PROJECT MANAGEMENT

– Challenges and Research Results

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Edited by Michał Trocki Emil Bukłaha

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INTRODUCTION

The demand for professional expertise in project management is constantly increasing due to the progressive complication of environmental processes and the functioning of organizations of all kinds as well as arising problems through projects' execution. To meet this demand, project management is intensively developed from both the practical and scientific side. As a result, project management has become a separate field of practical and scientific knowledge which has a separate subject of study, its own theoretical foundations, using specific research methods. The development of project management is done by specialized academic centers, research institutes, professional associations, consulting firms and individual professionals.

The Department of Project Management at the Warsaw School of Economics is one of the leading centers of scientific and practical project management in Poland. The issues described in this publication cover a wide spectrum of current challenges and problems in project management. The purpose of this publication is to present the research achievements of Department and people co-operating with it in both national and – above all – international environment of specialists in project management.

Michał Trocki, Emil Bukłaha

Michał Trocki

1

THE ISSUES OF PROJECT MANAGEMENT IN WARSAW SCHOOL OF ECONOMICS

1.1. Project Management History in Warsaw School of Economics

The issues of project management, as the subject of research and teaching, were taken at the beginning of the century in the Department of Management in Economy in Warsaw School of Economics by a team led by prof. Michał Trocki. On this subject, in 2003 Polish Economic Publishing House published one of the first Polish monographies titled *Project management* edited by M. Trocki, B. Grucza and K. Ogonek. The book has gained a great popularity and recognition in the publishing market. In 2006 its translation into Russian was created. In 2004 Difin Publishing House published a monograph titled *Management of the project team* edited by P. Wachowiak, S. Gregorczyk, B. Grucza and K. Ogonek. A collective publication edited by M. Trocki and B. Grucza titled *Management of an European project* released by PWE was established in 2007. In addition, many studies and articles on the management of projects have been published in collective works and journals. A number of presentations at scientific conferences were presented.

As a result of an intensive development of project management issues, the Project Management Department under the guidance of Full Professor Michał Trocki has been created in the structures of the Department of Management in Economy in 2005. In 2007, the Senate of Warsaw School of Economics decided to transform the Department into the Department of Project Management, functioning in the structure of the Collegium of Management and Finance of Warsaw School of Economics. Full Professor Michał Trocki was appointed the Head of the Department.

The Department of Project Management deals with the following issues:

- project management,
- project portfolio management,
- programme management,
- process management,

- process and design organization,
- process and design maturity,
- project controlling,
- task and project team management,
- knowledge in project management,
- management of European projects,
- change management.

This aspect is being developed in scientific, educational terms, as well as professional.

1.2. Research Issues Taken by the Staff of the Department of Project Management

The Department of Project Management systematically conducts researches in the field of project management. They include own studies, statutory researches and researches financed from the central funds on:

- social project management in accordance with the PCM methodology (2008),
- evaluation and selection of methodological support for project management (2008),
- system of evaluation and selection of projects under the Operational Programme Human Capital (2009),
- use of models of competence in the development of project management programs (2009),
- controlling in organizations implementing the projects (2010),
- organization's project maturity assessment (2010),
- knowledge management in projects (2009-2011),
- risk management in projects (2011),
- complex evaluation of projects (2012),
- project stakeholder analysis models (2012),
- communication management in projects (2012),
- significance of project management office (2012),
- projects of public-private partnership (2012),
- scale, scope and forms of controlling in implementation of the projects (2013),
- project risk management in the public finance sector units (2013),
- resources and project knowledge sources (2013),
- planning the projects under risk and uncertainty conditions (2014).

1.3. Scientific Development

In the Department of Project Management one conducts scientific seminar on project management which aims to integrate and develop expertise and scientific knowledge within project management and related fields. The participants of the seminar are academic workers, Ph.D. students and students interested in scientific issues of project management and related fields, as well as practitioners. During the seminar one presents and discusses professional and scientific problems, concepts and results of research works, postdoctoral and doctoral works and some of more interesting master theses in the field of project management.

The proposed doctoral theses in project management are conducted under the guidance of Full Professor Michał Trocki. Such doctoral theses in the field of project management have been created and defended so far:

- *Impact of project management on the creation of enterprise's value* (Ph.D.E. Sońta-Drączkowska) 2007,
- *Identification of the key success factors in consultancy project management* (Ph.D.P. Grząbka) 2007,
- *Problems of defining of European projects on the example of the EQUAL Community Initiative* (Ph.D.B. Grucza) 2008,
- *Application of knowledge management in projects' implementation* (Ph. D.P. Wyrozębski) 2010,
- *Organization's project maturity in Poland* (Ph.D.M. Juchniewicz) 2011,
- *Determinants of public-private partnership projects in Poland* (Ph.D.K. Wąsowski) 2012,
- *Communication in project management* (PhD. K. Kandefer-Winter) 2013,

Further doctoral dissertations are prepared to be defended:

- *Risk management in projects* (W. Metelski),
- *Factors of failures of projects IS/IT in Poland* (R. Urbanelis),
- *Competences of Polish ICT project managers* (M. Chomicz).

1.4. Publishing Activity of the Department of Project Management

Employees and associates of Department of Project Management are authors of numerous scientific and expert publications on project management. One can include the following books:

- Trocki M., Grucza B., Ogonek K., *Zarządzanie projektami*, PWE, Warsaw 2003 and 2009 (also translated into Russian),
- Wachowiak P., Gregorczyk S., Grucza B., Ogonek K., *Kierowanie zespołem projektowym*, Difin, Warsaw 2004,
- *Zarządzanie projektem europejskim*, edited by M. Trotsky, B. Grucza, PWE, Warsaw 2007,
- Trocki M., *Organizacja projektowa*, Bizarre Press, Warsaw 2008,
- *Strategiczne zarządzanie projektami*, edited by M. Trocki, E. Sońta-Drączkowska, Bizarre Press, Warsaw 2009,
- Wyrozębski P., *Biuro projektów*, Bizarre Press, Warsaw 2009,
- Juchniewicz M., *Dojrzałość projektowa organizacji*, Bizarre Press, Warsaw 2009,
- Nadskakuła O., *Ewaluacja projektów*, Bizarre Press, Warsaw 2008,
- Trocki M., Bukłaha E., Grucza B., Juchniewicz M., Wyrozębski P., Metelski W., *Metodyki zarządzania projektami*, Bizarre Press, Warsaw 2010,
- Sońta-Drączkowska E., *Zarządzanie wieloma projektami*, PWE, Warsaw 2011,
- *Zarządzanie wiedzą w projektach. Metodyki, modele kompetencji i modele dojrzałości*, edited by M. Trocki, Warsaw School of Economics Press, Warsaw 2011,
- Wyrozębski P., Juchniewicz M., Metelski W., *Wiedza, dojrzałość, ryzyko w zarządzaniu projektami*, Warsaw School of Economics Publishing House, Warsaw 2011,
- *Nowoczesne zarządzanie projektami*, edited by M. Trocki, PWE, Warsaw 2012,
- *Ocena projektów – koncepcje i metody*, edited by M. Trocki, M. Juchniewicz, Warsaw School of Economics Publishing House, Warsaw 2013,
- Wyrozębski P., *Zarządzanie wiedzą projektową*, Difin, Warsaw 2014,
- Trocki M., *Organizacja projektowa. Podstawy, modele, rozwiązania*, PWE, Warsaw 2014,
- Juchniewicz M., Metelski M., *Trójkąt ograniczeń projektowych. Wyniki badań*, Warsaw School of Economics Press, Warsaw 2015,
- *Planowanie przebiegu projektów*, edited by M. Trocki, P. Wyrozębski, Warsaw School of Economics Press, Warsaw 2015.

1.5. Educational Activity of Employees of the Department of Project Management

As the result of the efforts of the Department of Project Management and cooperating with them people, the subjects within project management to the educational offer of Warsaw School of Economics have been introduced and the specialty – project management has been also established. Project management as a directional subject has been introduced on Fist Cycle Studies (undergraduate), in the Management

faculty. A directional specialty Project Management, including specialistic subjects: *Project Management Basics*, *Strategic Project Management, Leading Project Team, Design Organization and Project Management of the European Union* has been created on Second Cycle Studies (postgraduate) in the Management faculty. For students of all specializations carried out at Warsaw School of Economics there is a possibility to achieve interdisciplinary specialization Project management. It includes 5 compulsory subjects and 10 subjects to choose from a range of school's offer.

For those who want to deepen their skills in project management, the Department also offers authorial subjects of free choice: *Preparation of projects financed from the EU funds, Budgeting and controlling of projects, Planning of the project, Project management methodology, Project Management Office* and the possibility of care over development of master thesis in project management and related faculties within the master seminar. Implementation of specialty allows to gain skills of the project manager. These qualifications are confirmed by a unique in the European scale certification system IPMA-Student, carried out in cooperation with the Polish branch of the International Project Management Association (IPMA).

In 2002 Project Management Postgraduate Studies were established for university graduates wishing to specialize in issues of project management. Since 2015, 60 editions of these studies have been completed and more than 4 000 project managers have been educated there. Department's staff also conducts classes in project management at postgraduate studies carried out by other departments and collegiums at the Warsaw School of Economics and on doctoral studies. Department's staff also conducts specialized courses in project management, for example a course on the PRINCE2 methodology.

1.6. Presentation of the Employees and Associates of the Department of Project Management

Full Professor Michał Trocki – a graduate of the Organization and Industrial Management at Warsaw University of Technology. He has been employed in Warsaw School of Economics since 1996, professor of economic sciences, founder and head of the Department of Project Management at Warsaw School of Economics, initiator, organizer and lecturer of Project Management specialty, Postgraduate Studies in Project Management and MBA program at Warsaw School of Economics. He specializes in project management, process management, capital groups management. He conducts research, publication, teaching and consulting activities in these areas. The head and participant of many scientific-research, organizational, consulting and training programs; domestic and foreign. The author of over 200 scientific and professional

publications in the field of management. He was, among others, the advisor of the Minister of Finance, President of the Second NFI, and the chief specialist in the Office of Organization and Management of Company's Directorate of TP S.A. and in the Office of Development and Organization of PZU S.A.

He is a Secretary of the Committee of Organization and Management Sciences, a member of the National Council for Entrepreneurship.

Ph.D. Emil Bukłaha, Assistant Professor, is a graduate of Management and Marketing at Warsaw School of Economics. He has been employed there since 2000. He specializes in project management, particularly the management of multiple projects, budgeting and controlling of projects, as well as change management and outsourcing. In these areas he conducts research, publication, teaching and consulting activities. He is a consultant and trainer in the field of project management, IPMA-student coordinator at Warsaw School of Economics.

Ph.D. Bartosz Grucza, Assistant Professor, is a graduate of Management and Marketing at the Warsaw School of Economics. He has been employed there since 1997. He specializes in project management, particularly the management of European projects and managing project team. In these areas he conducts research, publication, teaching and consulting activities. He is a consultant and trainer in the field of project management.

Ph.D. Mateusz Juchniewicz, Assistant Professor, is a graduate of Management and Marketing and doctoral studies at Warsaw School of Economics. He has been employed there since 2011. He specializes in project maturity, quality management and risk management projects. In these areas he conducts research, publication, teaching and consulting activities. He is an expert in public administration projects.

Ph.D. Paweł Wyrozębski, Assistant Professor, is a graduate of Management and Marketing and doctoral studies at Warsaw School of Economics. He has been employed there since 2010. He specializes in project management, especially project management methodologies and knowledge management projects. In these areas he conducts research, publication, teaching and consulting activities. He is a consultant and trainer in the field of project management.

Elżbieta Nowakowska has been running the Secretariat of the Department since 2007.

Doctorates of the Department:
Ph.D. Paweł Grząbka 2004–2007
Ph.D. Krzysztof Wąsowski 2010–2012
Ph.D. Ewa Sońta-Drączkowska 2004–2007
Ph.D. Katarzyna Kandefer-Winter 2009–2013
M.A. Witalij Metelski 2007 –

M.Sc. Rafał Urbanelis 2014 –
M.Sc. Marcin Chomicz 2015 –

Contact:
Department of Project Management
Warsaw School of Economics
02–544 Warsaw
Madalińskiego 31/33 Street
Poland
Phone.: +48 22 564 84 60
Fax: +48 22 564 84 61
kzpro@sgh.waw.pl
http://kolegia.sgh.waw.pl/KZPr or http://www.kzpro.pl/
GPS: N 52st 12' 15. 01" / E 21st 00' 56. 98"

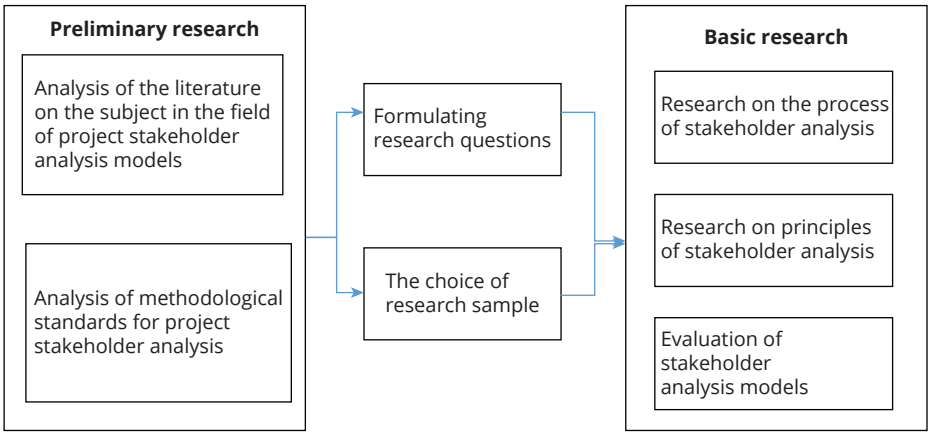
Bartosz Grucza

2
PROJECT STAKEHOLDER ANALYSIS MODELS

2.1. Aim of the Study

The concept of stakeholders was introduced into the theory and practice of management in the 80 s of the last century by R.E. Freeman, who by this concept wanted to draw attention to the need to take into account in managing the company also other than shareholders interest groups. The concept of stakeholder treats management as the result of aspirations, objectives and activities of various interest groups, which is consistent with the observations and practical experiences. This is of particular importance in managing complex projects. The aim of this study was to review the existing, but often hard to reach project stakeholder management, an attempt to summarize most important characteristics and formulate on this basis generalized conclusions. The research is a continuation of the author's work, who in the first half of 2012 contributed to the introduction in Polish, for the first time, of the full version of the world's three stakeholder management standards, being their translator and editor. The aim of the earlier works was to bring closer good stakeholder management practices to Polish reader and their popularization – as these were made available in an electronic version free of charge for non-commercial purposes on the website of the publishing house. This chapter is an attempt to present in a synthetic way the most important characteristics of models and the differences between them. Implementation of the submitted research subject helped to develop recommendations and proposals for changes in the environment of management projects. It also provides practical advice on how to streamline the process of proper preparation of the project drafts, making them more executable.

Figure 2.1. Research Model Concerning Project Stakeholder Analysis



Source: own study.

2.2. Concept of Stakeholders

Taking into account in the management of the company also other interest groups was associated with widespread and intensely promoted in the 80 s concept of business management oriented to the interests of its shareholders (*shareholders value management*)[1].

The term "*stakeholders*" is derived from the term "*to have a stake in*".

The concept of stakeholders is the general concept introduced for organizations of various kinds; is used most commonly in business management and project management. This concept is becoming more popular among management professionals, becoming, among others, an important element of the current versions of project management methodologies[2], due to its pragmatic, close to practical problems and solutions, character. This concept treats management as the result of aspirations, objectives and activities of various interest groups, which is consistent with the observations and practical experiences.

In the literature one can find many definitions of stakeholders. Here are some of them.

[1] M. Trocki, B. Grucza, *Analiza interesariuszy*, Bizarre, Warsaw 2005.

[2] Cf. E. Bukłaha, M. Trocki, P. Wyrozębski, W. Metelski, M. Juchniewicz, *Metodyki zarządzania projektami*, Bizarre, Warsaw 2011.

According to R. Edward Freeman – they are "groups that may affect implementation of the goals of the business or may be subject to interaction in the implementation of these objectives"[3].

Charles W.L. Hill and Gareth R. Jones define stakeholders as the various groups of people, or by individual subjects having claims against the company[4].

Richard O. Mason and Ian Mitroff believe stakeholders are "contenders (claimants) inside and outside the project, having legitimate interests regarding the project and its results"[5].

In turn, the ISO 10006 norm defines stakeholders as "any person holding interests in a project or in any way affected by the project"[6].

Generalizing these definitions, stakeholders can be defined as individuals, groups of individuals and institutions whose interests (aspirations) are related to the subject of management – enterprise, project or other organization – because of the potential impact on the course and consequences of management and/or due to exposure to the impact of management or its consequences.

Stakeholders may affect the company or project either positively, i.e. support its objectives or negatively, making it difficult or impossible to achieve its objectives. The larger the potential impact, the greater is the importance of stakeholders for the enterprise or project. Knowledge of the stakeholders of the company/project, their interests, ways of articulation and interaction capabilities are essential for the process of business management in all fields, including – in the field of project management.

2.3. Stakeholder Management Process

Stakeholder management process consists of planning, organizing, leadership, motivation and control of resources necessary to cope with the various external and internal stakeholders[7]. These functions are interrelated and repeatable – the emergence of new operators will require to re-initiate these functions at any time during the project's life cycle. The stakeholder management process is a continuous

[3] R.E. Freeman, *Strategic Management. A Stakeholder Approach*, Pitman, Boston 1984, Introduction, p. VI.

[4] Ch.W.L. Hill, G.R. Jones, *Strategic Management Theory: An Integrated Approach*, Hougton Mifflin, Boston 1995, p. 45.

[5] R.O. Mason, I. Mitroff, *Challenging Strategic Planning Assumptions. Theory, Cases and Techniques*, New York 1981, p. 12.

[6] ISO 10006, *Quality management systems – Guidelines for quality management in projects*, ISO, Geneva 2003, p. 1.

[7] J.K. Pinto, *Power and Politics in Project Management*, PMI Publications, Upper Darby PA 1996, p. 34.

process and involves adapting to new threats and opportunities from stakeholders and changing the strategy towards the existing entities. The inclusion of the notion of stakeholder management in the life cycle of the project emphasizes the ability of stakeholder's influence on the project at any time[8].

In order to support stakeholder management process it may be useful to use tools of shaping the political nature of the relationships with stakeholders. Interesting solutions are provided by the universal scheme of the political process used in managing stakeholders[9]. It suggests the use of six steps during the development of appropriate policies towards stakeholders:

1) analysis of the project's environment,
2) establishing objectives of the key players,
3) assessment of one's own abilities,
4) defining the problem,
5) developing solutions,
6) testing and improving the solutions.

Analysis of the Project's Environment

This step means that project managers must determine the actual attitude of the environment in which the project will be implemented, towards the project itself. Isn't the project crucial and cannot attract attention, or is it of great importance? From a political point of view, an essential element of the environment's assessment is to examine the "sensitivity" of the project on the environment. Will it pose a threat to the status quo of the organization or balance of forces of existing stakeholders? Reasonable project management requires an understanding that not all internal stakeholders perceive the project as important for the organization and that not all external actors have the same positive or, at worst, hostile approach to the implementation of the project.

Defining Goals of Key Subjects

The first step to forming a political strategy to mitigate the negative reactions of some stakeholders should be an attempt by the project manager to outline a complete picture of stakeholders. Image that objectively presents the nature of the stakeholders, and will be based on sound analysis, without putting a gloss on reality. Position

[8] *Project Management Handbook*, eds. D.I. Cleland, W.R. King, Van Nostrand Reinhold, New York 1988, p. 281.

[9] R. Block, *The politics of projects*, Yourdon Press, New York 1983, p. 23.

presented by stakeholders is based on their needs. It is therefore necessary to identify what the needs of every important stakeholder group in the context of the project are? Are their needs consistent with the needs of the organization, narrower, or are they beyond the scope of the organization? Is the aim not to maintain the status quo? Attention should be focused not only on seeking an explicit list of targets, most of which seem illusory. One needs to go into the real needs that drive the behavior of stakeholders, knowledge of hidden agendas and programs of action.

Assessment of One's Own Capabilities

What do we do well? What are our weaknesses? Do we have the political support and a strong enough bargaining position to each of the stakeholders? If we lack a relationship with someone important, where should we look for support? Each of these questions is an example of the importance of understanding of one's own potential. Cheating yourself is one of the most common causes of career's destruction, it also often leads to project's failure[10]. Not everyone has good contacts with senior management, which may be necessary to provide ongoing support and inflow of resources to the project. If we believe that political acuity is not our strong point, the obvious solution is to find someone endowed with this trait who could help.

Defining the Problem

After analyzing the project's environment, including the specifics of the major players and their abilities, one can identify sources of existing and potential problems. If the circumstances of the project cause significant uncertainty about the amount of work necessary to complete the project, it is likely there will be problems between accounting and project team. In the projects on the delicate field of environmental protection, conflicts between groups intervening from the outside, the client and the design team seem inevitable. The diagnosis of potential problems should always be the starting point of developing a strategy towards stakeholders.

Developing Solutions

There are two important issues relating to this step. Firstly, creating solutions means constructing plan of action to meet the needs of different groups of stakeholders in the context of the interests of other groups. This is the stage, in which the project manager, and his team, manage a complex political process. What solutions

[10] J.K. Pinto, *Power and Politics*…, op.cit., p. 37.

will prove themselves in dealing with the board? When implementing this strategy, what response can one expect from the chief accountant? Customer? The project team? Similar questions will help the project manager to develop solutions according to the interconnectedness of each of stakeholder's groups.

