based learning in education. The paper provides observations from an experimental exercise in teaching project management skills to a group of non-native English language speakers. It concludes with a view on the merit of project management skills in a cross-cultural context and thoughts on further development of the concept.

Key words: *cross-cultural, acculturation, project management, cultural transition, skills for life*

JEL codes: J150, L310, M140

Introduction

"To awaken quite alone in a strange town is one of the pleasantest sensations in the world. You are surrounded by adventure" (Stark, 2011, p.11). Individuals make cross-cultural transitions to new locations for many reasons. Like British travel writer, Freya Stark, they may be motivated by a desire for adventure and discovery. Others undertake these transitions as longer-term sojourns or migration for a variety of economic, political, social and environmental motivations (Dontsov & Zotova, 2013). These transitions present the newcomer with practical and social challenges which can significantly constrain their well-being and productivity. This conceptual paper provides an introductory exploration of the extent to which the acquisition of basic project management skills, methods and tools may enhance the capabilities of individuals to articulate, analyse, plan and manage “life” projects such as cross-cultural transitions. It explores the extent to which such skills acquisition might serve to release or develop latent capability in “at risk” individuals or groups, and seeks to identify the potential for realising measurable personal, social and economic benefits for the individual and society as a direct result of such capability activation. Academic research on the concept and quantifiable benefits of project management as a “life” skill is limited. Project management methodologies are mostly commercial-focused. There is great scope for further research to explore the feasibility of this concept, potential social or “life” applications, benefits quantification methods, and the applicability of leading project management frameworks to these “life” projects. This paper presents a novel and introductory exploration of the feasibility and potential benefits of providing adapted project management skills training to assist individuals with one specific example of everyday life, the cross-cultural transition.



Research results and discussion

The challenge of cross-cultural transition

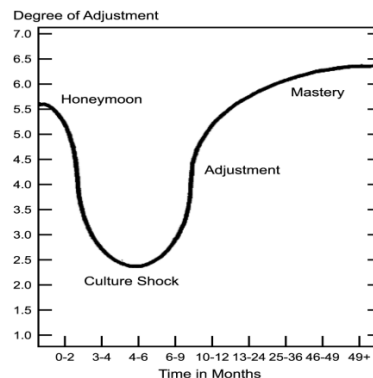
Individuals decide to relocate to foreign countries for many and varied reasons depending on their personal circumstances. The study of Dontsov and Zotova (2013, p.78) identifies standard of living, financial stability, future opportunities, wealth creation, the chance to start a new life, education, employment, security and family reunion as major drivers for undertaking these transitions. In the United Kingdom (House of Commons, 2016, p.14) the primary reasons for migration inflow between 2005 and 2015 have been work, study and family reunion.

The practical challenges of relocation to a new country include the fundamental needs such as finding accommodation, employment, healthcare, transport and financial services. The social challenges include making new friends, developing a support network and adapting to cultural differences. The success of the transition depends on the individual's ability to overcome these challenges in a process of adaptation and establishment of independence.

Studies have identified that the process of cross-cultural transition can pose significant threats to the psychological well-being of individuals as they attempt to overcome feelings of homesickness, prejudice, loss of self-esteem, anxiety, helplessness, depression, loneliness, stress and sleeplessness (Brown & Holloway, 2008; Ward & Kennedy, 2001). Brown and Holloway (2008, pp. 33-45) describe the international transition process as “one of the most traumatic events in a person's life”, concluding that almost all of the 13 subjects in their study suffered symptoms of “mental ill health” as a direct result of their relocation. The study of Ramos, Cassidy, Reicher and Haslam (2015) identifies the failure of post-migration experiences to meet pre-migration expectations as a primary cause of “acculturative stress” leading to mental illness. They cite social rejection, prejudice, language difficulties, and cultural differences as the major inhibitors to expectations being met and achievement of well-being in the new location.

According to Sam and Berry, (2010, p.472) acculturation is “the process of cultural and psychological change that results following meeting between cultures”. They identify four different acculturation styles – integration, assimilation, separation and marginalization. They conclude that integration, which involves preserving one's original culture whilst participating actively in the new culture, is generally the most successful strategy.