The second key element that must be paid attention to is the need to do "political homework" before proceeding with the development of specific solutions. Too often, project managers fall into the trap of trying to manage the process in the absence of sufficient information, or based on fragmentary data. Following such an approach, work of a project manager begins to resemble a fireman extinguishing still emerging fires, solving one crisis after another. In this way one cannot reach the goal of the project.

The most important in stakeholder management seems to be to create and maintain a variety of strategies that provide maximum flexibility to the project manager. These strategies tend to be sophisticated and are used specifically against various entities. They should not rely on one method of influence, regardless of the circumstances – the likelihood of creating and maintaining constructive relations will then be higher.

Testing and Improving the Solutions

Testing solutions means that project manager admits to working with incomplete information. It is assumed that the stakeholders will react to some initiatives in a predictable manner. Such assumptions, however, are often wrong. During testing and improving solutions, project manager and the team must realize that the implementation is an iterative process. Many previous assumptions about the needs and prejudices of various stakeholder groups must be checked for verification. In some cases, the evaluations of manager and the team may not be accurate. At other occasions assumptions turn out to be dangerously naive or disingenuous. The last step in stakeholder management process requires the project manager to carry out a critical self-assessment – requires the flexibility to incorporate new information into existing diagnosis and apply proper plan's corrections halfway.

The above six steps are a way to evaluate the role that stakeholders play in the successful implementation of the project. Each step allows the project manager to apply approach of "stakeholder political management", recognizing the multidimensional nature of the problem and interactions.

The threat stemming from too strong focus of the project on the expectations of stakeholders can be an uncontrolled increase in the scope of the project and the investment needed for its implementation and extension of primary schedules. In the absence of appropriate management mechanisms, the project may even lose business case, breaking away from the original strategic goals and objectives.

2.4. Overview of Shareholder Analysis Models

2.4.1. Model AA1000[11]

Stakeholder engagement standard AA1000 (AA1000SES) is an universal framework scheme based on publicly available sources, used for the development, implementation, evaluation and public presentation of stakeholder quality engagement.

It describes how to determine requirements for stakeholder engagement process, how to integrate stakeholder engagement with management, strategy and activities of the organization; how to define the purpose, scope and range of stakeholder's involvement, as well as mechanisms that allow a qualitatively good commitment, covering all processes of engagement and providing positive results.

The standard was designed to enable organizations to respond in a comprehensive and balanced way to emerging problems, unforeseen circumstances and emerging opportunities.

Standard stresses that the involvement of stakeholders must result in solutions valued by the parties involved and must be communicated in a credible way.

AA1000SES applies to all types and levels of stakeholder's engagement. It applies to the both internal and external involvement, to public organizations, private and social, regardless of their size. It can be used for project-based activities, but also to current activities.

AA1000SES standard is intended for use by management of stakeholder engagement process. It will also be useful for other managers and others responsible for making decisions, as well as for participants of stakeholder inclusion process.

Users of other standards of the AA1000 Series will find AA1000SES to be useful in understanding the principles of inclusion, significance and responsiveness, as well as in assessing compliance with these principles.

AA1000SES can also be used to promote a wide range of other standards, recommending or requiring the involvement of stakeholders. It can be used, e.g. to support risk, quality, relationship and knowledge management; it can be used to ensure social responsibility and sustainable development and transparency. AA1000SES was not designed to replace or undermine existing mechanisms, such as the requirements of government consultations or formal agreements, collective bargaining between organizations and employees. However, it may effectively inform about them and support these commitment methods.

[11] *AA1000 Stakeholder Engagement Standard 2011. Final Exposure Draft*, AccountAbility, 2011.

Stakeholder's engagement must be embedded in the culture and the main rules of the organization. To achieve this, AA1000SES requires organization to commit to the principles of the AA1000APS and to integrate stakeholder's engagement with management, strategy and activities of the organization. Thanks to this commitment and integration, stakeholder's engagement leads to better results at the strategic and operational levels.

Effective engagement depends on understanding why we engage (target), in what we engage (scope), and who should be involved in the engagement process (executives, initiator, stakeholders). Applying to the AA1000APS (2008) principles and integrating stakeholders with management, strategy and operations requires the involvement of stakeholders to be used systematically and regularly throughout the organization.

After establishing the purpose, scope and range of stakeholder engagement process, implementers must next make sure that the developed process is of good quality. AA1000SES stakeholder engagement process involves four steps: Planning; Preparation; Implementation; and Action, Review and Improvement.

2.4.2. Australian Government Model[12]

Stakeholder engagement model, developed by the Australian Immigration Office (Department of Immigration and Citizenship), was published in 2007 still in draft form. The standard was formulated with the participation of internal and external stakeholders in early 2008. It consists of three key elements:

- conception and planning,
- preparation and commitment,
- reacting and monitoring,

which in turn are divided into five main flexible and interchangeable steps. Elements shape a circle, showing the entire process, from the initial preparatory work by setting objectives and activities, deepening knowledge about stakeholders, through reacting and the review until the reassessment.

The first element of stakeholder engagement model involves identifying key stakeholders and issues important to them. It should be noted that the stakeholders are different for each group, section and division, and that they may vary depending on the circumstances.

It is therefore important to gather together members of the team and within it collectively identify potential stakeholders, define the goals and strategically think about the relationship.

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[12] *Zaangażowanie interesariuszy. Podręcznik użytkownika*, ed. B. Grucza, Bizarre, Warsaw 2012 after Australian Immigration Office, 2008 (first edition).

The preparation of a map, identifying key stakeholders and relationships, is an effective way of identifying all stakeholders.

Map sets out the organizations now identified as major stakeholders within the agreed categories. The map does not constitute an exhaustive list of stakeholders and is periodically revised. It is provided for information purposes, for economic regions when determining their key stakeholders.

When working with stakeholders it is important to define the rules of engagement. In the early stages of engagement one needs to define one's own job, the position, the reasons for dialogue and the ability to meet the needs of stakeholders. Stakeholders must know the rules of engagement, as well as its limitations. In many cases, the departmental officer works within the department policy and is unable to comment on the will of the stakeholders, due to legal restrictions or policies (of the government). Consultations may take place in relation to the whole of government's activities and department may be limited by a stage that has already been achieved. To explain this problem one can point to policy's framework and legislation, and how they apply to commitment.

A key component of a relationship is communication because stakeholder's engagement is in fact a complex relationship.

Within the framework of strengthening the potential engagement one should take into account the strengths of organizational systems, as well as identify gaps and weaknesses. In a similar way one should take into account individual abilities and skills needed to engage and areas in need of support. At all times one should think about his team and various skills that different people bring to their functions.

After identifying key stakeholders and issues, picturing the overall commitment, doing research, carrying out planning at a higher level and considering the potential, one can proceed to the implementation stage.

At this stage it can be considered to develop a stakeholder engagement plan which outlines the objectives, scope and methods. This should be an integral part of the overall plan of the organization's activities. By creating a stakeholder engagement plan, one must remember that it must relate to the overall objectives of the activities' plan, but should contain more precise references to tasks.

In the process of engagement an important issue is a common identifying with stakeholders of the issues or policies that cannot be changed, in order that the stakeholders do not have the feeling that they were misled or their consultancy opinions were worthless.

Periodically, especially after the most important moments in the process of engagement, one must browse maps of stakeholders and correct them if necessary – strategies, objectives and scope, plans and performance indicators.

Each stakeholder's engagement is different. There is no single framework, but it is important to have guidelines to help in understanding the process of engagement.

Strong stakeholder's engagement does not always reflect excellent communication, relationships and results for the entire duration of the process. Stakeholders may initially be hostile or reluctant during the consultation due to internal and external causes. An important issue is to work out how to deal with these obstacles.

2.4.3. Model Stakeholder Research Associates, UNEP, Accountability[13]

Stakeholder engagement model, consisting of the *Practical guide of engaging stakeholders*[14] and its sister volume *The practical look at the engagement of stakeholders – the Guide*[15] (prepared by Stakeholder Research Associates) are the results of efforts of United Nations Environment Programme – UNEP to create a guide on best practices in stakeholder's engagement, as well as wider objective to promote the engagement of stakeholders around the world, used to achieve sustainable development.

Many companies have come to regard engagement with a variety of entities and individuals in social, environmental and economic matters, as an important aspect of how to do business. However, the first actions in the field of stakeholder's engagement (so-called first generation) often were carried out under the pressure exerted ad hoc and limited to issues causing conflict with stakeholders. Many companies, realizing the benefits of a more active, broader and sustained dialogue, began to work out a more sophisticated, systemic approach to stakeholder's engagement. It turned out that these actions (so-called second generation) improved mutual understanding, helped to manage risk and effectively resolve conflicts.

Currently leading companies are increasingly aware of the fact that the engagement of stakeholders can contribute to gaining knowledge and innovative products and processes and can ensure the sustainability of decisions within the company and beyond. Third generation stakeholder's engagement enables companies to match environmental, economic and social activities to their fundamental strategy. Such stakeholder engagement processes involve the combination of resources (e.g. know-how,

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[13] Research based on an official Polish translation: *Od słów do czynów. Podręcznik angażowania interesariuszy*, vol. 2: *Praktyczny poradnik angażowania interesariuszy*, translated by A. Majewska, B. Grucza, edition and adaptation of Polish version of the book by B. Grucza, Bizarre, Warsaw 2012 after Stakeholder Research Associates Canada Inc., United Nations Environment Programme, AccountAbility, 2005 (first edition – in English).

[14] Ibidem.

[15] *Od słów do czynów. Podręcznik angażowania interesariuszy*, vol. 1: *Praktyczne spojrzenie na zaangażowanie interesariuszy – przewodnik*, translated by A. Majewska, B. Grucza, edition and adaptation of Polish version of the book by B. Grucza, Bizarre, Warsaw 2012 after Stakeholder Research Associates Canada Inc., United Nations Environment Programme, AccountAbility, 2005 (first edition – in English).

financial, human or operational resources) that can help all parties to acquire knowledge, solve problems and achieve goals impossible to be achieved alone. The model shows the process of stakeholder's engagement in five stages:

- The first stage is a general reflection on the strategic objectives of the company, on their relationship with stakeholders and individual issues and on the initial classification of stakeholders and issues in terms of priorities for further analysis.
- In the second stage, there are different degrees of engagement and guidance on analysis of existing relationships, available resources and organizational constraints. The second stage also aims to assist in gaining greater knowledge on the representatives of the stakeholders and in making decisions about the kind of relationship one wants to establish with these stakeholders.
- The third stage covers issues of internal and external competences and capacity to engage. It also contains guidance on how to ensure that all parties of the process are able to effectively participate in it.
- In the fourth stage one shows various techniques of engagement. Based on earlier steps, this section also shows how to plan an approach tailored to the needs of a particular situation and how to achieve their own goals.
- In the last, fifth stage, the manual provides guidance on how to verify the results of engagement and how ensure stakeholder's confidence about the quality of one's efforts.

Presented stakeholder engagement process is based on the principles of substantiality, completeness and ability to react.

Significance requires knowledge about one's own interests and priorities and the interests and priorities of stakeholders. Are these actions sincere? Do consultations take place only in order to improve the image of the organization, or their initiators want to really get a complete, balanced picture of the actual impact of their organization?

Completeness requires understanding and managing the impact of the organization and consequent opinions, needs, perception and expectations of stakeholders. Are they fair and based on reliable information? Does the engagement process enable the inclusion of all stakeholders or are those who particularly feel the impact of the organization ignored? Is one using internal and external processes, enabling organizations to acquire actual knowledge about their impact and the opinions of stakeholders?

The ability to react: it requires a coherent response to the main issues of importance for stakeholders and organizations. What results does it bring? What does the organization plan do about the issues discussed? How will it affect other aspects of the activities and what will the benefits be? Is there a will to make the changes required for implementation of new issues to management processes and strategy? And also: what kind of benefits will the firm get?

2.5. Conclusions from the Discussed Stakeholder Analysis Models

A good manager will never take a decision without taking into account how these decisions will affect the external groups[16]. One way to understand the relationship of project managers and their projects with the rest of the organization is to use stakeholder's analysis.

The process of stakeholder's analysis is forcing companies to recognize the potentially far-reaching consequences of actions taken, both intentional and unintentional, and their impact on various groups of stakeholders[17]. Stakeholder's analysis is essential for understanding the impact of major strategic decisions of the organization. It can also be used in the discussion on project management – there is a real concern about the impact of the various parties on the project and the project's development process. For example, customers of the project, as a group, aiming to develop a new project, have an active part in it, they want to implement it on time, not necessarily taking into account the production capabilities of the contractor. A group of interested clients may have an impact on the activities of the project team in many ways, mostly urging to accelerate implementation, working with a team in order to facilitate the commencement of the project, affecting the management of the parent organization in order to further support the project. The project team may, in turn reciprocate these relationships by working closely with customers and facilitating the transfer of the project to the intended group of users[18]. Understanding the importance of stakeholders for the effective and efficient implementation of the projects led to the development of principles, methods and instruments of cooperation with them in projects that make up the content of the Project Stakeholder Management. Stakeholder management usually includes three phases: analysis, planning and the implementation; they are associated with individual project management processes.

Comparison of the models shows many common features of the presented solutions. Stakeholder management process was formed similarly. The models are based on similar principles, while the Australian Government's model draws directly from the model Stakeholder Research Associates, UNEP, AccountAbility.

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[16] W.R. Dill, *Environment as an influence on managerial autonomy*, "Administrative Science Quarterly" 1958, no. 3, pp. 409–443.

[17] J.K. Pinto, *Power and Politics*…, op.cit.

[18] Ibidem.

Table 2.1. Stakeholder Management Phases

Phases	Stages	Connection with project management processes
Analysis phase	Stakeholder's identification	Identifying and defining project
	Creation of stakeholder's characteristics	
	Stakeholder's evaluation	
Planning phase	Predicting stakeholder's behavior	
	Planning activities towards stakeholders	Planning and organizing the project
Implementation phase	Cooperation with project's stakeholders	Control of the project, project execution, project closure

Source: *Strategiczne zarządzanie projektami*, eds. M. Trocki, E. Sońta, Bizarre, Warsaw 2009, p. 371.

Table 2.2. Synthetic Comparison of the Characteristics of the Stakeholder Analysis Models

Elements of the model	AA1000SES standard	Australian's government model	Model Stakeholder Research Associates, UNEP, AccountAbility
Process	Planning	Stakeholder's identification	Strategic thinking
	Preparation	Analyzing and planning	Analyzing and planning
	Implementation	Strengthening the engagement potential	Strengthening capabilities
	Review and improvement	Process development and involvements	Involvement in action
		Action, review and reporting	Action and verification
Principles	Commitment	Significance	Significance
	Integration	Complementarity	Complementarity
		Capability to reacting	Capability to reacting

Source: own study.

Standard AA1000SES is characterized by the greatest simplicity and clarity. The most expanded model is Stakeholder Research Associates, UNEP, AccountAbility, in which it is difficult to identify significant shortcomings. The disadvantage of the Australian's government model is the high specificity relating to the scope of expertise of the department of immigration.

This description of the models shows that the concept of stakeholder's analysis is a pragmatic concept, which means that it has to not only explain management problems but also solve them. For this purpose, a method referred to as a stakeholder's analysis is used. It occurs in various modifications, however, based on common principles of conduct.

The purpose of this analysis is to identify real and not formal system of power associated with enterprise management or project management.

Table 2.3. Advantages and Disadvantages of Stakeholder Analysis Models

	AA1000SES standard	Australian's government model	Model Stakeholder Research Associates, UNEP, AccountAbility
Advantages	Transparent rules	Transparent rules	Transparent rules
	Integration with management	Integration with management	Integration with management
	Integration with the strategy	Integration with the strategy	Integration with the strategy
	Transparent process	Transparent process	Transparent process
	Instructions for the reader		Instructions for the reader
	Definitions	Definitions	Definitions
	Clear structure	Clear structure	Clear structure
	Clear graphic form	Clear graphic form	Clear graphic form
	Versatility		Versatility
		Case studies	Expanded case studies
		Checklists	Expanded checklists
		Form templates	Expanded form templates
Disadvantages	Simplifications	High sectoral specificity	
	No examples		
	No forms		

Source: own study.

Models give full opportunity to use the recommended solutions in the Polish economic and social practice. They include solutions suitable directly for use in both the public and private sector. Clear description of the stakeholder engagement process, the abundance of the attached examples, ready-made forms and patterns empower one to recommend discussed solutions in every organization operating in Poland. In many areas of activity of domestic entities they would contribute to the elimination of common errors of strategic, tactical and operational management, especially project management and to increase the efficiency of the organization.

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Mateusz Juchniewicz

3

ACHIEVING EXCELLENCE IN THE IMPLEMENTATION OF PROJECTS USING PROJECT MANAGEMENT MATURITY MODELS

3.1. Definition and Development of Organization's Maturity

The term "maturity" has been functioning in management sciences for decades. Originally it was identified with the models defining the so-called organizational life cycle. According to them, the organization went through successive stages of "life", from creation through maturity until its termination. This concept was reflected in the studies of, among others, John R. Kimberly (*The Organizational Life-Cycle*) and Robert E. Quinn[1]. In the literature, the best known is the model of Larry Greiner. On the basis of his research, found that the organization achieves the different phases of growth, from youth to maturity through crises[2]. The term "maturity" was associated with the age of the organization, so it would be more accurate to use the term "grown-up".

Phillip Crosby, an American specialist in the field of quality management, as one of the first defined the term maturity in management. He has developed and published in his book *Quality is Free*, regarded as the first in the history, a maturity model – the so-called Quality Management Maturity Grid. Maturity is defined herein as the organization's ability to professional use of tools and techniques of quality management.

J. Kent Crawford gives two definitions of maturity. It is believed that originally the term meant the effectiveness of the organization in carrying out specific actions. Increasingly, however, one speaks of maturity as a coherent and comprehensive approach to improving the quality of services provided by the organization[3].

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[1] More: R.E. Quinn, K. Cameron, *Organizational Life-Cycles and shifting criteria of effectiveness: some preliminary evidence*, "Management Science" 1983, vol. 29, pp. 33–51.

[2] More: L.E. Greiner, *Evolution and Revolution as Organizations Grow*, "Harvard Business Review" 1972, vol. 50, no. 4.

[3] J.K. Crawford, *Project Management Maturity Model*, "Information Systems Management" 2007, vol. 23, no. 4, p. 1.

Terence J. Cooke-Davies gave the definition of maturity according to the provisions of the Oxford Advanced Learner's Dictionary and described the term as a full development or perfection.

On the other hand, the authors of CMMI (Capability Maturity Model Integration) model define the maturity of the organization as the extent to which the organization clearly and consistently implements processes that are documented, managed, measured, controlled and continually improved. The organizational maturity can be measured by audits[4]. Maturity of the organization, then, means to **achieve the level of development by the organization at which it applies systematic management tools and techniques, increasing efficiency and effectiveness of the actions taken.**

Growing up is therefore a process that requires from organizations implementing specific solutions and achieving next stages known as maturity levels. These basic features of maturity issue are universal – relate to it in every dimension – biological, social, economic.

3.2. History of Maturity Concept

As already mentioned, the first organizational maturity model is considered to be Philip Crosby's Quality Management Maturity Grid, published in 1979. However, there were earlier attempts to create models that define the stages of development of the organization. That is why it is often thought that the proper precursor of the concept of maturity was Richard Nolan, who, in 1973 developed the Stages of Growth Theory. Another important moment in the development of the maturity concept was a creation of a CMM (Capability Maturity Model) model by the Software Engineering Institute (SEI). The genesis of this tool is described in detail in the next section. Architecture of CMM model was based on a process approach to management. This meant that this model allowed to determine the level of maturity of the processes in an organization. The versatility of the process approach and the ability to apply it in all areas of management quickly translated into the growing popularity of the CMM model and further development of the concept of maturity. Maturity models in project management were developed on the basis of experiences with the application of CMM maturity models. Almost in parallel with them the industry tools (allowing to investigate the maturity of organizations operating in specific sectors) and the contextual tools (relating to the fields of management – including in the area of risk, change, stakeholders, etc. management) were created. In the longer term, the

[4] *Capability Maturity Model Integration for development (CMMI–DEV)*, *ver. 1.3*, Software Engineering Institute, 2010, p. 446.

concept of maturity in project management was expanded with the program and projects' portfolio management.

Currently, there are more than 100 models of maturity of the organization. The most important of these are shown in Table 3.1.

Table 3.1. The Most Important Models of Organization's Maturity

Original name	Polish translation
Agile Maturity Model	Model dojrzałości zwinnych technik zarządzania projektami
Brand Maturity Model	Model dojrzałości marki
Capability Maturity Model Integration	Zintegrowany model dojrzałości umiejętności
Change Proficiency Maturity Model	Model dojrzałości sprawności zmian
Configuration Maturity Model	Model dojrzałości konfiguracji
Data Governance Maturity Model	Model dojrzałości zarządzania danymi
Earned Value Management Maturity Model	Model dojrzałości zarządzania techniką Earned Value
Enterprise Architecture Maturity Model	Model dojrzałości architektury przedsiębiorstwa
Full – cost Maturity Model	Model dojrzałości rachunkowości pełnych kosztów
Information Lifecycle Maturity Model	Model dojrzałości cyklu życia informacji
Information Process Maturity Model	Model dojrzałości procesów informacyjnych
Internet Maturity Model	Model dojrzałości Internetu
IT Service Capability Maturity Model	Model dojrzałości usług informatycznych
Knowledge Management Maturity Model (KMMM) by APQC	Model dojrzałości zarządzania wiedzą[a]
Leadership Maturity Model	Model dojrzałości przywództwa
Localization Maturity Model	Model dojrzałości lokalizacji
Maturity Model	Model dojrzałości
Operations Maturity Model	Model dojrzałości operacji
Outsourcing Management Maturity Model	Model dojrzałości zarządzania outsourcingiem
People Capability Maturity Model	Model dojrzałości umiejętności ludzi
PMO Maturity Cube	Kostka Dojrzałości Biura Zarządzania Projektami[b]
Prosci's Change Management Maturity Model	Model dojrzałości zarządzania zmianą Prosci'ego
Risk Management Maturity Model	Model dojrzałości zarządzania ryzykiem
Services Maturity Model	Model dojrzałości usług
Software Maintenance Maturity Model	Model dojrzałości serwisu/utrzymania oprogramowania
The Treading Maturity Model	Kroczący model dojrzałości
Web Services Maturity Model	Model dojrzałości usług internetowych
Website Maturity Model	Model dojrzałości stron internetowych

[a] More on knowledge management in projects: P. Wyrozębski, *Zarządzanie wiedzą projektową,* Difin, Warsaw 2014.
[b] More on project management offices: P. Wyrozębski, *Biuro projektów*, Bizarre, Warsaw 2009.

Source: based on: M. Juchniewicz, *Dojrzałość projektowa organizacji*, Bizarre, Warsaw 2009.

Today, one observes a further development of the concept of maturity. First of all, new contextual models, encompassing more narrow, specialized areas of the organization are created. Fast develops also a group of models created by professional associations and consulting firms. Maturity of the organization increasingly becomes the object of scientific research.

In the next part of the chapter one reviews the most common project management maturity models.

3.3. Project Management Maturity Models

The most important project management maturity models are:

- The Kerzner Project Management Maturity Model – PMMM,
- Organizational Project Management Maturity Model – OPM3,
- PRINCE2™ Maturity Model – P2MM,
- OGC Portfolio, Program and Project Management Maturity Model – P3M3,
- OGC Project Management Maturity Model – PMMM,
- PM Solutions Project Management Maturity Model – $PMMM_{SM}$.

Project management maturity models can be divided into two groups. Construction of the first group of models consists in assigning organization to one of several (usually 5 – see p. 3.3.1) levels of project management maturity. So, they are of static, jumping character. To this group belong, among others:

- Prince 2 Maturity Model,
- Kerzner Project Management Maturity Model,
- OGC Project Management Maturity Model,
- PM Solutions Project Management Maturity Model.

The second group includes models that do not specify the maturity level of the organization. With them we shall assess specific areas of project management in the organization. The evaluation result is usually given in percentage points. This group includes Organizational Project Management Maturity Model (OPM3) and all derivative models, constructed mostly by consultancy firms based on OPM3.

Currently on the market there are over hundred models of maturity, of which, according to research by the Project Management Institute (PMI), approx. 30 are project management maturity models. Further one describes the most important of them.

3.3.1. The Kerzner Project Management Maturity Model (PMMM)

The model developed by Harold Kerzner, a specialist in project management, was supposed to combine the complexity of sophisticated tools such as CMMI model, while being simple to use, versatile and useful for any organization – regardless of its size. In 2001 the book, *Strategic Planning for Project Management Using a Project Management Maturity Model* was published by H. Kerzner. This is a complete publication describing this tool.

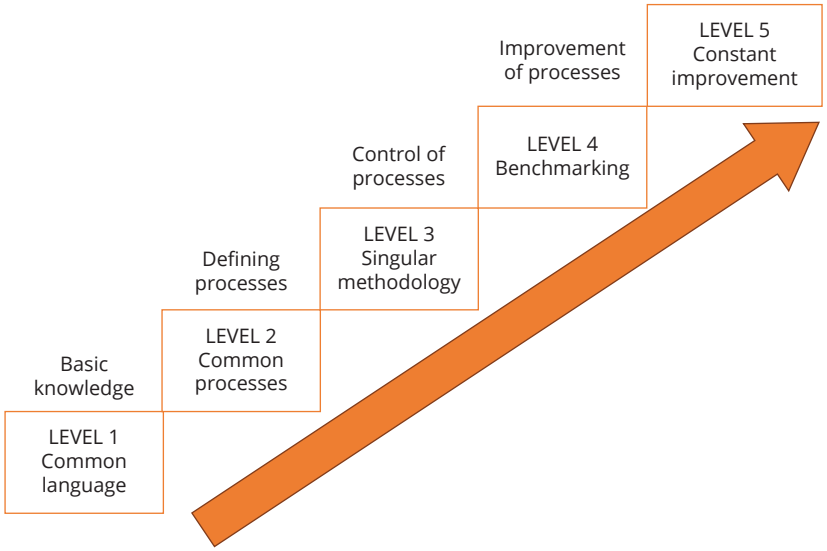
The model defines five levels of maturity of the project:

- Level 1 (Common language) – participants of the organization understand the importance of projects in business, they have a basic knowledge of project management and use uniform terminology in the implementation of projects.
- Level 2 (Common processes) – the organization recognizes that common processes must be defined and refined in a way to be able to repeat the success of one project in another project.
- Level 3 (Singular methodology) – the organization recognizes the synergies resulting from the combination of all methods in the organization into one methodology, the center of which is the project management. Thanks to the synergy effect, process control becomes easier.
- Level 4 (Benchmarking) – the organization recognizes that improving processes is necessary to maintain a competitive advantage. Benchmarking must be a continuous process. The organization is able to decide what to teach and from whom.
- Level 5 (Continuous improvement) – at this level the organization is continuously evaluating the information obtained as a result of benchmarking and decides on the suitability of information in advancing their own project management methodologies. The organization constantly tracks changes in technology, improvements, scientific publications, etc.[5]

General scheme of maturity levels in Kerzner model is shown on Figure 3.1.

[5] Description of maturity levels based on: H. Kerzner, *Strategic Planning for Project Management Using a Project Management Maturity Model*, John Wiley and Sons, 2001, pp. 42–43.

Figure 3.1. Scheme of Relationships Between Levels of Maturity in the Kerzner Model



Source: based on: H. Kerzner, *Strategic Planning for Project Management Using a Project Management Maturity Model*, John Wiley and Sons, 2001, p. 42.

3.3.2. Capability Maturity Model Integration (CMMI)

CMMI is a model of maturity of processes mainly used in the ICT project management. Originally it was commissioned by the US Department of Defense as a tool for assessment and verification of software vendors, taking part in public tenders.

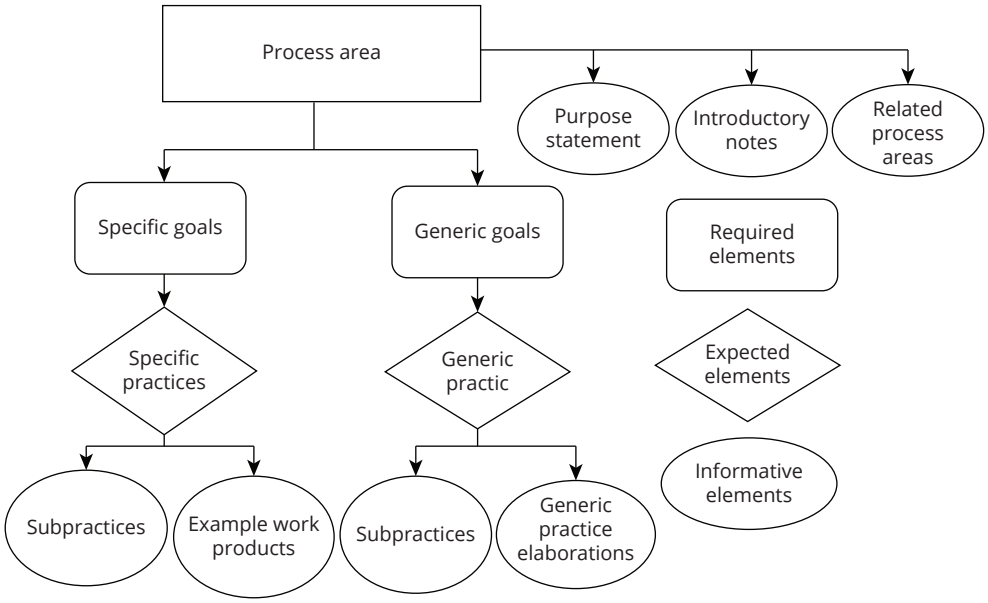
A general structure of CMMI model is shown in Figure 3.2.

If an organization wants to pursue the given process, it must meet the generic and specific goals assigned to this process area (required elements). Goals are described by practices. Their implementation can help to achieve the goals, but the organization is not obliged to implement practices (expected elements). Practices are described in detail by the informative elements, similar as the process area.

The CMMI highlights two approaches to assessment of the organization – continuous and staged.

In the continuous CMMI model approach one assesses the level of skills of the organization for each process area separately. On this basis, one can create a detailed profile specifying the maturity of the organization.

Figure 3.2. The Design of CMMI Model



Source: *Capability Maturity Model Integration for development (CMMI–DEV), ver. 1.3*, Software Engineering Institute, 2010, p. 10.

Continuous approach is based on six levels of skills, which are used to assess the improvement of processes in the organization. These are presented in Table 3.2.

Table 3.2. Skill Levels According to CMMI–Continuous Approach

Level	Name
0	Incomplete
1	Performed
2	Managed
3	Defined

Source: *Capability Maturity Model Integration (CMMI) – CMMI for Development 1.3*, Software Engineering Institute, 2010, p. 24.

A staged approach of CMMI model allows a comprehensive assessment of the maturity of the organization. For this purpose, the authors of CMMI model have defined 5 maturity levels (Table 3.3).

Table 3.3. Stages of Maturity According to CMMI Model – Staged Approach

Level	Name
1	Initial
2	Managed
3	Defined
4	Quantitatively Managed
5	Optimizing

Source: *Capability Maturity Model Integration (CMMI) – CMMI for Development 1.3*, Software Engineering Institute, 2010, p. 27.

The complexity of the CMMI model causes that the assessment using this tool is a project implemented mostly in the design formula. The first most important step that allows to start an evaluation project is to expose knowledge of the CMMI model in the organization. Most often it is the role of top management. One should disseminate the information about the model, expose the benefits of implementing CMMI. Only in a situation of full understanding of the model and after accepting the philosophy of continuous improvement across the organization one can begin planning assessment. At this stage, one can use the IDEAL model (Initiating, Diagnosing, Establishing, Acting and Learning). A key part of planning is to answer three questions:

- in which cells of the organization (in the whole organization?) will CMMI model be implemented?
- which model will be used (there is no need to use CMMI model as a whole, one can use only its elements, for example CMM-SW CMM–IPPD etc., one can also use other configurations of components of the model – e.g. to select from 22 process areas only those which will be improved)?
- which approach – continuous or staged – will be used?

Software Engineering Institute has developed a document setting out precisely how an organization can assess its maturity using the CMMI model. This document – Appraisal Requirements for CMMI – ARC – has three classes of assessment. They are characterized in Table 3.4.

The use of Class A incurs the highest expenditures. It is necessary to create a large evaluation team, the evaluation process takes more than 100 days. It is necessary to use multiple sources of information. The aim of the evaluation is to obtain an official certificate issued by SEI confirming the maturity level of an organization or skill level. The use of Class B reduces the cost of evaluation in relation to variant A, but in this case it is not possible to obtain an official document confirming the maturity of the organization. The use of Class C incurs minimal costs, but the credibility of

the results of the evaluation is not high. This type of evaluation should have a pilot, survey character, before a proper assessment.

Table 3.4. Classes of Organization's Assessment Using CMMI

Category	Class A	Class B	Class C
Amount of acquired information	very high	medium	small
Ranking generation	yes	no	no
Demand for resources	very high	medium	low
The size of the evaluation team (relatively)	large	average	small
The correctness of the result	high	average	low
Time of duration (relatively)	long	average	short
Frequency	small	medium	high
Standard	SCAMPI A	SCAMPI B	SCAMPI C

Source: own research based on: *Standard CMMI Appraisal Method for Process Improvement SCAMPI A, v. 1.3*, Software Engineering Institute, 2010.

3.3.3. Organizational Project Management Maturity Model (OPM3)

Organizational Project Management Maturity Model (OPM3) was developed in late 2003 by the Project Management Institute. Its design is largely based on the philosophy and architecture of CMMI.

Understanding of the OPM3 idea requires an understanding of what the OPM is, i.e. Organizational Project Management. PMI defines OPM as "a coherent, logical application of knowledge, skills, tools and techniques to organizational and project activities in order to achieve objectives of the organization through projects"[6]. So OPM3 does not examine only project management maturity. It is the connection between strategy, organization and management ability of a single project.

OPM3 is composed of 4 main elements. These are the Best Practices, Capabilities, Key Performance Indicators and Outcomes.

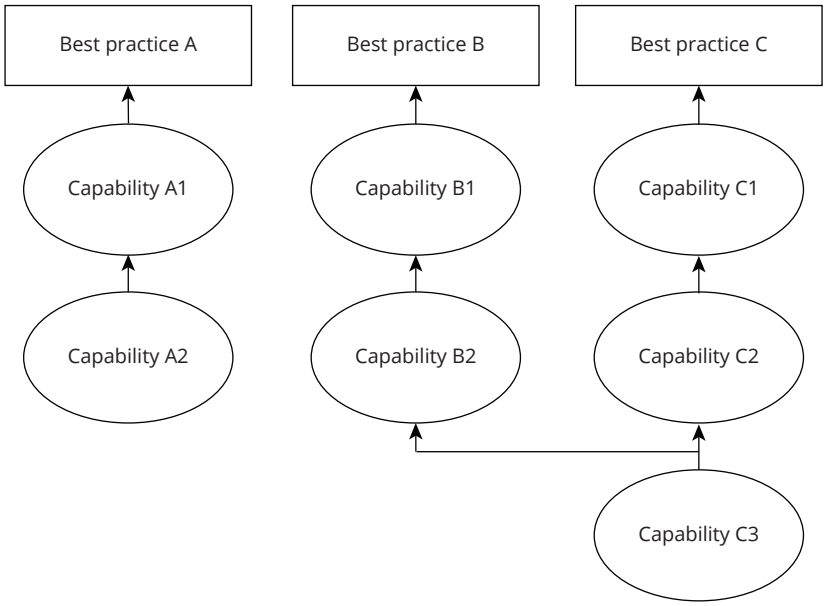
Best practices are a description of "optimal way, recognized and widespread in the economy, of achieving the objective"[7]. In OPM3 586 best practices have been described and cataloged. Their use guarantees an increase in efficiency of the organization. However, to enable the organization to conclude that it uses the best practice, it must have very specific skills.

[6] L.M. Kruszewski, *Organizational Project Management Maturity Model*, Project Management Institute Inc., Pittsburgh, 7 October 2003, p. 10.

[7] Based on: R. Rao, *OPM3 – an Overview*, XtraPlus Solutions, 2004, p. 5.

Capability is a component of best practices, specific competence, which an organization must have in order to follow best practice. OPM3 describes 2109 capabilities. For each best practice there must be assigned at least two capabilities. Given capability can be simultaneously a part of a number of the best practices. There are also links between capabilities – in order to possess a certain capability, one may need to have one or more other capabilities. These relationships can be presented on the diagram (Figure 3.3).

Figure 3.3. Relationships Between Capabilities and Best Practices



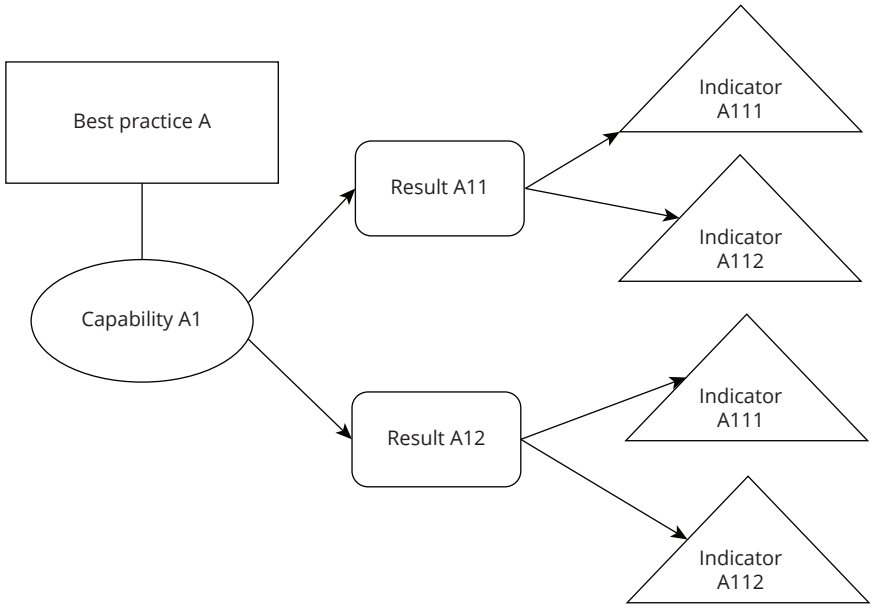
Source: own research based on: J. Schlichter, *Organizational Project Management Maturity Model. Emerging Standards*, Project Management Institute Inc., 2001.

If an organization wants to follow best practice A, it must possess the capabilities A1 and A2. If it wants to follow best practice B, it must possess the capabilities C3, then B2 and eventually B1. If it wants to follow best practice C, it must possess the skills C3, C2 and C1. Such a network depending on the organization enforces continuous, long-term improvement of processes.

Each capability has a set of results (at least one) that allows one to determine whether the organization has a particular skill. The results are generated by capabilities, in other words – the possession or use by the organization of capabilities produce certain effects and results. They are objectively verified by indicators. These are quantitative or qualitative criteria for determining whether the organization achieves the

result allowing to assess owned capabilities. Indicators can be expressed in terms of ratings (quantitative) or as expert judgment (qualitative). The relationships between capabilities, results and indicators are shown in the diagram (Figure 3.4).

Figure 3.4. The Relationships Between Capabilities, Results and Indicators



Source: own study based on: L. Bull, *An Introduction to OPM3 and Supporting Models*, EFCOG Project Management Working Group Summer Meeting – Albuquerque NM, July 17, 2007, Project Management Institute Inc., p. 9.

Best practices and capabilities – the basic components of OPM3 – have been grouped into categories forming 3 dimensions of a model. Firstly, the so-called domains – project management, program management, portfolio management (Project, Program, Portfolio – PPP) have been distinguished in OPM3. 586 best practices and 2109 capabilities described in the model have been grouped in the following proportions:

- project management – 208,
- program management – 167,
- portfolio management – 216.

Each best practice can be assigned to more than one domain.

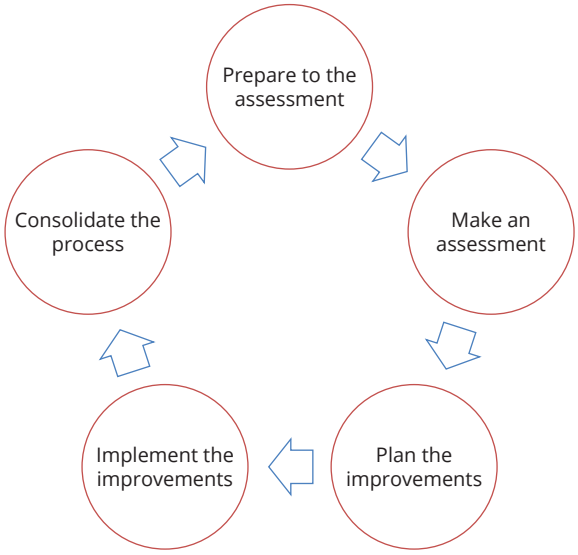
The second dimension of the model is called OPM3 continuum – the stages of process improvement. They are: standardization, measurement, control, continuous improvement (Standardize, Measure, Control, Improvement – SMCI). Best practices have been grouped in the following proportions: standardization – 199; measurement

– 143; control – 120; continuous improvement – 126[8]. In addition, practices and capabilities have been assigned to areas of knowledge in accordance with the PMBoK (Project Management Body of Knowledge) approach.

The assessment cycle using OPM3 consists of three basic elements, within which one can further extract 5 operations forming a cycle. These three basic elements are knowledge, assessment and improvement.

OPM3 cycle can be represented by the diagram (Fig. 3.5). Its specific elements are further described in detail.

Figure 3.5. OPM3 Cycle



Source: L. Bull, *An Introduction to OPM3 and Supporting Models*, EFCOG Project Management Working Group Summer Meeting – Albuquerque NM, July 17, 2007, Project Management Institute Inc., p. 13.

3.3.4. Portfolio, Programme and Project Management Maturity Model (P3M3)

P3M3 consists of three tools:

- Project Management Maturity Model – PjMMM,
- Programme Management Maturity Model – PgMMM,
- Portfolio Management Maturity Model – PfMMM.

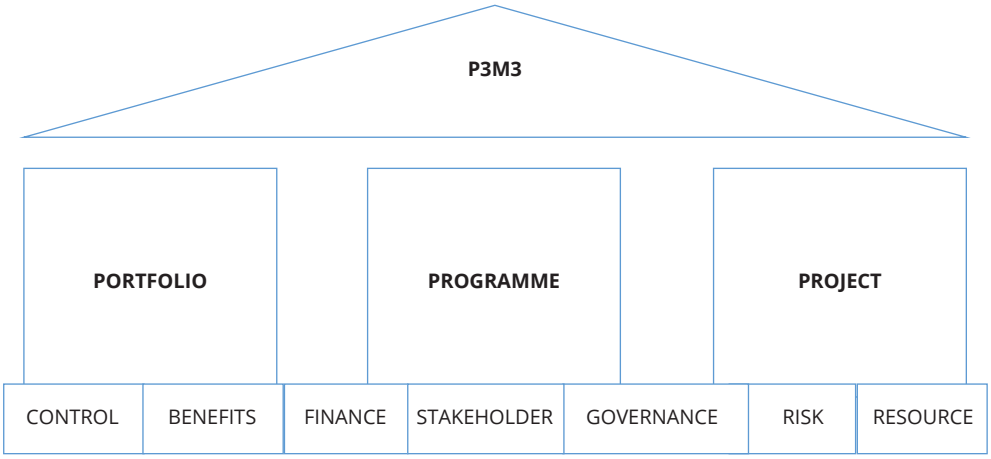
[8] B. Comfort, *Organizational Project Management Maturity Model OPM3*, EXP Consulting Limited, p. 16.