Studies of the process of cultural adaptation have resulted in the development of numerous process models. Figure 1 illustrates the U-Curve cross-cultural adjustment theory, originally associated with the work of Lysgaard (1955, cited by Black & Mendenhall, 1991, p.227). Many subsequent models such as those of Brown, Adler, Torbiorn and Mohamed approximate or elaborate on this original four-phase model (Brown & Holloway, 2008, p.34).



Source: Black & Mendenhall, 1991, p.227

Fig. 1. The U-Curve of Cross-Cultural Adjustment



The “honeymoon” phase is characterised by an initial sense of excitement and adventure, as in the case of Freya Stark, waking up to the “sights and sounds” of Baghdad. The “culture shock” phase refers to the sense of trauma experienced as the realities of everyday life take hold and the individual’s inability to cope with the new environment trigger negative feelings such as anxiety, depression, loneliness and stress. The “adjustment” phase is characterised by a sense of re-orientation and recovery as the individual learns to cope and make progress within the new cultural environment. Finally, in the “mastery” phase the individual achieves a new sense of purpose, independence and self-esteem, akin to the self-actualisation status of Maslow’s motivational needs theory (Black & Mendenhall, 1991; Maylor, 2010; Van Tonder, 2013).

As is the case with most academic models, the U-Curve model will not be applicable in all contexts. Brown and Holloway (2008, p.45) question the validity of the honeymoon phase, asserting that stress and culture shock is greatest at the start of the transition process, outweighing any initial feelings of euphoria. Black and Mendenhall (1991) review various case studies where the adaptation process resembles a J-Curve or an inverted U-Curve under different cultural contexts.

What remains true in all cases is the notion that the culture shock phase represents a significant risk factor for successful adaptation to new environments. Factors such as language difficulties, prejudices, social isolation and cultural difference may significantly inhibit the adaptation process, causing damage to self-esteem and psychological well-being, and in doing so, further inhibit progress to the adaptation and mastery phases. Colic-Peisker (2009, p.176) identifies employment as the primary determinant of life happiness and transition success for refugee groups in Australia. Benson-Rea and Rawlinson (2003, p.71) identify English language skills as a critical barrier to employment and hence, transition success, for 85% of skilled migrants in New Zealand. Some transitions will fail, having never progressed from the “limbo” phase of culture shock and its attendant negative emotions.

What strategies can be deployed to mitigate culture shock and push individuals up the U-Curve towards adaptation? Black and Mendenhall (1991) stress the importance of maximum exposure to the host culture as a source of “social learning” through behavioural observation. Ward and Kennedy (2001, p.640) identify task-oriented planning, active coping strategies, and a sense of humour as being highly supportive of well-being and cross-cultural adaptation. Van Tonder (2012, p.346) highlights the “important supporting role of friends, networks and community structures”. Ramos et al. (2015, pp. 30-32) reinforce the criticality of social support, cultural identity, host contact and “second-language confidence” in successful cross-cultural transitions.

Cross-cultural transition and the skills for life concept

In 2001, the English Government launched a national seven-year “Skills for Life” education strategy to improve the literacy, numeracy and language skills of seven million adults identified as being “at risk” of economic disadvantage, social exclusion and ill health. The programme was developed in response to a national report by Sir Claus Moser which concluded that 20% of the adult population of England possessed lower literacy, numeracy and language skills than an average eleven year-old child. The Skills for Life strategy targets specific groups regarded as being at greatest risk of disadvantage and exclusion – the long-term unemployed, benefits claimants, prisoners and supervised offenders, public sector employees, low-skilled employees, the homeless, refugees, asylum seekers, non-native English speakers (ESOL) and disadvantaged communities (Department for Education and Employment [DfEE], 2001).