Seven common areas of expertise have been defined for all tools:

- management control determines the extent to which organization controls its current activities,
- benefits management determines the extent to which an organization defines, monitors and provides increased productivity of ROI,
- financial management determines the extent to which the organization manages and controls the investments,
- stakeholder management determines the extent to which the organization recognizes and communicates with stakeholders of the project in order to minimize risks and negative impacts,
- strategic management in the organization determines the extent to which organization controls the correlation of its projects with the strategy,
- risk management determines the extent to which the organization recognizes the adverse risk and defines prevention and positive risk and action multiplexing potential benefits,
- resource management determines the extent to which the organization uses its position in the value chain and minimizes the impact of supply shortages and surpluses.

Diagram showing the P3M3 structure is shown in Figure 3.6.

Figure 3.6. The P3M3 Construction Scheme



Source: own study based on: http://www.apmgroup.co.uk/Accreditation/MaturityAssessment/P3M3.asp (20.02.2009).

The basis are 5 levels of maturity. They are characterized separately for project, programme and portfolio. (Table 3.5).

Table 3.5. P3M3 Maturity Models Characteristics

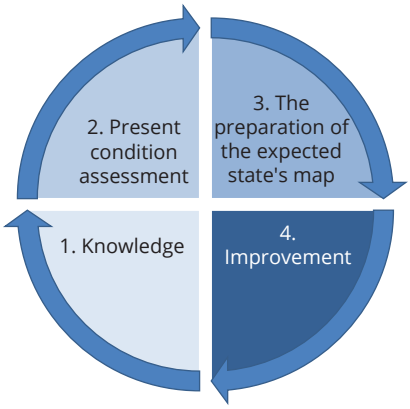
Maturity Level	Project	Programme	Portfolio
1 – Initial	Organization recognizes projects and runs them differently from its ongoing business	Organization recognizes programmes and runs them differently from projects	Organization's Executive Board recognizes programmes and projects, and maintains an informal list of its investments
2 – Repeatable	Organization ensures that each project is run with its own processes and procedures in accordance with a minimum specified standard	Organization ensures that each programme is run with its own processes and procedures to a minimum specified standard	Organization ensures that each programme and/ or project in its portfolio is run with its own processes and procedures to a minimum specified standard
3 – Defined	Organization has its own centrally controlled project processes flexible enough within these processes to suit the particular project	Organization has its own centrally controlled programme processes, flexible enough within these processes to suit the particular programme	Organization has its own centrally controlled programme and project processes flexible enough within these processes to suit particular programmes and/or projects, organization has its own portfolio management process
4 – Managed	Organization obtains and retains specific measurements on its project management performance and runs a quality management system to better predict future performance	Organization obtains and retains specific measurements on its programme management performance and runs a quality management system to better predict future performance	Organization obtains and retains specific management metrics on its whole portfolio of programmes and projects as a means of predicting future performance. Organization uses these tools to prioritize programmes and projects within the portfolio
5 – Optimized	Organization undertakes continuous process improvement with proactive problem and technology management for projects in order to improve its projects' performance over time and optimize processes	Organization undertakes continuous process improvement with proactive problem and technology management for programmes in order to improve its projects' performance over time and optimize processes	Organization undertakes continuous process improvement with proactive problem and technology management for the portfolio in order to improve its portfolios' performance and optimize processes

Source: own study based on: *OGC – Portfolio, Programme and Project Management Maturity Model*, OGC, 2006, pp. 7–8.

3.4. Research on Organization's Project Management Maturity – General Model

Regardless of which model is chosen for the evaluation, testing should be done in a specific way – the so-called maturity assessment cycle shown on Figure 3.7.

Figure 3.7. Organization's Project Management Maturity Assessment Cycle



Source: own study.

The test starts from getting acquainted with the issue and the model – at the beginning the organization must comprehensively know the structure and logic of the model of maturity. Then, one creates in the organization awareness of such phenomena as the design maturity, project management maturity model, the level of project's maturity and skills' level. The organization also begins to recognize and name processes for managing projects. So already in the initial stage of the project's maturity assessment one obtains some standardization of design language and objective understanding of certain phenomena. The second step is an assessment of project's maturity. The organization already has a basic knowledge, common terminology and understanding of the processes. It is thus possible to assess the level of skills to use the techniques and tools of project management. This stage affects the enrichment of knowledge of the organization. The organization obtains information about its level of maturity. As the result of the evaluation the so-called picture of the current situation is formed. This image can has two basic forms:

- The level of maturity that was reached by the organization (e.g. Kerzner's model, P3M3) has been determined;

- a "map" of the processes' maturity in the organization has been created. All project management processes have been diagnosed and for each of them one has determined on what level of skills each process separately is (e.g. CMMI continuous approach) or determined what percentage of the processes from a given area is implemented (e.g. OPM3).

Thanks to this map organization has information about what aspects of project implementation are the least developed, which are the best. This tool allows one to go to the next step in the assessment, i.e. development planning and improvement.

At the last stage the organization already has full knowledge of maturity model, and also has made an assessment of its project management maturity. It is thus possible to start improvement processes. At the beginning it is necessary to define the target level of project management maturity, i.e. to create a profile of the expected state. It may take different forms, depending on how the picture of the current state was prepared:

- planned, expected design maturity of the organization – organization chooses, based on the characteristics of maturity levels of the given model, target level that will be appropriate for its objectives, strategies and owned resources and the possibility of improvement,
- target skill level for each project management process separately.

This profile will also depend on the organization's strategy, on its business model and culture of the organization (some processes will be crucial, e.g. from the point of view of the model of delivering products to customers, improving certain processes may not be possible, even though it's necessary, because of the constraints arising from cultural or organizational structure). After recognizing the gap between current state and the desired one, it is possible to plan the improvement procedures for project management in the organization and achieving the expected level of maturity. This can often be the case when the organization is unable to carry out all the improvements. In this case, one should, in the context of process maps, prioritize – which processes must be streamlined, which are crucial for projects implemented in the organization.

3.5. Maturity of the Organization Compared to Other Concepts of Organizational Improvement, Development Perspectives

The issue of improvement of the organization, improving the efficiency and effectiveness of the measures taken is an issue present in the theory and practice of management for decades.

It can be assumed that the concepts of organizational improvement will continue to gain on importance. As the maturity level of the organization grows, the possibilities of simple improvements run out, it is necessary to search for more complex solutions.

Maturity models are one of the main directions of development of the concept of organizational improvement – they have been described previously synthetically. The dynamic development of these tools allows one to assume that in the near future there will arise more and more complex models that will allow in detailed way to assess the level of maturity of the organization in selected areas. However, while the existing arrangements were largely based on a process approach, modern models of maturity will be based on the concept of the so-called organizational functions. This approach defines the functions as areas that must be supported by the organization. Maturity assessment is focused on determining which functions are implemented, using what tools and institutional arrangements.

Maturity models so far have been mainly associated with project management and process management. One can currently observe models' development in other areas, mainly in risk, human resources and stakeholders management.

Currently in the literature more often one can meet criticism of projects maturity models[9]. The most common objections formulated towards this group of tools are:

- inflexible approach to changing organization,
- focus on the processes and tools, and to a lesser extent on issues related to the attitudes of people,
- maturity levels are too broadly defined,
- models in a small way include proposals for solutions to the problems of the organizations, rather their goal is to increase awareness of the issue.

Summarizing the above objections it can be concluded that projects maturity models can be a valuable support for the organization's management. However, it is necessary to synchronize them with other tools supporting organizations' improvement in other areas. In addition, management of the organization must be aware that maturity models are only the set of signposts and suggestions. Streamlining the organization should proceed in small steps, taking into account the attitude of people towards change.

[9] Compare K. Jugdev, J. Thomas, *Project management maturity models: the silver bullets of competitive advantage?*, "Project Management Journal" 2002, vol. 33, no. 4, pp. 4–14.

3.6. The Application of Project Maturity Assessment in Management

The growing role of projects in the organizations makes project management more often a key factor for success in a given sector/industry. One should therefore expect an increasing role of project maturity issues in management. This trend is noticeable in Western Europe and the USA, in Poland it is still not very popular issue. It can be said that organizations in Poland, most are not mature enough for project management maturity research and for consuming benefits from it.

The importance of project maturity in management should be considered from two perspectives.

Firstly, project maturity models are complex diagnostic tools. Assessment of project maturity allows an organization to make a detailed diagnosis of the state of project management, in particular:

- to identify all project management processes – very often there is no awareness of the existence of certain processes in the organization. They are carried out in an intuitive way, without standardization, measurement, control and improvement. Maturity "forces" recognition of all processes – implemented, but not named, carried out and named and unimplemented;
- to identify strengths and weaknesses of the organization – after evaluation it is possible to identify strengths and weaknesses of the organization within project management. Recognition of these two areas is the first step of an organization to identify sources of successes and failures and to improve its operations;
- to determine one's own level of maturity with regard to the environment – consistent measurement methods allow an organization to direct comparisons with competitors (and thus to recognize the different kinds of sources of competitive advantage of other players on the market) and cooperators (and thus to recognize sources of possible difficulties in cooperation, problems with the quality of delivered products, etc.).

Second, the vast majority of maturity models contains, in addition to diagnostic tools, a set of tools supporting the development of the organization. These tools can be described as:

- loose, nonconcretised tips – what and how to do to increase the likelihood of achieving a higher level of maturity (Kerzner's model),
- precise, specific and measurable actions to be taken in order to have higher levels of maturity or skills (OPM3).

Organizations' project management maturity research can also lead to other positive effects such as:

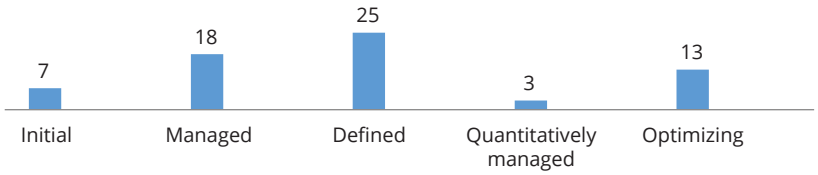
- improving the competitive position – more and more customers looking for companies ready to realize large-scale projects, are guided by their level of maturity. The high level of maturity is a clear signal that the organization uses unified, professional language, uses professional techniques, tools and project management methodologies. The probability of success of the project is therefore higher,
- prestige – increasingly often a certain level of project management maturity becomes one of the criteria in public tenders. In recent years one of the requirements was to have certain certificates in the area of quality management (ISO, HACCP, etc.), currently a certain level of project management maturity, confirmed by the international certificate could be a criterion for selection of the contractor.

3.7. The Results of Research on the Project Management Maturity Throughout the World and in Poland

3.7.1. Research in the World

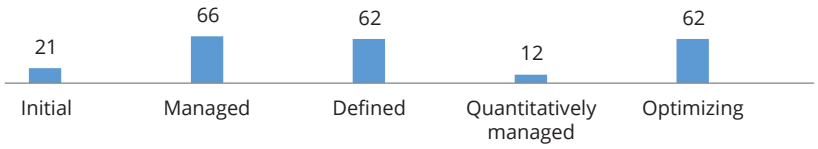
The following section presents the project management maturity research conducted in organizations around the world using a variety of tools and models. The results are ordered chronologically.

Figure 3.8. The Results of Research in 66 Organizations Using CMMI (2003)



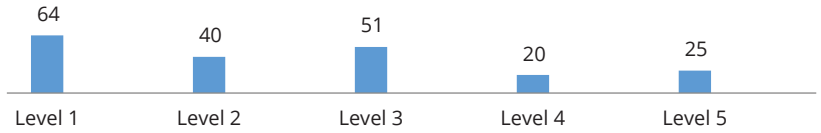
Source: study based on: E. Buchholtz, A. *Cordes, Introduction to Capability Maturity Model Integration (CMMI)*, RTP SPIN Meeting, 23 October 2003, p. 27.

Figure 3.9. The Results of Research in 223 Organizations Using CMMI (2003)



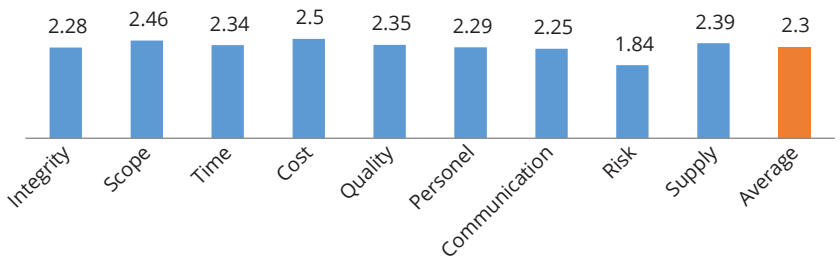
Source: based on: *Process Maturity Profile – CMMI v.1.1., SCAMPI v.1.1 Class A Appraisal Results 2004 End Year Update,* Software Engineering Institute, 2005.

Figure 3.10. The Results of Research in 200 Organizations Using PricewaterhouseCoopers Maturity Model (2004)



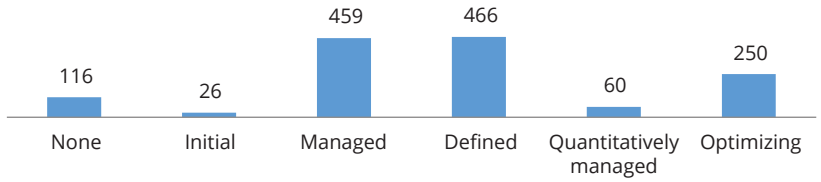
Source: study based on: *Boosting Business Performance through Programme and Project Management*, PricewaterhouseCoopers 2004, p. 12.

Figure 3.11. The Results of the Project Management Maturity Research in 65 IT Organizations on Mauritius (2004)



Source: A. Sukhoo, A. Barnard, M.M. Eloff, J.A. van der Poll, *An assessment of software project management maturity in Mauritius*, University of South Africa, Pretoria 2004, p. 677.

Figure 3.12. The Results of the Research in 1377 Organizations Using CMMI (2006)

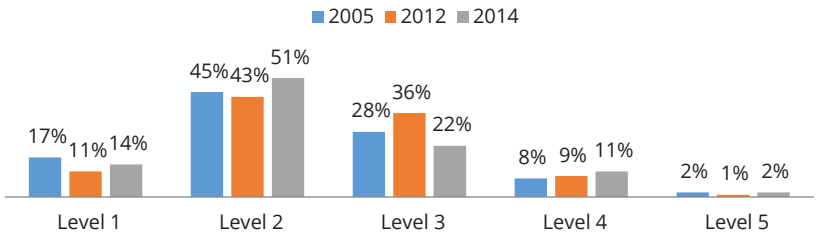


Source: study based on: *Capability Maturity Model Integration CMMI*, ver. 1.2 overview, Software Engineering Institute, 2007, p. 34.

As it results from the study, there are not any comprehensive researches on project management maturity or they are not made public. Results of the partial research show two important trends. With the development of project management one can observe growing maturity of the organizations. While at the beginning of the twenty-first century, most organizations in the world demonstrated a first, second or third level of project management maturity, it already since 2004 can be said that most of the surveyed organizations have reached maturity at second, third or fourth

level. The percentage of companies that are on the first level of maturity significantly decreases and a share of the most mature organizations grows – reaching the fifth level of maturity. It must be noted that organizations from less developed countries or the developing ones have a lower average level of maturity than organizations from highly developed countries.

Figure 3.13. The Results of Cyclical Research of Organizations in Brazil with the Use of Self-Assessment MPCM Form (Years 2005, 2012 and 2014)

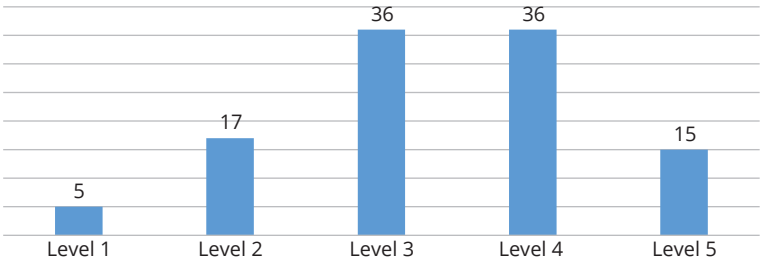


Source: own study based on: www.maturityresearch.com/ (7.05.2015).

3.7.2. The Results of Research in Poland

In Poland, researches on project management maturity are not popular. However, it is worth presenting the results of two projects in this area. The first study was conducted in 2007. It covered 107 Development Partnerships implementing projects under the EQUAL[10] Community Initiative Programme. Synthetic results are shown in Figure 3.14.

Figure 3.14. The Results of the Research of 107 Development Partnerships Implementing Projects Under the EQUAL Community Initiative Programme

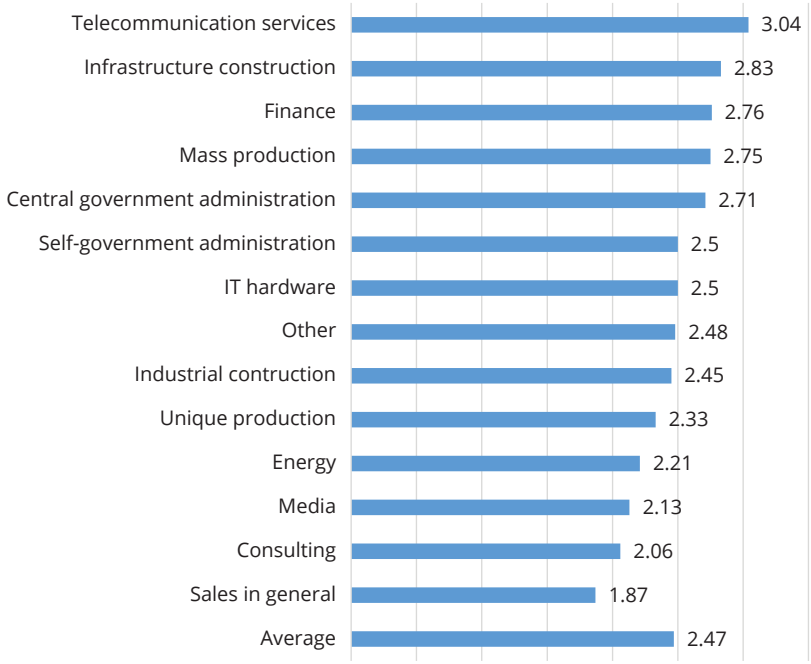


Source: B. Grucza, B. Puszczewicz, K. Mitrofaniuk, M. Zalewski, *Badanie dojrzałości projektowej Partnerstw na Rzecz Rozwoju Programu Inicjatywy Wspólnotowej EQUAL*, Fundacja Fundusz Współpracy, April 2007, p. 26.

[10] More information: B. Grucza, B. Puszkiewicz, K. Mitrofaniuk, M. Zalewski, *Badanie dojrzałości projektowej partnerstw na rzecz rozwoju programu Inicjatywy Wspólnotowej EQUAL*, April 2007.

The presented results are clearly different in structure from other such studies. They point to the large percentage of organizations on the third and fourth level of maturity. In 2009–2012 one conducted extensive research on project management maturity of organizations in Poland[11]. In the study a five-level maturity scale was used. The organization could get a result in the range of 1–5. An evaluation of maturity was conducted in 383 organizations. The Figures 3.15 and 3.16 present the most important results.

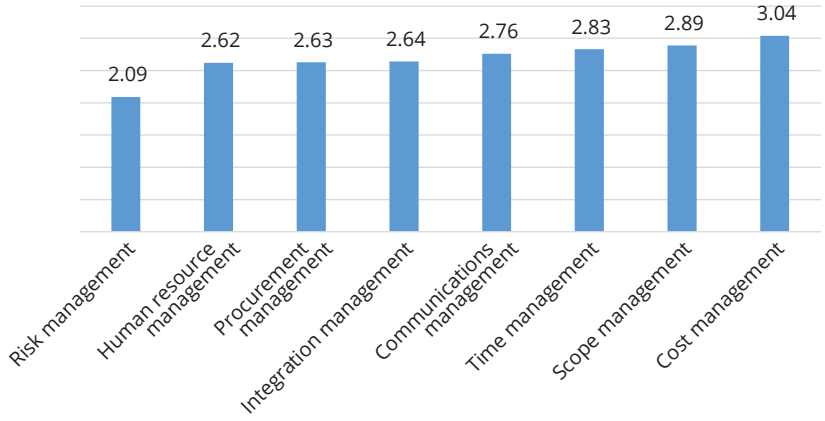
Figure 3.15. The Level of Maturity from the Perspective of Sectors of Activity



Source: own study.

[11] The studies were conducted by Mateusza Juchniewicza in Department of Project Management.

Figure 3.16. Maturity Level from the Perspective of Knowledge Areas According to PMBoK Approach



Source: own study.

3.8. Conclusions

The concept of project management maturity is steadily gaining in importance. It is connected with the dynamic development of project management and specific needs of the organization in terms of:

- assessment of the degree of the skills in project management,
- comparison of one's own competences with competitors, partners, suppliers,
- building competences determining effective and efficient implementation of projects,
- building the prestige and position in the market.

One can also observe the development of project maturity issues in the management standards. In many countries (including the US and the UK) having a certain level of project management maturity is a condition in order to win a public tender.

Analysis of the most important maturity models allows one to claim that in recent years many tools have been updated and expanded to new areas – primarily for testing the maturity of program management and project portfolio. Generally organizations are able to better implement individual projects and are beginning to recognize the need to assess their skills in managing multiple projects.

Interest in maturity models has long since gone beyond commercial companies. Public sector entities that perform increasingly complex projects, use models to improve their competences and to assess the potential contractors. Also, non-governmental organizations recognize the need of professionalization of their activities

in conditions of significantly limited resources. Project management maturity models will therefore most likely be the most popular tools for organizational improvement in the foreseeable future.

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Michał Trocki

4
DESIGNING PROJECT ORGANIZATION

4.1. The Problem of Project Organization

Project management's research interests focus primarily on the dynamic aspect of projects, i.e. their course. This is understandable due to the nature of the projects, i.e. undertakings, complex processes. Equally important, though not as strongly emphasized, is the static aspect of project management concerning the conditions of implementation of projects coming from the organizational environment in which they are carried out, i.e. the parent organization (*permanent organization*)[1] and its environment. Particularly important is the combination of these two aspects – dynamic and static – expressed in the form of project organization.

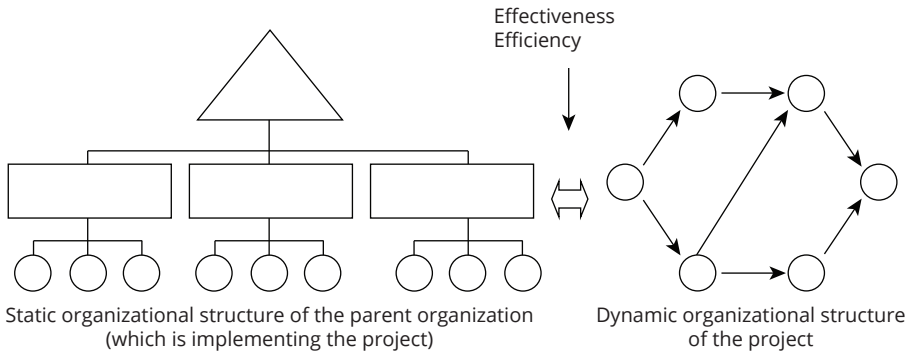
The basic problem of the project organization is to create organizational solutions which are effective and efficient combination of two activities: current activities of the parent organization and project activities and their organizational structures: static, permanent structure of the parent organization oriented primarily to carry out its repetitive tasks and dynamic, term structure of the project focused on the achievement of its unique outcome (Figure 4.1).

The following dilemma is associated with it. "The projects are time-limited activities. For this reason, they introduce an element of instability into an organizational system created to handle repetitive actions. A problem arises for organizational design, if the existing organization should be fully focused on the requirements of the project with all its consequences, or if the organization of project implementation should be incorporated into an existing organization. The second of these solutions can guarantee stability, although the existing system may reduce the effectiveness of the project. This difficulty determines the dilemma of designing organizations for the implementation of projects. Solving this dilemma is complicated by the fact that the implementation of projects usually requires the cooperation of various areas of

[1] The parent organization is understood to be an organization of any legal and organizational form, which is an initiator, the project's sponsor and beneficiary of its results.

the organization. Impacts originating from the unstable element, which is a project management, cannot be isolated, they affect a major proportion, if not on the entire organization"[2].

Figure 4.1. Main Challenge of Project Organization



Source: own study.

In the case of project organization it comes to answer the question, "how should design activities be organized? This question is often neglected or treated as a necessary evil, because good organization is characterized by the fact that it is not noticeable as far as possible. One begins to think about the organization of design activity when one finds out that something is wrong. But is it not that good organization should begin much earlier? If one takes a closer look, a wide variety of organizational forms is possible in practice (...).

There are two important areas in the company, each of which should be organized according to one's own point of view (from an own perspective). On the one hand, there is the original, parent organization (static, permanent). Its mission is to ensure that the basic tasks of the company are carried out as effectively as possible. On the other hand, there is a secondary project organization (dynamic, temporary), which is responsible for shaping the changes in the company"[3].

Attempts to overcome this dilemma were taken in practice for a long time and led to the development of various solutions of project organization.

"With regard to shaping of the organization one must distinguish two levels: on the one hand, the organization of the projects alone and on the other hand, linking

[2] F. Frese, *Grundlagen der Organisation*, Verlag Gabler, Wiesbaden 1984, p. 463.

[3] R. Wagner, N. Grau, *Vorwort*, in: *Basiswissen Projektmanagement – Projektarbeit richtig organisieren*, eds. R. Wagner, N. Grau, Symposion Publishing, Dusseldorf 2014, p. 13.

project activities with traditional, repetitive tasks. (...) project works were previously treated as an addition to the hierarchical organization and today are considered as something natural. Companies shift all areas of their business, primarily research and development to the project organization"[4].

And finally, project organization must take into account the frequent situation of simultaneous implementation of multiple, time-varying projects – interrelated by cause-and-effect as programs and by resources, as a portfolio of projects. These projects compete with each other and this must be taken into account in the project organization's solutions.

Creating project organization's solutions effectively and efficiently combining the current activities of the parent organization and project activities are particularly difficult due to significant differences in those activities (Table 4.1).

Table 4.1. Comparison of the Activities of the Parent Organization and Project Activities

Comparative criteria	Activities of parent organization	Project activities
Objectives	numerous, often ambiguous	single, specific
Horizon of goals	long-term	short- and medium-term
Tasks	repetitive	new, unique
Implementation	everyday work	Campaign
Durability	relatively stable	unstable, temporary
Complexity of actions	small, medium	high, very high
Duration of tasks' implementation	short / easily calculated	long/difficult to calculate
Costs of tasks' implementation	known, small / medium, which can be calculated	high /very high, estimated
Budget	unequivocal	difficult to establish
Control	systemic	based on the assumptions
Assessment indicators	functional	based on results
Risk	medium	high
Professional competences	medium	high
Organizational structure	hierarchical	with reduced hierarchy, of network character
Innovativeness	low	high
Standardization	high	low

Source: based on *Nowoczesne zarządzanie projektami*, ed. M. Trocki, PWE, Warsaw 2012, p. 50; based on many sources.

[4] G. Schreyogg, *Organisation*, Verlag Gabler, Wiesbaden 2008, p. 160.

Such solutions, however, are a prerequisite for the success of the project, as demonstrated by numerous studies[5].

4.2. Requirements and Conditions of Project Organization

The project organization should be effective, i.e. ensuring positively assessed compliance of the activities – both the parent organization's activities, as well as project activities – with their goals, both in operational and strategic dimension. The project organization should also be efficient, i.e. ensuring a positive relationship of useful results – both the parent organization's activities and the projects' activities – to the expenditures on those activities[6]. The project organization, in order to be effective and efficient, must be adapted to the specific conditions: to the implemented projects, to the parent organization and its environment.

Analysis of the innumerous literature shows a small number of differences in views on the specific characteristics of the projects affecting the solutions used in the project organization. A wide set of features – including complexity, internal dependencies, the size, the implementation period, the time criticality, innovativeness, riskiness, reducibility and criticality of resources – is proposed by P. Dwayne Cable, John R. Adams[7]. Rolf Kremer limits the set to the complexity, the implementation period, the time criticality, riskiness, and reducibility, adding scope of the project[8]. Harold Kerzner believed just three features of projects were crucial: type, size and scope[9].

Similar differences in opinions concern the characteristics of the parent organization influencing the project organization. P.D. Cable, J.R. Adams mention only two such features: the importance of the project for the organization and relationships with the customer. R. Kremer adds to this: the need for central control and engagement of senior management and the engagement of the project manager and the staff. H. Kerzner indicates a greater number of features defining solutions used in project organization: the organization's strategy, philosophy of senior management, the nature of the parent organization, the importance of the project for the parent

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5 E.g. *The CHAOS Manifesto. The Laws of CHAOS and the CHAOS 100 Best PM Practices*, The Standish Group International, Boston 2011; *Pulse of the Profession: Capturing the Value of Project Management*, Project Management Institute, 2015.

6 More on the subject: M. Trocki, *Model kompleksowej oceny projektów*, in: *Ocena projektów – koncepcje i metody*, eds. M. Trocki, M. Juchniewicz, Warsaw School of Economics Press, Warsaw 2013, pp. 177–191.

7 P.D. Cable, J.R. Adams, *Organizing for Project Management*, in: *Principles of Project Management*, Project Management Institute, Four Campus Boulevard, 1996, p. 25.

8 R. Kremer, *Formen der Projektorganisation. Projektrollen und Aufgabenbereiche*, in: *Projektmanagement. Handbuch für die Praxis*, eds. H.-D. Litke, Carl Hanser, München 2005, p. 98.

9 H. Kerzner, *Project Management. A Systems Approch to Planning, Scheduling and Controlling*, Van Nostrand Lawrence, New York 1984.

organization, location of the project, the ability of implementing the project, available resources, experience of project management.

The analysis of presented above, other and own views allows one to consider for the most important from the point of view of solutions used in project organization following features of the project:

- strategic importance of the project,
- dimensions of the project,
- complexity of the project,
- duration of the project,
- cost of the project,
- innovativeness of the project,
- risk of the project,
- engagement of organization's senior management,
- professional requirements in relation to project management,
- methodological requirements in relation to project management,
- recruitment of employees to the project.

4.3. Model Solutions for Project Organization

Attempts to solve the problem of project organization have been taken in practice and theory for a long time and led to the development of various solutions used in project organization, which in a generalized form are presented by model solutions for project organization. Research on the views of specialists shows a far-reaching convergence of opinions on these solutions (Table 4.2).

As model solutions for project organization one mentions most often solutions based on organizational relations: functional project organization, line-staff project organization, matrix project organization and "pure" project organization. These solutions, although very important and widely used, have limited applicability for projects that go beyond the parent organization. Hence the need to take into account in the project organization also solutions based on other relationships: capital in the form of project company and contract in the form of external project execution, project consortium and network project organization.

In practice, one deals with eight model solutions for project organizations and their modifications:

- functional project organization,
- line-staff project organization,
- matrix project organization; weak, balanced and strong,
- pure project organization,

- project company,
- external project execution,
- project consortium,
- network project organization.

Table 4.2. Model Solutions for Project Organization – Overview of Opinions

Model solutions for project organization	Sources					
	R. Kremer, A. Rohde[a]	R. Chrobok[b]	B.J. Madauss[c]	E. Larson[d]	D.P. Cable, J.R. Adams[e]	M. Trocki[f]
Functional project organization				x	x	x
Line-staff project organization	x	x	x			x
Matrix project organization	x	x	x	x	x	x
"Pure", autonomous project organization	x	x	x			x
Project company						x
External project execution						x
Project consortium						x
Network project organization				x		x

[a] R. Kremer, A. Rohde, *Projektorganisation*, in: *Kompetenzbasiertes Projektmanagement (PM3)*, IPMA/SPM, Nürnberg 2011, pp. 183–216.
[b] R. Chrobok, *Unternehmens- und Projektorganisation*, in: *Projektmanagement Fachmann Band 2*, RKW-Verlag, Eschborn 2003, p. 887.
[c] B.J. Madauss, *Handbuch Projektmanagement*, Schaeffer-Poeschel Verlag, Stuttgart 2000, pp. 85–121.
[d] B.E. Larson, *Project Management Structures*, in: *The Wiley Guide to Managing Projects*, John Wiley and Sons, Hoboken, eds. P.W.G. Morris, J.K. Pinto, New Jersey 2004, pp. 48–66.
[e] D.P. Cable, J.R. Adams, *Organizing for Project Management*, in: *Principles of Project Management*, Project Management Institute, 1997.
[f] M. Trocki, *Organizacja projektowa. Podstawy, modele, rozwiązania*, PWE, Warsaw 2014.

Source: M. Trocki, *Organizacja projektowa. Podstawy, modele, rozwiązania*, PWE, Warsaw 2014, pp. 106–107.

Comparison of typical model forms of project organization is presented in Table 4.3 and their detailed description in the literature[10].

Compiled above model solutions differ from each other in respect to:

- the ability to control the implementation of the project by the chief executives of the parent organization,
- relief chief executives of the parent organization coordination of activities related to the implementation of the project,
- clarity of the division of powers and responsibilities between the participants,

[10] E.g. M. Trocki, *Organizacja projektowa. Podstawy, modele, rozwiązania*, PWE, Warsaw 2014, pp. 101–176.

Table 4.3. Comparison of Typical Model Forms of Project Organization

Evaluation criteria	Typical forms of project organization																							
	functional project organization			line-staff project organization			matrix project organization			"pure" project organization			project company			external project execution			project consortium			network project organization		
	-	o	+	-	o	+	-	o	+	-	o	+	-	o	+	-	o	+	-	o	+	-	o	+
Control from the chief executives	x					x			x			x			x		x			x		x		
Relief chief executives of coordination activities			x	x					x			x			x			x			x			x
Clarity of the division of powers and responsibilities			x		x			x				x			x			x			x			x
Cooperation with the functional units	x					x			x	x			x			x			x			x		
Internal know-how transfer	x				x				x	x			x			x			x			x		
Flow of information	x				x				x	x			x			x				x			x	
Flexibility of action	x				x			x		x					x			x			x			x
Cooperation of project team			x	x				x				x			x			x			x			x
Use of staff		x			x				x			x			x			x			x			x

Source: M. Trocki, *Organizacja projektowa. Podstawy, modele, rozwiązania*, PWE, Warsaw 2014, p. 243.

- quality of project management cooperation with the functional units of the parent organization,
- the possibility of an internal know-how transfer,
- flexibility of action, namely the ability to adapt the project to changing conditions and requirements,
- quality of interaction of project team,
- the use of staff involved in the implementation of projects.

4.4. Process of Project Organization Design

Designing project organization is based on principles common to all organizational problems and includes the following steps:

1) formulation of assumptions,
2) analysis of project tasks,
3) analysis of the determinants of project organization,
4) overview of the project organization's model solutions,
5) selection of a model solution of a project organization as a basis for detailed studies,
6) designing specific solutions for project organization,
7) documentation development for project organization.

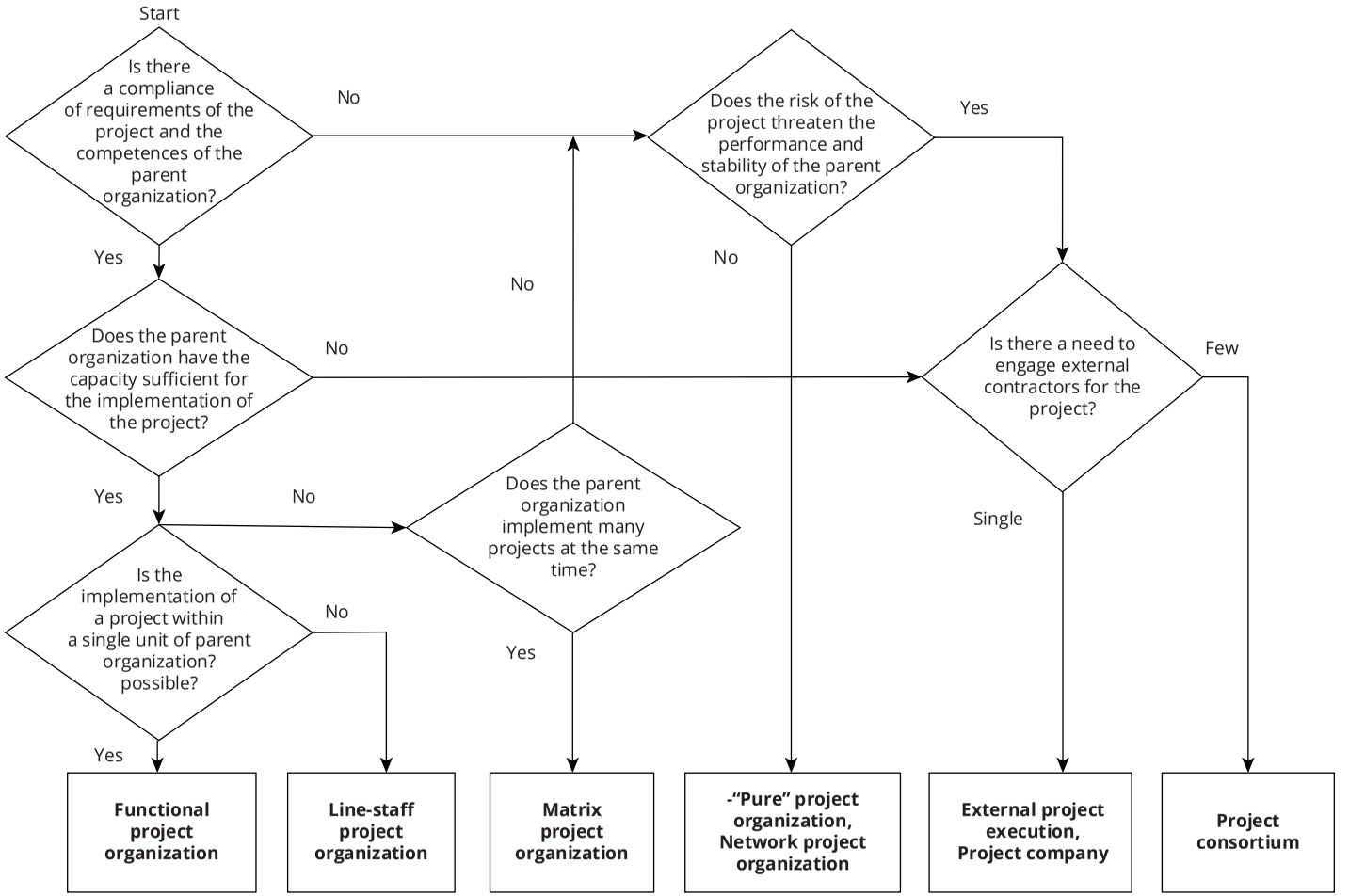
The first three stages are carried out based on the general principles of organizational design, described in the literature[11] and the fourth stage was briefly described above with reference to detailed descriptions in the literature. The stage of selecting a model solution of project organization, as a basis for detailed studies, requires a discussion.

Considering for a basis of choice a full set of model solutions of a project organization one can recommend pre-selection scheme as shown in Figure 4.2, which is based on six criteria that boil down to the following questions:

- Is there a compliance of requirements of the project and the competences of the parent organization?
- Does the risk of the project threaten the performance and stability of the parent organization?
- Does the parent organization have the capacity sufficient for the implementation of the project?
- Is there a need to engage external contractors for the project?
- Does the parent organization implement many projects at the same time?
- Is the implementation of a project within a single unit of parent organization possible?

[11] [1] See, e.g. M. Trocki, *Metody projektowania organizacji*, PW Publishing House, Warsaw 1989.

Figure 4.2. Scheme of Preliminary Selection of Model Solution of a Project Organization



Source: own study.

Table 4.4. Expanded Recommendations on Model Solution of a Project Organization

Criteria of choice	Model solutions of project organization							
	functional project organization	line-staff project organization	matrix project organization	"pure" project organization	project company	external project execution	project consortium	network project organization
Strategic importance of the project	low	medium	high	very high	very high	medium – very high	very high	medium
Dimensions of the project	small	medium	big	very big	very big	medium – very big	very big	medium
Complexity of the project	low – medium	medium	high	very high	very high	medium – very high	very high	medium
Duration of the project	short, few months	medium, around a year	medium, around a year	long, over a year	very long, couple years	medium – long	long	medium, around a year
Cost of the project	low	low – medium	medium	high	very high	medium – very high	very high	medium
Innovativeness of the project	low	low	medium	high	very high	medium – high	high	high
Risk of the project	low	low	medium	high	high	medium – high	high	medium
Engagement of organization's senior management	low	high	medium	high	high	medium	high	low
Professional requirements in relation to the project management	high	high	high	high	high	medium – high	very high	high
Methodological requirements in relation to project management	medium	medium	high	high	high	medium – high	very high	medium
Recruitment of employees to the project	internal partial	internal partial	internal full	internal and external	external and internal	external	external	external

Source: M. Trocki, *Organizacja projektowa. Podstawy, modele, rozwiązania*, PWE, Warsaw 2014, pp. 248–249.

This initial choice should be compared with the recommendations of the selection of forms of project organization contained in the standards of project management in the literature, the collection of best practices, etc. [12] Since they are limited to solutions of project organization based on the organizational relationships and do not include solutions based on the capital and contract relations, there is the need for their extension (Table 4.4).

After selecting a model solution of project organization one can begin to design its specific solutions that are based on the answers to the following questions:

- Who should have strategic control over a project?
- In which part of the structures should the project manager be located?
- What powers should the project manager have?
- How should the project manager be recruited?
- What duties and powers should the project manager have?
- What roles should the members of the project team apply to?
- What competencies should the members of the project team have?
- How should members of the project team be recruited?
- What are the duties and powers required of the members of the project team?
- What should the organizational structure of the project team be?
- From where should the support of the project come and on what principles should it be implemented?
- Who should be the advisor of the project and on what terms?
- What should the relationship of the project team with the parent organization be?
- Should detailed solutions be described in the appropriate documentation?
- In what form should the designed solution of project organization be documented?

These solutions should be based on the general principles of organization's design and best practices of specific organizational solutions described in the literature.

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[12] P.D. Cable, J.R. Adams, *Organizing for Project Management*…, op.cit., p. 25; R. Kremer, *Formen der Projektorganisation*…, op.cit., p. 98; *PMBoK. A Guide to the Project Management Body of Knowledge*, Project Management Institute, Fifth Edition, 2013, p. 22 and others.