From the lens of cross-cultural transitions, the “at risk” targeting of refugees, asylum seekers and non-native English speakers is of interest. The English Government is recognising the “life skills” gaps of these groups which inhibits their “active participation in twenty-first-century society” (DfEE, 2001, p.3). With respect to these groups, the Skills for Life strategy focuses on literacy and language skills education as the primary enabling mechanism for greater social inclusion, psychological well-being, independence and ultimate adaptation. A national framework of ESOL curriculum, certification and free skills training for adults was implemented as a tactical solution to the skills gap. ESOL training materials focused on day-to-day life skills and contained primarily cross-cultural style and content. According to the English National Audit Office [NAO] (2008, p.20) review, approximately 300,000 target group individuals attained ESOL Skills for Life certifications between 2000 and 2007. There is no qualitative data provided within this report for measuring the success of this programme in bridging the “life skills” gap.

In terms of human capital theory, an investment in the language skills of non-native English speakers might be viewed as enhancing their cultural capital. These skills will in turn enhance their social capital as socialising and making new friends becomes easier. Eventually these language skills are likely to enhance economic capital in the way of increased employment and further learning opportunities (Ryan, Sales, Tilki & Siara, 2008).

In the context of cross-cultural transitions, “skills for life” education can provide much more than just local language and everyday living skills. It can provide individuals with positive host community contact, new skills and opportunities for social networking and support, greater second-language confidence, greater self-esteem and independence. Skills for life can help individuals to overcome the obstacles of culture shock and climb the U-Curve of socio-cultural adaptation.

Cross-cultural transition and project management skills for life

Ward and Kennedy (2001, p.640) identify “task-oriented planning” as a positive strategy for coping with cross-cultural transitions. What tasks might be applicable to cross-cultural transitions and what skills might be useful to plan and manage them? Is it feasible to plan and manage these transitional tasks as “life projects”?

According to Maylor (2010, p.3) “Life is one big project. The trick is in managing it.” This concept promotes a view of Life as a series of related tasks which can be planned and managed as a project. The Association for Project Management [APM] (2012) defines a project as “a unique, transient endeavour undertaken to achieve planned objectives”. Similarly, the Project Management Institute [PMI] (2008, p.5) defines a project as “a temporary endeavour undertaken to create a unique product, service, or result”. In the sense that Life is temporary, unique and has a purpose, Maylor’s quotation is valid. In the business world, the discipline of project management has been developed primarily as a structured method for planning and managing complex organisational changes. In fact, the tools, techniques and skills of project management can be applied with equal efficacy to any endeavour that meets the project criteria of temporariness, uniqueness and purpose, including “life projects”.

In recent years, studies have recognised the project management skillset as a useful and enabling “skill for life”. Schools are increasingly incorporating project-based learning [PBL] into their core curriculum. According to Bell (2010) PBL in schools fosters the early development of critical “21st century” life skills such as collaboration, communication, teamwork, problem solving, independence, goal setting, time management, negotiation, creativity, analytical thinking, planning and organisation. She cites United States and British studies which identify superior academic achievement and higher motivation levels in PBL-



approach schools. The study of Wurdinger and Rudolph (2009) reiterates this “life skills” focus of PBL, with 85% of respondents identifying life skills such as “creativity” and “finding information” as the most important learning outcomes, as opposed to 10% for the traditional academic skills.

Whilst the concept of project management as an enabling life skill has been emerging increasingly in the schools education environment, there is little reference to its specific applicability in an ESOL or cross-cultural transition context. However, the life skills identified by Bell (2010) are precisely the type of enabling skills required by individuals navigating the U-Curve of cross-cultural transitions.

Critical transitional activities such as finding a job and learning a language (Benson-Rea & Rawlinson, 2003; Colic-Peisker, 2009) may be framed and managed as temporary endeavours undertaken to achieve unique results. Using a simplified and practical set of project management skills and tools, individuals may be taught how to define achievable objectives, how to breakdown their goals into a manageable set of related tasks, how to plan and schedule these tasks, and how to manage and control their plans through to fruition. This structured approach is equally applicable to transitional tasks such as finding a home, learning a skill, planning an education, starting a business, or making new friends. A project-based approach to “life tasks” can provide the positive “task-based planning” and active coping strategy endorsed by Ward and Kennedy (2001).