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Paweł Wyrozębski

5

RISK AND UNCERTAINTY IN PROJECT PLANNING PROCESS

5.1. Introduction

Projects are present in almost every field of human activity, and for decades have remained one of the most dynamically developing fields of knowledge[1]. This knowledge applies to functional, organizational, and personal problems and solutions of project management[2].

Functional problems, associated with the course of the projects are reflected in the stages of the project management cycle[3]. In the literature they are present in a variety of models[4], but usually they include activities related to the initiation, planning, implementation, monitoring and control, and closing projects[5].

Projects are complex, temporary, unique undertakings. Like all human activities, for right execution they require preparation before the action – i.e. planning. Planning is considered one of the most important management functions[6]. Problems and solutions associated with project planning are widely discussed in the literature,

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1 J.M. Nickolas, H. Steyn, *Project Management for Business, Engineering and Technology*, Butterworth-Heinemann/Elsevier, UK 2008, p. 17.

2 L. Crawford, *Global Body of Project Management Knowledge and Standards*, in: *The Wiley Guide to Managing Projects*, eds. P.W.G. Morris, J.K. Pinto, John Wiley and Sons, Hoboken, New Jersey 2004, p. 1153, doi: 10.1002/9780470172391.ch46; P. Wyrozębski, E. Pączek, *Empirical Study On Knowledge Sources In Project-Intensive Organisations*, in: *Within And Beyond Boundaries Of Management*, eds. Z. Dworzecki, M. Jarosiński, Warsaw School Of Economics Press, Warsaw 2014, pp. 211–226.

3 *Nowoczesne zarządzanie projektami*, ed. M. Trocki, PWE, Warsaw 2012.

4 R.M. Wideman, *The Role of the Project Life Cycle (Life Span) in Project Management*, "Max's Project Management Wisdom" 2004; R.G. Cooper, *Winning at new products: pathways to profitable innovation*, Proceedings Project Management Research Conference, Montreal 2006.

5 *A Guide to the Project Management Body of Knowledge*, 5th edition, Project Management Institute, USA 2013.

6 H. Kerzner, *Project Management. A Systems Approach to Planning, Scheduling and Controlling*, 9th ed., John Wiley and Sons, USA 2006, p. 396.

textbooks and standards of project management[7]. Proper planning of projects is also a factor of success and failure of project execution[8].

Given the complexity of the project objectives and results, planning processes are also accompanied by considerable difficulty and complexity, resulting from, among others, domains subject to planning, quality and reliability of available information and the predictability and volatility of future conditions of the project[9]. The difficulty to simulate future states of the project in its complex and variable environment justifies the need to consider the impact of risk and uncertainty in the planning processes[10].

The aim of the chapter is to present the progress and results of the study on the level of risk and uncertainty in project planning with the recognition of the diversity of their occurrence in relation to selected industries and the characteristics of the projects. Based on the analysis of the literature and foreign research, presentation of which is beyond the scope of this chapter, three research questions have been formulated:

- RQ1. What is the level of risk and uncertainty of project planning?
- RQ2. In what areas of planning is the level of risk and uncertainty the greatest?
- RQ3. Is there a relationship between the level of risk and uncertainty of the project, and the type and context of project implementation?

The next section of the chapter presents the course of the research process, the obtained results and conclusions.

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[7] *Project Cycle Management Guidelines*, European Commission, Brussels 2004; *A Guide to the Project Management*…, op.cit.; *Managing Successful Projects with PRINCE2. TSO*, OGC, London 2009; ISO 21500:2012, *Guidance on project management*, 2012.

[8] D. Murphy, N. Baker, D. Fisher, *Determinants of Project Success*, National Aeronautics and Space Administration Boston College, Boston 1974; J.K. Pinto, *Project Implementation: A determination of its critical success factors, moderators and their relative importance across the project life cycle*, University of Pittsburg, Pittsburg 1986, p. 20; D.J. Cleland, *Field guide to project management – second edition*, Wiley, New York 2004, pp. 24–25; D. Dvir, T. Raz, A. Shenhar, *An empirical analysis of the relationship between project planning and project success*, "International Journal of Project Management" 2003, vol. 21, no. 1, pp. 89–95.

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5.2. Strategy and Research Model

Risk and uncertainty manifest themselves in many areas of project planning[11]. They have an impact on defined requirements, assumptions and limitations of projects, the scope, cost, time, quality and results[12]. The risk of the project is defined as the cumulative effect of uncertainty impacting the project as a whole[13]. According to the PMBoK authors, "the level of risk of the project is more than just a simple sum of the individual risks, because it takes into account all sources of uncertainty in the projects" [14].

The importance of risk and uncertainty in project planning is emphasized by Prof. M. Trocki. According to his proposed approach, in the case of projects one deals with three planning situations: planning under conditions of certainty, planning under conditions of risk and planning under conditions of uncertainty[15].

Planning under conditions of certainty (planning under conditions of full information) occurs when information on all the major issues of planning is complete and reliable. In this situation, one can explicitly specify the implementation conditions of future activities and states subject to planning, and the probability of deviation from the plan is low. With **planning under conditions of risk** "information on major issues of planning is not complete and reliable"[16]. In this case, planners face the need to identify different variants of the project and analyze them from the point of view of the likelihood of materializing. The last situation described by M. Trocki occurs when one is **planning under conditions of uncertainty**. According to the definition, "it occurs when the information on the main issues of planning, as in the second case, is incomplete and unreliable, various action options and their effects exist there, but one cannot determine – either objectively or subjectively – probability of their occurrence" [17].

This definition became a starting point to undertake this study and to make an attempt to answer the research questions posed at the beginning. On the basis of the works of M. Trocki, proposed by him aspects of risk and uncertainty of project planning were extended to the list of 25 statements listed in Table 5.1.

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[11] J. Schuyler, *Risk and Decision Analysis in Projects*, 2nd ed., Project Management Institute, USA 2001.

[12] E.W. Larson, C.F. Gray, *Project Management. The Managerial Process*, McGraw-Hill International, USA 2011, p. 211.

[13] *A Guide to the Project Management*…, op.cit.

[14] Ibidem, p. 30.

[15] *Planowanie przebiegu projektu*, ed. M. Trocki, P. Wyrozębski, Warsaw School of Economics Press, Warsaw 2015.

[16] Ibidem.

[17] Ibidem.

Table 5.1. Project Planning Level of Risk and Uncertainty Measures

q04.1	When planning the project, the team had access to all the necessary information
q04.2	The information, based on which the project was planned, was complete
q04.3	The information, based on which the project was planned, was considered certain
q04.4	The plan was supposed to present one, best variant of the project implementation
q04.5	Environment of the project had a stable and predictable character
q04.6	The overall level of project risk was low
q04.7	Key stakeholders were in agreement as to the course of the project
q04.8	The team knew exactly the expectations towards the project
q04.9	Goals of the project could be clearly and precisely identified
q04.10	The end result could be accurately described
q04.11	Way to obtain the final result was previously known in the organization
q04.13	There was no need to consider different variants of the project
q04.14	List of project tasks was determined and permanent
q04.15	Relationships between the project tasks were understood by everyone in the team
q04.17	Each task could be clearly described to contractors
q04.18	The project did not anticipate the possibility of returning to the already completed tasks
q04.19	The duration of each task could be precisely determined
q04.20	The team was certain of task duration estimates
q04.21	The estimation of project duration was not difficult
q04.22	There was no need to use large reserves of time
q04.23	Determination of needed resources didn't cause difficulties
q04.24	The number of needed resources could be determined with high precision
q04.25	The cost of individual tasks could be precisely determined
q04.1	There was no need to reserve substantial funds for unforeseen events
q04.2	Cost estimates of the project were certain

Source: own study.

In order to prepare a research tool, the above statements were supplemented by the scale of measurement, which is based on a five-point Likert scale.

Research tool supplemented by descriptive variables has been distributed among project management specialists. As a result of the collecting of empirical material, the efforts made it possible to reach the group numbering a total of 185 respondents.

The acquired sample is of nonprobability character. Due to the specifics of project activities, limited scale and scope of professional organizations and the lack of frame as a basis for sampling it was not possible to meet the conditions for its representativeness. One should therefore bear in mind the formal lack of sample's representativeness. Nevertheless, according to the author, one can, based on the

obtained sample, observe the phenomena and put forward cautious conclusions regarding the whole population.

5.3. Characteristics of the Research Sample

The obtained structure of the research sample is quite diverse. About a quarter of the surveyed projects are construction ones (24.3% of the sample), every sixth project is an information technology project (16.8%), while one in ten – organizational (10.8%) and associated with the development of products and services (9.7%). Along with the scientific-research projects (7.0%) they constitute more than two-thirds of cases involved.

Table 5.2. Distribution of Project Types Represented by the Study Participants

Type of project		Frequency	Percent	Valid percent	Cumulative percent
Important	construction	45	24.3	24.5	24.5
	information technology	31	16.8	16.8	41.3
	organizational	20	10.8	10.9	52.2
	products and services development	18	9.7	9.8	62.0
	scientific-research	13	7.0	7.1	69.0
	industrial/production	13	7.0	7.1	76.1
	infrastructure	10	5.4	5.4	81.5
	marketing	8	4.3	4.3	85.9
	sales	7	3.8	3.8	89.7
	social	6	3.2	3.3	92.9
	educational/training	5	2.7	2.7	95.7
	other	8	4.3	4.3	100.0
	total	184	99.5	100.0	
Lack of data		1	0.5		
Total		185	100.0		

Source: own study.

The research survey was addressed to members of project personnel in Polish organizations participating in the projects. Among the respondents most numerous (70 people / 40%) were specialists – project team members and members of the project management team (27.4%). Slightly more than one in five respondents (22.3%) was a project manager performing managerial functions in relation to subordinate employees. Together these three groups accounted for almost 90% of the obtained sample.

Table 5.3. Most Often Occupied Positions in Projects

Occupied position		Frequency	Percent	Valid percent	Cumulative percent
Important	specialist/project team member	70	37.8	40.0	40.0
	project management team member	48	25.9	27.4	67.4
	Project manager	39	21.1	22.3	89.7
	informal cooperation within projects	12	6.5	6.9	96.6
	Project management office employee	3	1.6	1.7	98.3
	passive observer	1	0.5	0.6	98.9
	project board member	1	0.5	0.6	99.4
	member of the organization's senior management	1	0.5	0.6	100.0
	total	175	94.6	100.0	
Lack of data		10	5.4		
Total		185	100.0		

Source: own study.

Table 5.4. The Division of the Organization due to the Scale of Support from the Head Office/Parent Organization

Scale of support		Frequency	Percent	Valid percent	Cumulative perent
Important	no, full independence	43	23.2	24.9	24.9
	minimal support	56	30.3	32.4	57.2
	medium support	53	28.6	30.6	87.9
	intensive support	21	11.4	12.1	100.0
	total	173	93.5	100.0	
Lack of data		12	6.5		
Total		185	100.0		

Source: own study.

From the point of view of the role of project management in enterprises two-thirds of respondents work in organizations where it is high (33.1%) or very high (33.7%). One in thirteen respondents indicated the intensity level of projects in the organization as small. Among the organizations represented by respondents dominated the ones with a minimum or medium support from the head office or the parent organization. Only every twelfth respondent described the level of obtained support as intense. It can therefore be concluded that in the entire further tested sample

management practices have individual character and are relatively independent of other organizations.

5.4. Scale Reliability Analysis

The obtained research material allowed the accession to the analytical work on the verification of data quality and the development of a synthetic indicator of risk and uncertainty of project planning. This index will be used in further steps to verify research hypotheses.

Due to the fact that the research questions were supposed to measure the analyzed phenomenon in order to verify the quality of data, one used scale reliability analysis of the reliability scale using Cronbach's alpha index and the procedure for the design of a reliable scale described in the literature on the methodology of scientific research[18].

The scale reliability analysis was conducted using Cronbach's alpha coefficient. For the full list of 25 partial measures the coefficient amounted to 0.879.

Table 5.5. Cronbach's Alfa Reliability Analysis – the First Iteration

Reliability statistics	
Cronbach's alfa	Number of positions
0.879	25

Total statistics of positions				
	scale average after removal of positions	scale variation after removal of positions	Total correlation of positions	Cronbach's alfa after removal of positions
q04.16	79.2749	187.353	0.107	0.883

Source: own study.

In the light of the methodological recommendations presented in the literature, the level of reliability of the obtained scale can be considered sufficient.

The analysis showed that it is possible to improve the reliability and quality of the scale by excluding from it the q04.16 statement: "The project did not anticipate having to return to the already completed tasks". This statement in the least way correlated with the scale. Apparently, the respondents felt the difficulty of understanding it and granting to it the right answers. On this basis, it was decided to exclude this measure from the scale.

Repeated analysis of the reliability of the 24 partial indicators showed a value of Cronbach's alpha of 0.883. At the same time again it was possible to improve the

[18] *Electronic Statistics Textbook*, StatSoft, 2015, www.statsoft.com/textbook (23.11.2015).

scale's quality by the exclusion of the statement q04.12: "There was no need to consider different variants of the project". Alfa in this case increases to 0.884. Just as in the previous case, it was decided to exclude this statement from further analysis.

The third iteration and analysis of the reliability of the scale for 23 partial measures showed that further exclusions of statements do not improve the quality of projection of the examined phenomenon in the research tool. The final layout of measures thus consisted of 23 statements, with a high value of the alpha coefficient of 0.884.

Table 5.6. Analysis of Cronbach's Alfa Reliability – the Third Iteration

Reliability statistics	
Cronbach's alfa	Number of positions
0.884	23

Total position statistics				
	scale average after the removal of position	scale variation after the removal of position	Total position correlation	Cronbach's alfa after the removal of position
q04.1	73.6316	158.940	0.511	0.878
q04.2	73.5263	159.710	0.549	0.877
q04.3	73.0468	167.245	0.330	0.883
q04.4	72.6667	168.188	0.284	0.884
q04.5	73.5673	157.365	0.582	0.876
q04.6	73.7018	161.799	0.413	0.882
q04.7	73.1871	157.659	0.628	0.875
q04.8	72.7310	162.598	0.517	0.879
q04.9	72.4854	167.122	0.395	0.882
q04.10	72.3626	167.597	0.350	0.883
q04.11	72.9883	161.635	0.468	0.880
q04.13	73.2105	158.814	0.548	0.877
q04.14	73.1053	161.577	0.494	0.879
q04.15	72.8655	165.917	0.415	0.881
q04.17	73.2105	165.555	0.360	0.883
q04.18	73.3158	162.264	0.498	0.879
q04.19	73.4737	160.168	0.545	0.878
q04.20	73.5965	163.807	0.389	0.882
q04.21	73.2222	162.986	0.447	0.880
q04.22	73.0409	161.981	0.549	0.878
q04.23	73.0702	163.924	0.471	0.880
q04.24	73.2982	162.752	0.435	0.881
q04.25	73.2456	160.033	0.605	0.876

Source: own study.

5.5. Development of Risk and Uncertainty Index, RUI

Having partial measures one started to develop a summary scale.

The aim of summary scale was to obtain the synthetic indicator which reflects the overall level of uncertainty and risk in the planning of projects. This indicator has been in further stages used to verify the hypotheses placed in the beginning. The procedure adopted methodological recommendations for the design of composite indicators developed by the OECD and others[19].

The adopted method of creating RUI (risk and uncertainty index) included the following procedure[20]:

- determining the scope of the measurement and the appropriateness of the use for this purpose of composite index,
- choice of the partial indicators, designed to create a composite index,
- assessment of the quality of the data used,
- assessment of the relationship between partial indicators,
- weighting the partial indicators and their aggregation into a composite index.

The results of the first three steps associated with defining the scope, the selection of partial measures and the evaluation of the quality of the collected material were presented in earlier parts of this chapter.

In the assessment of the relationship between indicators and their aggregation into a composite index it was possible to use a few, described in the literature, alternative methods. According to the recommendations they can be determined arbitrarily, according to expert judgment or by using multiple regression, method of principal components, factor analysis, the Cronbach's alpha coefficient (Cronbach alpha), neutralization of correlation effects, efficiency frontier, the distance to the target and the analytic hierarchy process[21].

In the further described study the method of factor analysis using principal component analysis, PCA was used. Description of the method can be found in many

[19] *Handbook on Constructing Composite Indicators. Methodology and user guide*, OECD, Paris 2008; W. Florczak, *Pomiar gospodarki opartej na wiedzy w badaniach międzynarodowych*, "Wiadomości Statystyczne" 2010, no. 2; M. Nardo, M. Saisana, A. Saltelli, S. Tarantola, *Tools for Composite Indicators*, Brussels 2005; L. Hudrliková, *Composite indicators as a useful tool for international comparison: The Europe 2020 example*, "Prague Economic Papers" 2013, no. 4.

[20] W. Florczak, *Pomiar gospodarki*…, op.cit.

[21] *Handbook on Constructing*…, op.cit.; W. Florczak, *Pomiar gospodarki*…, op.cit.; M. Nardo, M. Saisana, A. Saltelli, S. Tarantola, *Tools for Composite Indicators*…, op.cit.; L. Hudrliková, *Composite indicators*…, op.cit.

sources, including the work of Lenka Hudrlikova[22], Bryan Manly[23], Donald Morrison[24], in StatSoft[25] statistical textbooks, and in the OECD's elaboration[26].

In order to verify the correctness of the analysis of the use of PCA, a Kaiser-Mayer-Olkin coefficient and Bartlett's test of sphericity were used in the study. KMO coefficient's threshold value reflecting the adequacy of the correlation matrix is determined by researchers at 0.5[27] to 0.7[28]. In the analyzed case, it amounts to 0.821. Barlett's test of sphericity showed that the hypothesis of uncorrelated factors may be rejected. The test statistic is 1,568.687 at the significance level of less than 0.001. According to the obtained results, further PCA analysis is justified and correct methodically.

Table 5.7. Kaiser-Mayer-Olkin and Bartlett's Tests

Tests of Kaiser-Mayer-Olkin and Bartlett		
KMO measure of sampling adequacy		0.821
Bartlett's test of sphericity	approximate chi-square	1,568.687
	df	253
	significance	0.000

Source: own study.

In the further analysis a method of extracting the factors of principal components with Varimax rotation was used. The selection of components was based on the Kaiser criterion, which assumes that eigenvalues of the separated factors will be greater than one.

Factor analysis helped to qualify 23 measures to six groups of factors, whose sum of the squares of the components after rotation was 63%. Cronbach's alfa that conveys the reliability of the whole amounted to 0.884.

The exact verification of the assignment of measures to components allowed to identify and name the individual components. Their configuration corresponds to the problem areas of project planning. Easy identification and uniformity of issues creating them seem to confirm the correctness of the preparation of a research tool.

[22] L. Hudrliková, *Composite indicators*…, op.cit.
[23] B. Manly, *Multivariate Statistical Methods: A Primer*, Chapman and Hall, Londyn 2004.
[24] D.F. Morrison, *Multivariate Statistical Methods*, Thompson Brooks, California 2005.
[25] *Electronic Statistics Textbook*…, op.cit.
[26] *Handbook on Constructing*…, op.cit.
[27] A. Field, *Discovering Statistics using SPSS for Windows*, Sage publications, London–Thousand Oaks–New Delhi 2000; B. Williams, T. Brown, A. Onsman, *Exploratory factor analysis: A five-step guide for novices*, "Australasian Journal of Paramedicine" 2012, vol. 8, no. 3.
[28] G. Wieczorkowska, J. Wierzbiński, *Statystyka. Analiza badań społecznych*, Wydawnictwo Naukowe Scholar, 2007.

Table 5.8. Factor Analysis – Results

The total explained variance									
Component	initial eigenvalues			sums of squares of components after extraction			sums of squares of components after rotation		
	total	% of variance	cumulative %	total	% of variance	cumulative %	total	% of variance	cumulative %
1	6.656	28.940	28.940	6.656	28.940	28.940	3.034	13.191	13.191
2	2.464	10.711	39.651	2.464	10.711	39.651	2.547	11.074	24.265
3	1.760	7.653	47.304	1.760	7.653	47.304	2.327	10.116	34.381
4	1.463	6.360	53.664	1.463	6.360	53.664	2.266	9.852	44.233
5	1.156	5.025	58.690	1.156	5.025	58.690	2.245	9.759	53.992
6	1.092	4.747	63.437	1.092	4.747	63.437	2.172	9.445	63.437
The method of extracting factors – the Principle components. The method of rotation – Varimax with Kaiser normalization.									

Source: own study.

Table 5.9. The Configuration of Components and Their Measures in the Study

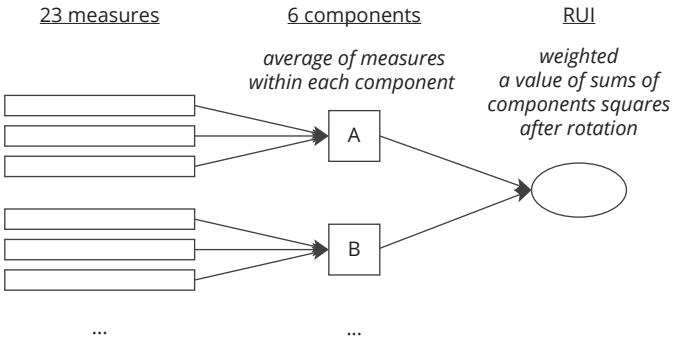
	Name of a component	The scope of measures/ questions	Translated % of the variance after rotation	Weigh
A	Risk and uncertainty of project resources	4.21–4.25	13.191	0.2079
B	Risk and uncertainty of project assumptions	4.1–4.4	11.074	0.1746
C	Risk and uncertainty of project time	4.17–4.20	10.116	0.1595
D	Risk and uncertainty of project scope	4.13–4.15	9.852	0.1553
E	Risk and uncertainty of project environment	4.5–4.7	9.759	0.1538
F	Risk and uncertainty of project result	4.8–4.11	9.445	0.1489
			Sum: 63.437	Sum: 1.000

Source: own study.

In order to aggregate 23 partial indicators to six components, and then one index which reflects a sum of risks and uncertainties of project planning (RUI), a procedure for weighting was adopted and averaging measures were presented in the diagram shown in Figure 5.1. Weighs have been standardized by the sum of the squares of components, which correspond to the part of the variance translated by the component.

As a result of the described procedure the desired composite index – RUI – reflecting a level of risks and uncertainties of project planning was obtained. The use of the indicator in the study will be presented later in this chapter.

Figure 5.1. The Procedure for Creating RUI Index



Source: own study.

5.6. Results and Discussion

End of works at the pre-treatment of data enabled the transition to the next stage of works and reference to the questions set at the beginning of research.

The answer to the first question **RQ1 on the level of risk and uncertainty** of project planning is possible on the basis of the distribution analysis of previously developed RUI indicator. Hypothetical RUI values may range from 1 to 5, since the linear indicator averaging process does not alter the border value of distribution. Because of the way of the partial measures structure and the adopted scale with an increase in value of the index, increases the level of risk and uncertainty of project planning. Properties of index for the researched project sample are shown in Table 5.10

The median of the distribution is 2.68, while half of the sample was located between the values of the first and third quartile respectively of 2.24 and 3.09. According to the respondents, projects represented by them were characterized by medium or even medium-low level of risk and uncertainty in planning. A detailed distribution of level of risk and uncertainty of the analyzed projects is shown in Figure 5.2.

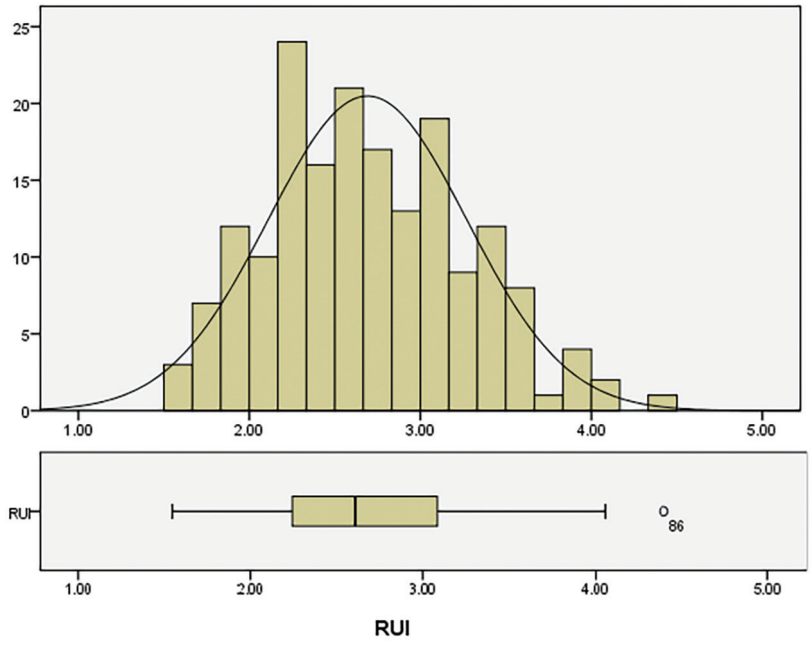
The researched sample is a nonprobability sample, so one needs to keep in mind the restrictions of drawing conclusions about the entire population. Therefore, two additional research questions involve a greater cognitive load than the first one.

Table 5.10. RUI Indicator – Descriptive Statistics

descriptive statistics (DESCRIPTIVES)				
			statistics	Standard error
RUI	Average		2.69055	0.043430
	95 percent confidence interval for the average	lower limit	2.60484	
		higher limit	2.77625	
	5 percent truncated mean		2.67668	
	Median		2.60620	
	Variance		0.338	
	standard deviation		0.581048	
	Minimum		1.540	
	Maximum		4.390	
	Range		2.850	
	interquartile range		0.846	
	Skewness		0.347	0.182
	Kurtosis		–0.432	0.361

Source: own study.

Figure 5.2. RUI Indicator – Histogram



Source: own study.

The second question **(RQ2)** applies to in-depth analysis of the level of risk and uncertainty from the perspective of the individual domains of project planning. For this purpose, the results of the factor analysis carried out earlier were used. This analysis made it possible to group the individual measures into six components (Tab. 5.11).

Table 5.11. Components of RUI Index – Descriptive Statistics

Statistics							
		risk and uncertainty of project resources	risk and uncertainty of project assumptions	risk and uncertainty of project duration	risk and uncertainty of scope of the project	risk and uncertainty of the project's environment	risk and uncertainty of the result of the project
N	important	179	180	179	179	180	180
	lack of data	6	5	6	6	5	5
Average		2.7089	2.7222	2.9404	2.5680	3.0000	2.1708
Standard error of average		0.06012	0.06253	0.06258	0.06429	0.07259	0.05492
Median		2.6000	2.7500	3.0000	2.3333	3.0000	2.0000
Standard deviation		0.80429	0.83895	0.83722	0.86017	0.97390	0.73684
Sum		484.90	490.00	526.33	459.67	540.00	390.75

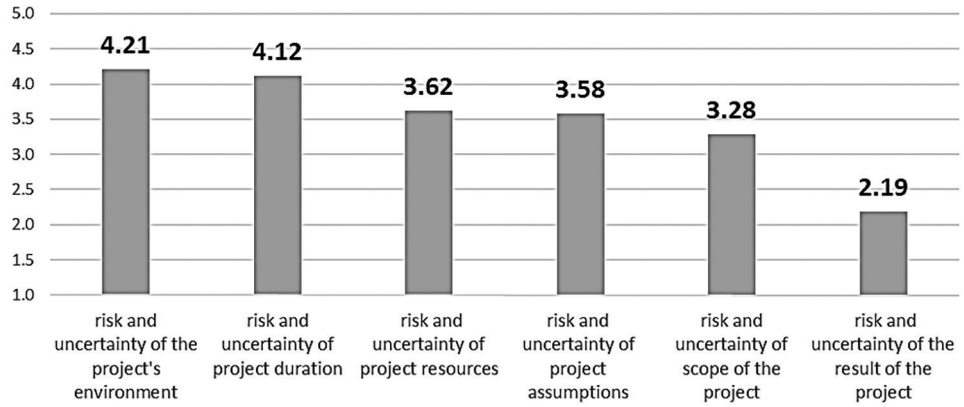
Source: own study.

The measurement of individual variables and six components was made on an ordinal scale. Therefore, Friedman test has been used in order to assess the degree of risk and uncertainty of project planning areas and the development of a single component ranking. The results are shown in Figure 5.3.

The lowest level of risk and uncertainty accompanied the examined projects in the area of planning their results. The result of Friedman's test with an average rank of 2.19 and a large (1.09 points) distance to the second area in the ranking allow to regard it as an area with relatively lowest probability of deviations during the project. Respondents knew the expectations towards their projects and in their opinion possessed enough defined objectives. Both the end result and how it was delivered were largely known in advance in the organization. Relatively high confidence about the results of the projects corresponds to another area, i.e. the scope of the project (average rank of 3.28). A small uncertainty accompanying the results facilitates defining and planning the scope, identification of partial tasks and working out the cooperative structure of a project. The obtained results indicate that the highest levels of risk and uncertainty concerned the project's environment (average rank of 4.21). In particular, this uncertainty was related to the predictability of changes in the environment of the project, the overall risk assessment and actions of project stakeholders. Interestingly,

while planning the results and scope of projects were characterized by a relatively low level of risk and uncertainty, duration planning was ranked second (average rank of 4.12), just behind the area of the project's environment, and therefore as an area significantly more difficult in planning.

Figure 5.3. Friedman's Test Statistics for Components – Average Ranks



Statistics of the test[a]	
N	179
Chi-square	142.722
df	5
The asymptotic significance	0.000
[a] Friedman's test	

Source: own study.

A detailed list of variables adopted in the study which underwent Friedman's test is presented in Table 5.12. The respondents relatively often opposed recognition of their projects as low-risk ones. Relatively most their problems were caused by the access to the necessary information needed in planning. They recognized the need for having reserves in order to protect the milestones and the deadline of the project. Environment of projects planned by them was more dynamic than stable. At the same time, according to the earlier analysis, among the factors characterized by a low level of risk they pointed planning objectives and results of the projects and their scope.

Table 5.12. Statistics of Friedman's Test for Individual Measures

Ranks			
		Average rank	Arithmetic mean
q04.6	The level of project risk was low	15.19	3.2278
q04.1	When planning the project, the team had access to all the necessary information	14.81	3.1222
q04.20	There was no need to use large reserves of time	14.44	3.1285
q04.5	Environment of the project had a stable and predictable character	14.37	3.0944
q04.2	The information, based on which the project was planned, was complete	14.31	3.0222
q04.19	The estimation of project duration was not difficult	14.21	3.0000
q04.18	The team was certain of task duration estimates	13.09	2.8547
q04.25	Cost estimates of the project were certain	12.96	2.7753
q04.24	There was no need to reserve substantial funds for unforeseen events	12.71	2.8258
q04.21	Determination of needed resources didn't cause difficulties	12.42	2.7584
q04.17	The duration of each task could be precisely determined	12.35	2.7709
q04.7	Key stakeholders were in agreement as to the course of the project	12.22	2.6816
q04.13	List of project tasks was determined and permanent	12.13	2.7095
q04.14	Relationships between the project tasks were understood by everyone in the team	11.82	2.6236
q04.22	The number of needed resources could be determined with high precision	11.58	2.5866
q04.23	The cost of individual tasks could be precisely determined	11.51	2.5819
q04.3	The information, based on which the project was planned, was considered certain	11.49	2.5698
q04.11	Way to obtain the final result was previously known in the organization	10.68	2.5222
q04.15	Each task could be clearly described to contractors	10.50	2.3743
q04.8	The team knew exactly the expectations towards the project	9.37	2.2611
q04.4	The plan was supposed to present one, best variant of the project implementation	9.01	2.1778
q04.9	Goals of the project could be clearly and precisely identified	7.82	2.0000
q04.10	The end result could be accurately described	7.02	1.9000

Test statistics[a]	
N	171
Chi-square	486.721
Df	22
The asymptotic significance	0.000
[a] Friedman's test	

Source: own study.

The third question adopted in the study (**RQ3) was associated with the search for the relationship between risk and uncertainty of the project, and the type and context of project implementation.** In order to answer it, three hypotheses were erected:

- H1. The respective domains of projects differ substantially in terms of the level of risk and uncertainty of planning,
- H2. "Hard" projects are characterized by a lower degree of risk and uncertainty than the "soft" ones,
- H3. With the increasing complexity of the project increases the degree of risk and uncertainty of planning.

These hypotheses were afterwards subject to verification using appropriate statistical tools and methods. Distribution normality research with Shapiro-Wilk test showed that none of the measures describing the level of risk and uncertainty of project planning (RUI, components, individual measures within the components) meets the conditions for having its distribution in line with the normal distribution. Normality tests statistics indicate that one must reject the null hypothesis talking about its normality. Therefore, the nonparametric tests were used for the study of the relationship between the variables.

Table 5.13. Distribution Normality Test Results of RUI Index and Components

Normal distribution tests						
Elements of analysis	Kołmogorow-Smirnow[a]			Shapiro-Wilk		
	statistics	df	significance	statistics	df	significance
RUI	0.069	179	0.037	0.983	179	0.029
Risk and uncertainty of project resources	0.096	179	0.000	0.970	179	0.001
Risk and uncertainty of project assumptions	0.087	179	0.002	0.978	179	0.007
Risk and uncertainty of project time	0.087	179	0.002	0.975	179	0.003
Risk and uncertainty of project scope	0.161	179	0.000	0.947	179	0.000
Risk and uncertainty of project environment	0.115	179	0.000	0.965	179	0.000
Risk and uncertainty of project result	0.144	179	0.000	0.956	179	0.000
[a] With a Lilliefors significance correction						

Source: own study.

H1. The respective domains of projects differ substantially in terms of the level of risk and uncertainty of planning

According to the state of scientific and practical knowledge, type of project, understood as the area of its implementation, affects its specificity. Therefore, hypothesis binding domain of the project with the level of risk was justified.

Groups having less than 13 cases were excluded from the analysis, obtaining as a result six domains in the comparisons. In the first step of the analysis the differences of the RUI composite index reflecting the overall level of risk and uncertainty of projects were examined. The analysis conducted with Kruskal-Wallis test did not show the significant differences in the sample (chi-square = 3.512, p = 0.622).

Table 5.14. The Results of Kruskal-Wallis Test for RUI

Ranks			
	type of project	N	average rank
RUI	construction	43	64.21
	information technology	31	78.65
	scientific-research	13	73.62
	organizational	19	61.42
	industrial/production	13	67.92
	products and services development	17	65.29
	Total	136	

Source: own study.

Table 5.15. The Results of the Kruskal-Wallis Test of Components

Test statistics[a,b]						
	risk and uncertainty of project resources	risk and uncertainty of project assumptions	risk and uncertainty of project time	risk and uncertainty of project scope	risk and uncertainty of project environment	risk and uncertainty of project result
Chi-kwadrat	1.960	2.094	7.676	1.621	3.011	14.829
df	5	5	5	5	5	5
The asymptotic significance	0.855	0.836	0.175	0.899	0.698	0.011
[a] Kruskal-Wallis test						
[b] Grouping variable: Type of project						

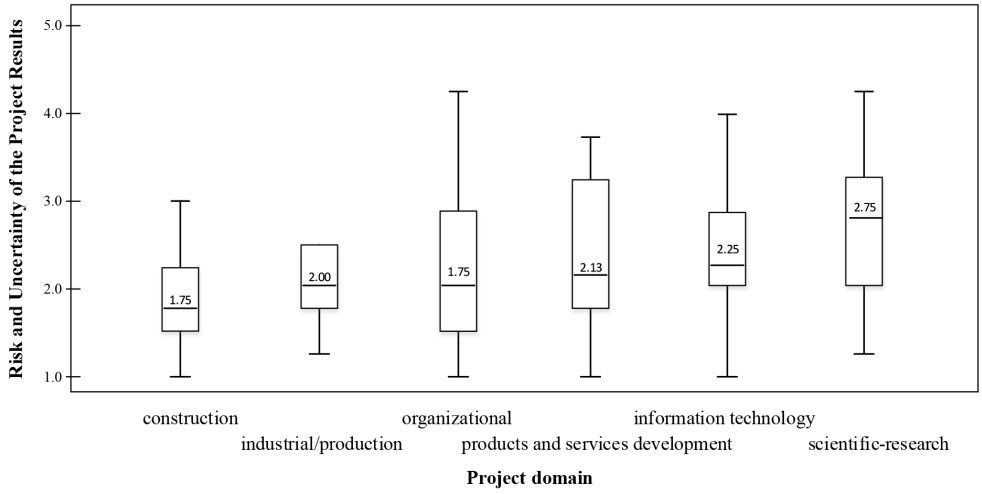
Source: own study.

In the next step the different levels of risk and uncertainty from the perspective of six areas of the components forming together a composite indicator were examined.

Kruskal-Wallis analysis, which showed in this respect one significant differentiation, was used again. It concerned the component – the risk and uncertainty of the project.

Participants of the study representing different domains of projects significantly differ in assessing the degree of risk and uncertainty associated with the planning of the project results. Further information is provided by the analysis of the box-plot shown in Figure 5.4. Component's distributions are characterized by a considerable dispersion between their minimum and maximum values. However, one can see a relatively high certainty of the final result and a focus of values around the median for the construction and industrial-production projects.

Figure 5.4. Quartile Distribution of Risk and Uncertainty of the Project Results by Project Domains



Source: own study.

These observations are confirmed by complementary post-hoc analysis. Conducting pairwise comparisons showed that with the level of $p < 0.05$ the level of risk and uncertainty of project results planning differs significantly between construction projects, and in turn: information technology, scientific-research and products and services development. In each case, the construction projects were accompanied by greater certainty and stability of assumptions on the results. The other three types of projects are characterized by a relatively high level of risk and uncertainty.

Table 5.16. The Results of Post-Hoc Tests

Sample 1 – Sample 2	Statistics of test	Standard error	Standardized statistics of test	Significance
Construction vs. information technology	–28.735	9.299	–3.090	0.002
Construction vs. scientific-research	–35.592	12.491	–2.849	0.004
Construction vs. products and services development	–23.727	11.079	–2.142	0.032

Source: own study.

H2. "Hard" projects are characterized by a lower degree of risk and uncertainty than the "soft" ones

Among the various types of projects one of the dimensions of their classification is a division into the so-called "hard" and "soft" projects. The nature of the end result is a reference point. "Hard" projects are the projects whose end result has a form of a physical effect – the object, structure, investment asset, element of infrastructure, or product. Such results, though often very complex, are easily identifiable, tangible and thus potentially easier to imagine, define and plan. "Soft" projects – through the opposition – are the projects, whose end results are of intangible nature. They will include events, modifications and improvements of processes, implementation of changes, training or organizational projects. In literature they are also defined as "product oriented", i.e. "hard" and "process-oriented", i.e. "soft". A different specificity of two categories of projects affected hypotheses investigating the level of risk and uncertainty in their planning.

Due to the division of the survey sample into two independent groups according to the criterion discussed above, Mann-Whitney's test to verify the hypothesis was used. As a result of the test procedure in relation to the RUI index, one failed to find significant differentiation of this feature because of the nature of the final result ($U = 3221.0$, $P = 0.671$).

Table 5.17. The Mann-Whitney Test Results for RUI Index

Statistics of test[a]	
	RUI
Manna-Whitney	3221.000
Wilcoxona	4761.000
Z	–0.425
The asymptotic significance (double-sided)	0.671
[a] Grouping variable: Type of result	

Ranks				
	Type of result	N	Average rank	Sum of ranks
RUI	soft	55	86.56	4761.00
	hard	122	90.10	10992.00
	total	177		

Source: own study.

In-depth analysis from the perspective of each of six components showed statistically significant differentiation in the case of two of them.

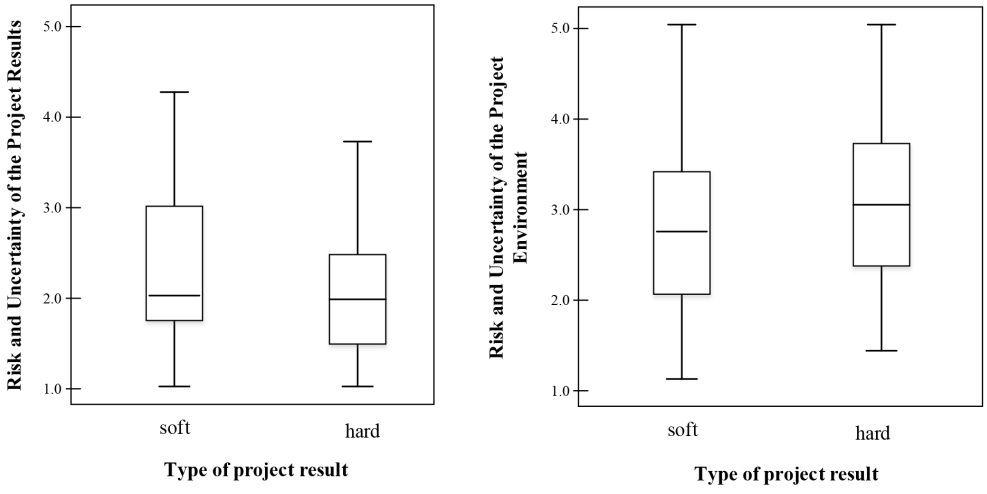
Table 5.18. Mann-Whitney Test Results for the Individual Components

Statistics of test[a]						
	risk and uncertainty of project resources	risk and uncertainty of project assumptions	risk and uncertainty of project time	risk and uncertainty of project scope	risk and uncertainty of project environment	risk and uncertainty of project result
Manna-Whitney	3104.000	3356.500	3068.500	3197.000	2733.500	2696.000
Wilcoxon	4644.000	10982.500	4608.500	10700.000	4273.500	10322.000
Z	–0.798	–0.082	–0.912	–0.506	–2.054	–2.174
The asymptotic significance (double-sided)	0.425	0.935	0.362	0.613	0.040	0.030
[a] Grouping variable: Type of result						

Source: own study.

According to the outcomes of the test procedure, the nature of the result was important in the case of components that describe the level of risk and uncertainty concerning the outcome of the project itself and its environment.

Figure 5.5. Quartile Distribution of Risk and Uncertainty of the Project Result and Risk and Uncertainty of the Project Environment Components from the Perspective of Type of Result



Source: own study.

In the case of object-oriented projects level of uncertainty accompanying determining the expectations of the project, defining the objectives, specifics of effects and technology of their delivery was significantly lower than in the case of process-oriented projects. In this way an empirical confirmation that the specificity and the ability to visualize the effects of the end results affect the ability of project participants to more precise planning of the project's products was obtained. Soft projects are characterized in this area by much greater uncertainty, resulting from the difficulty of clearly identifying, describing and agreeing among project stakeholders their intangible effects.

Table 5.19. Types of the Results by Projects Domains – Frequency Statistics

Project domain		Type of result					
		soft			hard		
		size	% from N in a row	% from N in a column	size	% from N in a row	% from N in a column
Type of project	construction	0	0.0	0.0	44	100.0	35.2
	industrial/production	1	7.7	1.8	12	92.3	9.6
	infrastructural	1	10.0	1.8	9	90.0	7.2
	information technology	6	20.0	10.7	24	80.0	19.2
	products and services development	4	23.5	7.1	13	76.5	10.4
	scientific-research	5	38.5	8.9	8	61.5	6.4
	marketing	4	50.0	7.1	4	50.0	3.2
	sales	4	57.1	7.1	3	42.9	2.4
	other	5	62.5	8.9	3	37.5	2.4
	educational/training	4	80.0	7.1	1	20.0	0.8
	Social	5	83.3	8.9	1	16.7	0.8
	Organizational	17	85.0	30.4	3	15.0	2.4
	Total	56	30.9	100.0	125	69.1	100.0

Source: own study.