The acquisition of basic project management skills *per se* cannot resolve the primary cross-culture transitional barriers of language proficiency (Benson-Rea & Rawlinson, 2003), social isolation (Brown & Holloway, 2008), cultural learning (Black & Mendenhall, 1991) and economic stability (Colic-Peisker, 2009). It can, however, empower individuals with a toolset to manage transitional tasks systematically, generating a remedial impact on the sense of “helplessness” and “disorientation” (Brown & Holloway, 2008, pp. 38-39) experienced by those stuck in the culture shock phase. As “life projects” are incrementally achieved, self-doubt and stress will be progressively replaced by self-worth, self-confidence and satisfaction, on a path to cross-cultural adjustment (Black & Mendenhall, 1991, p.240). In this sense, the application of project management skills to transitional tasks may be viewed as an active coping strategy, confronting the “stressors” of cross-cultural transition (Sam & Berry, 2010, p.474).

Further to the empowering utility of the skills themselves, the process of skills acquisition itself is likely to prove cathartic and restorative to an audience engaged in the process of cross-cultural transition. As observed by Bell (2010) and Wurdinger and Rudolph (2009), the project-based learning approach helps develop critical social, cultural and organisational skills such as teamwork, collaboration, communication, responsibility, creativity, self-confidence, time management and problem solving. Project management skills training workshops should incorporate a strong, hands-on, PBL focus with a practical team-based project delivery component to maximise this developmental opportunity.

Life is a Project: a London pilot

England’s national “Skills for Life” strategy was developed to tackle the multiple agendas of skills, employability and social cohesion (Cooke & Simpson, 2009, p.1). The marginalization of minority groups, including non-native English speakers, due to poor literacy, numeracy and language skills was regarded as a significant drain on global competitiveness, welfare services, and social cohesion. The ESOL component of the strategy targeted the economic, socio-cultural and psychological needs of non-native language speakers through the provision of basic skills training. Whilst ESOL training targets were met, observers such as Appleby and Bathmaker



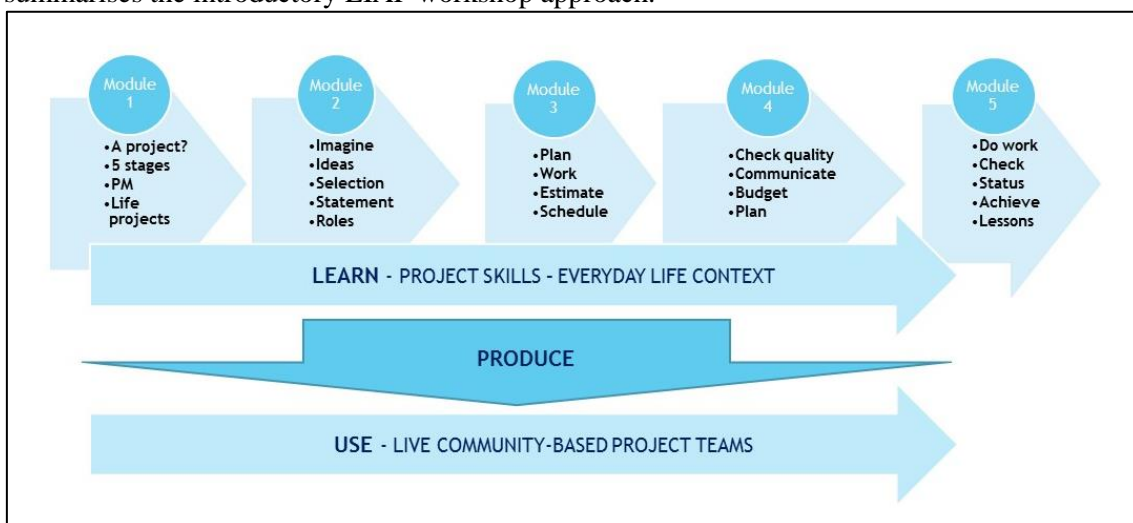
(2006) and Cooke and Simpson (2009) noted a gradual shift in policy focus away from the socio-cultural and psychological needs of ESOL learners, towards employability and economic competitiveness targets.

LIAP concept.

In recent years, the author of this paper, an experienced project management practitioner and English language teacher with a special interest in cross-cultural project teams, developed the concept of empowering marginalized non-native language speaking groups with a basic set of generic project management skills and techniques, as an enabling “skill for life” in support of their cross-cultural transitions. The Life is a Project [LIAP] programme framework was developed to test the feasibility of this concept. An initial review of existing literature, language training resources, project management training resources, case studies and consultation with a variety of professional bodies and practitioners from these disciplines, failed to identify existing programmes or resources suitable for this specific purpose. Existing “life skills” programmes and materials which had been developed for native-language-speaking schools environments were deemed too complex and were contingent upon the availability of additional resources and specialist teacher networks.

LIAP approach.

To test the LIAP programme concept, it was decided to conduct an introductory series of weekly project skills workshops over a five week period of time. A basic curriculum was developed to introduce the concept of a project-based approach to life-task planning and achievement. Visual training materials were developed to demonstrate a simple, five step Imagine-Plan-Do-Check-Achieve project life-cycle approach to defining goals and deconstructing complex life tasks into manageable pieces of work. Training materials utilised strong visual content and language was graded to a level not exceeding the capabilities of an ESOL Level 1 learner (Upper Intermediate). Workshops were structured to maximise learner collaboration using a PBL approach. A key outcome of the programme was for learners to collaborate on the delivery of a real-world community project of their choice. Figure 2 summarises the introductory LIAP workshop approach.



Source: LIAP programme framework developed by author based on PMI and PRINCE2 methodologies

Fig. 2. “Life is a Project” pilot programme framework



LIAP course content.

Module 1: This module introduced students to the concept of a project as a temporary endeavour. The concept of a simple 5-stage Imagine-Plan-Do-Check-Achieve project lifecycle was introduced. Scope, Time, Cost and Quality were introduced as elements to be managed with practical “life” examples. Each student identified their own “life project” to develop throughout the pilot.

Module 2: The second module introduced the concept of project teams and roles such as the Project Sponsor, Project Manager, Stakeholders and team members with practical applications to their own “life project”. Students were introduced to the concept and content of a simplified Project Statement document. They were assisted to produce their own document.

Module 3: The third module introduced a simplified version of the work breakdown process, using post-it notes to breakdown high-level deliverables into sequenced, scheduled and estimated activities. Practical examples were provided and students were assisted to apply these techniques to their own “life project”.

Module 4: The fourth module further developed the scheduling task and introduced the concept of a Project Management Plan with identified approaches for managing Quality, Communication, Schedule and Budget.

Module 5: The fifth module introduced simple tools and techniques for managing and controlling projects according to plan, checking quality, reporting status, managing meetings and problem resolution through to completion. Students were taught the concept of lessons learned as part of project closure and celebration.

LIAP delivery.

In January 2016, the LIAP pilot programme was delivered to a group of 10 ESOL learners in Ealing, West London. No-cost participation was offered through local community venues. Training facilities were provided by a local library and workshops were conducted by an experienced project management volunteer resource. Participants were adults from 6 different native language origins with English language proficiencies ranging from ESOL Entry Level 1 to ESOL Level 1 (Elementary to Upper Intermediate).

During the LIAP workshops, participants were introduced to fundamental concepts of project management, tools and techniques. Examples were provided of everyday life tasks being managed as projects. Participants were assisted to define personal life projects as the focus case material for development and practical activities throughout the programme. They defined specific life projects such as achieving English language proficiency, finding employment, starting a business, planning a party and achieving entry to post-graduate studies. Using simple project management techniques, participants worked in teams to breakdown complex life goals, or “deliverables”, into a series of related tasks which could be estimated, scheduled, enacted and monitored through to completion. As well as developing plans for individual life projects, the programme culminated with the planning and delivery of a community-based project – a fund-raising “Refu-tea” party in support of the British Refugee Council.

The emphasis of the entire programme was empowerment through a “task-based planning” (Ward & Kennedy, 2001) approach to cross-cultural transitions. The primary objective was to share with participants a new set of skills to help combat the “helplessness” aspect of cross-cultural adaptation. The opportunity to practice English language skills in an open, supportive environment (Cooke & Simpson, 2009) was framed as a secondary benefit. Whilst the teaching of English language skills was not included in the course framework, questions were fielded and concepts explained by the workshop leader.



LIAP observations and reflections.

The LIAP workshops supported the concept that a simplified and language-graded set of project management skills and techniques could be taught to ESOL learners. Whilst workshop learners displayed a range of communicative abilities, the visual style and practical PBL structure of the workshop provided practical, non-verbal support for the learning objectives. Active participation in team-based activities and successful production of personal plans validated that concepts were being understood and applied. Participants expressed their frustrations with the inhibiting effect of lack of language fluency in cross-cultural transitions. Their views were consistent with the “marginalised” and “not being *audible*” observations of Cooke and Simpson (2009, p.2).

All workshop participants positively embraced the idea of learning project skills as a new coping and enabling mechanism in support of their cross-cultural transition. They were clearly enthused by the opportunity to become more “audible” in a supportive, cross-cultural learning environment. As observed with most “life skills” training initiatives in schools (Bell, 2010), vocational settings (Simona, 2015), and community-based (Stewart, 2012) environments, the greatest benefits of these initiatives are the development, or restoration, of self-confidence, self-esteem and psychological well-being. In one case, a workshop participant used her new skills and further developed her workshop project plan, to open a dance school, through to real-world fruition. Her new enterprise was due to commence business in September 2016.

One obstacle encountered was the initial tendency of participants to view the programme as an English language training course. Regular reinforcement of the project skills for life concept overcame this misconception. Another obstacle was that the no-cost, volunteer-led nature of the initiative resulted in sporadic attendance patterns from some participants. As a proof-of concept, this initiative was unfunded. Materials were developed and presented as a voluntary endeavour. Training facilities and materials reproduction were provided by a local library at no-cost. The limited scope and resourcing of the initiative constrained its ability to measure, to a greater extent, the validity of project management as an enabling life skill for cross-cultural transitions.

Whilst the in-course feedback from most participants and exceptional post-course success of one participant strongly supported the concept of project management as an enabling life skill, there was not sufficient academic rigour, hypotheses definition or outcome measurement around this initiative to support any robust and defensible conclusion. This was largely a consequence of the necessarily informal nature of the undertaking and the lack of available volunteer resource. Support should be sought from professional associations and community organisations to embrace the concept, encourage similar initiatives, disseminate case studies and materials, and provide volunteer resources. Academic investigations should include a wider sample of cross-cultural contexts, and methods for measuring the impact of project skills training on the longer-term attainment of transitional project goals, psychological well-being and socio-cultural adaptation. This would likely require a study timeframe of months or years.

On the basis of this preliminary initiative, the concept appears worthy of further exploration and more rigorous study. The LIAP programme materials are being made available to practitioners, academics and non-profit associations. It is hoped that individuals and organisations with a genuine interest in the concept of disseminating project management skills for social good will see merit in this initiative and assist with further research and development of the concept and its further practical application in the realm of cross-cultural transitions and beyond.



Conclusions

Cross-cultural transitions are undertaken for a wide variety of needs or wants based reasons. In most cases, these personal journeys are characterised by a process of socio-cultural and psychological adaptation to the new environment. In some cases, the challenges of this adaptation process can impact the psychological well-being of individuals to a degree that threatens the success of their transition. For many, there is a sense of helplessness and the risk of being stuck in a “trough” of culture shock. Empowering individuals with new “life skills” is a positive strategy for mitigating this risk. A project-based approach to life objectives is one such skill. The process of learning to confront transitional challenges with skills to articulate and plan achievable, incremental pathways to life goals, can be empowering and revitalising to individuals’ well-being. There is a great opportunity for those with project management skills and an interest in social good to undertake community-based skills-sharing initiatives which may positively enhance the lives of others. The concept of project management as an enabling life skill in a cross-cultural context is worthy of further exploration and application in the field. In a broader context, this cursory exploration provides unquantified support for the notion that the sharing of basic project management “life” skills through capability-building educational initiatives such as the LIAP pilot, does have significant potential to realise social and economic benefits to the individual and to society. Further academic research and support from the project management profession is recommended.

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