On the other hand, from the point of view of the risk and uncertainty of the project environment, their level was higher in hard projects. In particular, this applied to variable describing the overall level of risk (q4.06). In the case of soft projects the average value of the variable in the sample was 2.89 (median = 2.0) and, in the case of hard projects – 3.36 (median = 4). This observation can be explained by the complexity of projects, whose end result is a material object, consisting of many semi-products, subsystems, installations, etc. This situation occurs especially in the case of construction, industrial, infrastructure projects, and information projects

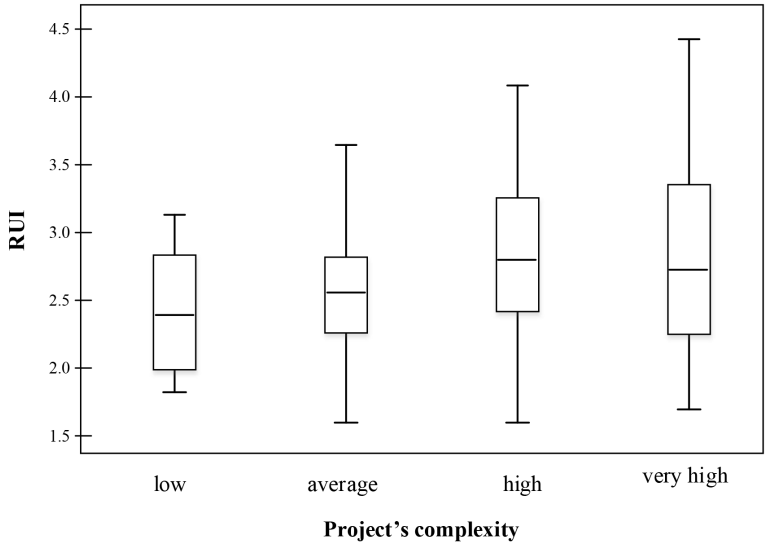
related to building information infrastructure, which were strongly represented in the sample (see Table 5.19). The complexity of the results, and in consequence, of the problems of planning their implementation results in higher overall risk than in the case of soft projects.

H3. With the increasing complexity of the project increases the degree of risk and uncertainty of planning.

Third hypothesis related to the issues of project complexity, linking them to the level of risk and uncertainty of planning. Due to the measurement of all researched variables on an ordinal scale (in the case of project complexity it is increasing with the intensification of this phenomenon) in order to verify that hypothesis Spearman's rho correlation coefficient was used.

Conducted test procedure showed a statistically significant correlation between the RUI composite index, and the level of complexity of the project (rho = 0.173, p = 0.021). The strength of the correlation is moderate, but its direction remains in line with expectations – with increasing levels of complexity of the project there was an increase of the synthetic indicator of the level of risk and uncertainty of planning.

Figure 5.6. Quartile Distribution of RUI Index from the Perspective of the Level of Complexity of the Project



Source: own study.

In the next step, correlation analysis was performed with respect to the six components which constitute the RUI. The results are shown in Table 4.20.

Table 4.20. The Results of the Analysis of the Correlation Between the Variable Complexity of the Project and the Individual Components

Components	Complexity of the project		
	Spearman's rho correlation coefficient	significance (double-sided)	N
Risk and uncertainty of project resources	**0.265**[b]	**0.000**	**178**
Risk and uncertainty of project assumptions	0.019	0.805	179
Risk and uncertainty of project time	0.135	0.071	178
Risk and uncertainty of project scope	0.041	0.587	178
Risk and uncertainty of project environment	**0.301**[b]	**0.000**	**179**
Risk and uncertainty of project result	–0.022	0.768	179
[b] Correlation is significant at the 0.01 level (double-sided).			

Source: own study.

Of the six components, statistically significant correlations were found for the two of them. The greatest complexity of the project was related to the risk and uncertainty of the project environment. All three measures forming component also individually correlated with the level of complexity of the project. In the highest degree it concerned the variable describing the overall level of risk (q04.6), whose Spearman's rho coefficient was 0.35 at $p < 0.001$. Correlated variables associated with the variability and predictability of the project environment (q4.5) and the degree of compliance of the stakeholders towards the course of project (q04.7) were weaker, but still statistically significant ($p < 0.05$).

Table 5.21. The Results of Correlation Analysis Between the Measures Within the Component Risk and Uncertainty of the Project Environment and the Variable Complexity of the Project

Variables composing component "Risk and uncertainty of the project environment"		Complexity of the project		
		Spearman's rho correlation coefficient	significance (double-sided)	N
q04.5	**Project environment had stable and predictable character**	**0.174**[a]	**0.020**	**179**
q04.6	**Level of project risk was low**	**0.350**[b]	**0.000**	**179**
q04.7	Key stakeholders were in agreement as to the course of the project	0.180[a]	0.016	178
[a] Correlation is significant at the 0.05 level (double-sided).				
[b] Correlation is significant at the 0.01 level (double-sided).				

Source: own study.

The second component related monotonically with the level of complexity of the project was risk and uncertainty of project resources (rho = 0.265, p <0.001). An in-depth analysis of correlations within variables forming component highlighted the complexity of the relationship of the project with variables describing the risk and uncertainty of project costs. The increase in complexity of the project primarily affects the reduction of certainty of cost estimates (rho = 0.320, p <0.001), the need to secure substantial reserves for unforeseen events (rho = 0.273, p <0.001) and the ability to accurately determine the costs of the project tasks (rho = 0.199, p = 0.008).

Table 5.22. The Results of the Analysis of the Correlation Between Measures Within the Component Risk and Uncertainty of Project Resources with a Variable Complexity of the Project

Variables composing component **"Risk and uncertainty of project resources"**		Complexity of the project		
		Spearman's rho correlation coefficient	significance (double-sided)	N
q04.21	Determination of needed resources didn't cause difficulties	0.138	0.068	177
q04.22	The number of needed resources could be determined with high precision	0.124	0.099	178
q04.23	**The cost of individual tasks could be precisely determined**	**0.199** [b]	**0.008**	**176**
q04.24	**There was no need to reserve substantial funds for unforeseen events**	**0.273** [b]	**0.000**	**177**
q04.25	**Cost estimates of the project were certain**	**0.320** [b]	**0.000**	**177**
[a] Correlation is significant at the 0.05 level (double-sided).				
[b] Correlation is significant at the 0.01 level (double-sided).				

Source: own study.

5.7. Conclusions

Obtained results in the course of the research allow drawing findings and conclusions for the science and practice of project management in the organization.

First, these are the conclusions of a methodical nature. To measure the uncertainty accompanying project planning a set of measures was developed. Then, on their basis a composite index – RUI was prepared, consisting of six components separated during factor analysis (PCA). This process was based on best practices and methodological recommendations described in the sources indicated earlier in this chapter. Conducting research in the field of management, and project management in particular, often requires from researchers to measure the number of variables

describing considered, most often a complex phenomenon. In particular, this problem affects researchers on the topic of project management maturity of organizations but also other complex areas such as project planning, risk management, or personal problems of project management. Composite indices are commonly used at the macro level to assess and compare the level of socio-economic development of countries. According to the author, knowledge and recommendations for the construction and interpretation can be successfully transferred to organizations management. As a result, it will be possible to improve research tools, and thus more accurate and reliable measurement and inference concerning researched objects and phenomena. Among the critical issues of project management, which longs for such solutions, there is a problem of assessing the success of the project. Despite years of effort, the environment of professionals of practice and science of project management has still not worked out a common, widely recognized methodology to evaluate the success of projects[29].

Among the other conclusions related to research on diversity of risk and uncertainty of project planning level, it is worth noting the following points.

First, the analysis demonstrated that with the project planning the lowest level of uncertainty accompanies the planning of results and scope of projects. The planned products and their specification are supposed to reflect the expectations of internal and external principals of the project. Their planning can be based on existing contracts, agreements, specifications and other project documents. In contrast, it is much harder when planning to obtain reliable information about the conditions of implementation and execution of these. It is relatively difficult to plan the time and resources, especially financial resources. In these areas, organizations should seek ways and solutions to improve the quality and reliability of planning.

Relative easiness of defining the objectives and results of the project and significantly higher uncertainty of time and resources justify directing project management attention to stochastic methods of project planning. Methods such as PERT, Critical Chain Project Management, Monte Carlo analysis allow to take into account the risk in the parameters of tasks falling within the scope of the project, and by so they facilitate determination of appropriate buffers of time and reserves of resources in projects[30]. In view of the obtained results using them in projects seems to be more

[29] A. Stretton, *Some deficiencies in data on project successes and failures. Series on Project Successes and Failures*, "PM World Journal" 2014, vol. 3, no. 7, www.pmworldjournal.net (23.11.2015).

[30] P. Wyrozębski, A. Wyrozębska, *Challenges of project planning in the probabilistic approach using PERT, GERT and Monte Carlo*, "Journal of Management and Marketing" 2013, vol. 1, no. 1; P. Wyrozębski, A. Wyrozębska, *Benefits of Monte Carlo simulation as the extension to the Program Evaluation and Review Technique*, in: *Proceedings in Electronic International Interdisciplinary Conference*, eds. M. Mokryš, Š. Badura, A. Lieskovský, Publishing Institution of the University of Žilina, Žilina 2013.

reasonable than the use of deterministic methods such as the critical path method (CPM), MPM methods or simple schedules.

In terms of industry comparisons (projects' domains) it should be distinguished construction projects, which were characterized by the lowest level of risk and uncertainty within planning results. In the light of the obtained data they were significantly lower than in the case of information technology, scientific-research and development of new products projects. This observation appears to be a consequence of the specific nature of this group of projects imposed by law, building standards and the long tradition of the construction industry. Objects erected as a result of construction projects are subject to detailed designing and documenting. In the case of Poland it includes Act of 7 July 1994 – Construction Law (Journal of Laws 2010 No. 243, item 1623, as amended) and accompanying regulations such as Regulation of the Minister of Transport, Construction and Maritime Economy of 25 April 2012 on the detailed scope and form of a construction project. Formal requirements towards construction undertakings oblige contractors to a detailed description of the results prior to the implementation of the project.

Practices and approach to the documentation of construction projects shape the specifics of the industry. On the other hand, it should be a source of inspiration and good practices that will support other industries during the planning of work.

In the case of information technology projects, R&D and NPD development of a detailed specification of the final result is often impossible. Then it is necessary to use methods that support exploration and design changes, allowing for an evolutionary move towards achieving that objective. One recommends greater flexibility of planning, decision-making freedom and delegating powers to low level and greater tolerance in the hands of the project manager on the range and quality of the results. Not only in IT but also in R&D and NPD it will be deliberate to use agile methods of project management, such as SCRUM, XP, DSDM and others.

The study showed differences in the risk and uncertainty of project planning results between the "hard" and "soft" projects. In the case of "process-oriented" projects efforts should be made in order to better identify and define the expected project results. In view of the accompanying significantly higher level of risk, management of projects must be certain that the offered products are described accurately, their composition, form, characteristics do not raise doubts, and all key stakeholders perceive them and understand the same. In another case there may be a risk of derogations and the poor quality of "soft / intangible" results – and therefore susceptible to individual interpretation.

As a result of the analysis one proved a correlation between the level of complexity of projects, and RUI index and the accompanying risk and uncertainty of project environment and resource planning. The complexity of the project as the

only describing variable correlated in the study with the composite index. As in the case of geographical coverage, increase of the complexity of the project will require the use of stochastic methods of budget and resources planning and comprehensive analysis of the environment and the various risks during the stage of its preparation.

Moreover, the level of complexity of projects should be reflected in the internal regulations, e.g. project management methodology. In particular, its evaluation should affect the acceptable size of the buffers and financial reserves of projects. Based on the above it can be recommended for the management of complex projects to carefully analyze the quality of the estimates, made assumptions and effort put in planning, making sure that the work has been done to the best of their knowledge.

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Emil Bukłaha

6
OPERATIONAL PROJECT CONTROLLING – RESULTS OF THE STUDY

6.1. Introduction – Description of the Aim of the Study

The aim of the study is to analyze the scale and types of controlling used in the practice of project management, in respect of the projects implemented in organizations operating in Poland. The author also done research on the current status and approach to control of projects at every stage of their life cycle, and the results were set together with the scope of the information required to effectively manage projects and most frequent recommendations in recognized methodologies of project management (PRINCE2, PMBoK, PCM, Scrum).

Participants of projects implemented in Polish organizations, primarily the managers, but also members of the project teams and project boards were the target group.

Despite its significance, controlling of projects is an issue not adequately described in the literature, both Polish and foreign. For the past ten years, just a few books on the subject were created[1]. At the same time one tries to move the concept of controlling the current activities of the organization to the project management area, which raises a lot of confusion and misunderstanding, since the implementation of projects does not usually coincide with the process (repetitive) activities of the company.

In the opinion of the author the conducted research enabled to create a comparative analysis of the actual shape, form and scale of demand for control-decision-settling in projects (as well as the reasons for their state) with methodological approaches, which set world standards in modern project management. This in turn – according to the author – will serve not only for the organization of knowledge, but also can carry in itself a significant application dimension.

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[1] S. Devaux, *Total Project Control: A Manager's Guide to Integrated Project Planning, Measuring, and Tracking*, Wiley & Sons, New Jersey 1999; F. Drigani, *Computerized Project Control*, CRC Press, Boca Raton 1988; J. Pinto, J. Trailer, *Essentials of Project Control*, Project Management Institute, Philadelphia 1999; S. Mubarak, *Construction Project Scheduling and Control*, Wiley & Sons, New Jersey 2010; W. Del Pico, *Project Control: Integrating Cost and Schedule in Construction*, Wiley & Sons, New Jersey 2013.

6.2. Definition and Genesis of Project Controlling

Term **project controlling** is used in organizations to describe a set of methods and techniques that assist the project management process supplying relevant information necessary at each level of project management in order to make rational decisions. It is an example of adapting organizational systems to the specificity of projects. The most common areas of project controlling application are[2]:

- budget, costs and financial liquidity,
- schedule, duration of the work and milestones,
- planned and actual scope of work,
- business justification for the project,
- the availability of resources and the resource-intensiveness of activities,
- project risk management, especially in the stages of implementation,
- issues of quality of semi-finished products and final products of the project.

The primary factors forcing the use of specific solutions in this field for project management include[3]:

- a single project target and its non-routine nature,
- a specific organizational structure (the project team, which most often is terminated after the project),
- focus on the project – in business operations controlling system presents the results primarily in the appropriate time systems, e.g. a month, quarter, year, while with projects more important are the results, e.g. from the various stages of work,
- less credible standards – the uniqueness of the projects reduces the possibility of utilization of historical data stored for other projects,
- frequent changes in plans, which necessitates frequent modifications, among others, financial plans of the project,
- different rhythm of activity – the organization's commitment to the project is variable in different phases of their cycle, but with repetitive business operations is relatively constant,
- lower credibility of the scope planning, time and costs of project activities, which could substantially affect the predictability and the level of the final financial results of project activities,
- usually weaker connection of project activities with the accounting system of an organization working primarily in a reproducible manner.

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[2] Own study based on: E. Bukłaha, *Controlling i budżetowanie projektów – wybrane zagadnienia*, in: *Controlling – wiedza i narzędzia praktyczne, poradnik*, 17 November 2008, Forum Press, Poznan 2008, pp. 1–11.

[3] Based on M. Łada, *Budżetowanie projektów*, "Przegląd Organizacji" 2007, no. 3, p. 37.

R. Bertsche indicates, among others, the following reasons for using control procedures in the projects[4]:

- uncritical drawing on the documentation of similar projects completed in the subsequent project planning,
- disregard of differences in the implementation of specific actions in relation to the level of competences and experience of their operators,
- imposition by the customer of deadline for the project before performing detailed analyzes of the scope and progress of work,
- constant changes in the course of the project implementation,
- unavailability of pre-contracted workers in the various phases of the project (the holiday factor).
- delays due to overload of project team members performing multiple tasks simultaneously.

In summary, the main task of controlling is an integration of control activities into a coherent whole, taking into account the above mentioned management challenges, which distinguishes them from the control processes, often carried out by autonomous individuals and organizations concerning a limited area of its operation.

6.3. Types of Project Controlling

In the literature one distinguishes the different methods of project controlling. The first is the division according to the moment of carried out control:

- prospective (preliminary) – assessment of the degree of preparation to performing tasks that in the time of the control has not started yet,
- current – analysis of the current progress of work on the day of control or work which should have already gone on as planned,
- retrospective (consecutive) – a comprehensive assessment of the tasks which had ended before the day of control or should end as planned.

Another way of division is due to the carried out functions for the process of managing information about the project[5]:

- simplified – a comparison of the desired (designated) state with the current one,
- complex – a system of mutually identified projects, principles, methods and techniques for internal control system, oriented to achieve the target result,

[4] R. Bertsche, *A Low Tolerance for Error*, "PM Network", April 2015, vol. 29, no. 4, pp. 58–63.

[5] *Zastosowanie arkusza kalkulacyjnego w controllingu*, eds. A. Kardasz, Z. Kęsa, AE Press, Wroclaw 2004, p. 11.

- image – a process of navigation and economic control with the use of plan designating a destination,
- abstract – an integrated system of management, planning, control and information, supporting adaptation and coordination of the entire management system.

An important supplement of the mentioned directory is a coordination function. Coordination refers to the basic systems in the area of controlling, i.e. the information supply system and the system of planning and control.

Another form of division, chosen by the author as a leading in the research part of this chapter, is the one that takes into account planning horizon of the project activities and the level of detail of the acquired information, i.e. division into **strategic** and **operational** controlling[6]. **Strategic project controlling** makes an assessment of the strengths and weaknesses of projects in relation to the current development strategy of the organization. It examines the preliminary feasibility of projects, it assess their cost-effectiveness and efficiency from the point of view of the adopted guidelines, creates ranking lists of projects, analyzes the convergence of their goals with the strategic objectives of the organization. Here are applicable tools such as[7]:

- strategic evaluation of the project (multi-faceted evaluation of the effectiveness of the project, taking into account external and internal conditions),
- analysis of the project value for the customer (used to determine the final price of the project according to the "market" method),
- final costing of the project (specifying the scope, quality and timing of the project based on the cost of the project and its target price),
- life-cycle costing of the project (project cost analysis, taking into account, in addition to the implementation phase, the phase of use of the products of the project),
- project portfolio analysis (value and costs analysis taking into account projects as part of the complete portfolio of related projects),
- analysis of risk related to the program or portfolio of projects, as well as individual projects, strategically important for the organization.

Tools of strategic controlling allow a better development of implemented project portfolio, realizing the real expectations of clients as to the scope, quality and cost of the most important projects, determining the impact of stakeholders, risk analysis, etc. From the tools and techniques used in strategic project controlling one expects the increase of capabilities and opportunities to provide stable implementation of projects under the programs or portfolios of projects and making accurate strategic decisions.

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[6] see among others: H. Vollmuth, *Controlling*, Placet, Warsaw 1997; A. Preißner, *Projekte budgetieren und planen*, Carl Hanser Verlag, Muenchen 2003.

[7] based on: M. Łada, A. Kozarkiewicz, *Rachunkowość zarządcza i controlling projektów,* C.H. Beck, Warsaw 2007, pp. 32–33.

Operational project controlling is oriented to regulate the implementation of projects in short timeframes (usually maximum a year). It focuses on the planning, execution and control of projects selected for implementation at the stage of strategic controlling. In the project it is mostly represented at the level of project manager. Collected information is primarily used to improve decision-making process related to the current management of project phases. Appropriate tools for operational project controlling include[8]:

- planning progress and costs of the project (determining the expected financial impact resulting directly from the implementation of the project),
- evaluating the financial performance of the project (analysis of the costs and financial benefits of the project),
- reports for decision-making (a set of information to assist in making decisions about the acquisition and allocation of resources to the project),
- recording and accounting of project costs (systematic measurement of the actual financial effects of executed projects),
- project risk analysis, especially important at the stage of its implementation, with reference to desired dimensions (e.g. financial, technical, human, quality, time, etc.),
- preparation and control of the implementation of the project budget (analysis of the actual financial implications of the projects compared to the base budget),
- post-completion analysis of the project (the so-called post-audit, analysis of the actual costs and benefits of the implementation of the project, both financial and non-financial; gathering post-project experience).

Operational project planning is a continuation of the strategic planning process. It refers to the implementation phase of the project, acting as a starting point for the implementation of project's operational plans, in line with the strategic objectives of the organization. It focuses not on effectiveness but on its implementation (feasibility) consistent with strategic objectives, taking into account the internal and external constraints (stakeholder and risk analysis, etc.).

Guidelines for strategic controlling primarily lie within competences of the management of the organization or departments authorized by them, while operational controlling depends on project managers and (rarely) project team members.

[8] Ibidem.

6.4. Operational Project Controlling in Polish Organizations

The chapter will present the results of the author's research on operational project controlling in organizations operating in Poland. The data will be presented in the form of aggregated results with an analysis. The entire study will be preceded by a detailed description of the research sample and selected research methods and its scope.

6.4.1. Research Sample

The research was done in 2014 as a targeted research – the target group consisted of only participants of projects implemented in Polish organizations, primarily in positions of project managers, project team members, but also the project boards and project advisors, i.e. students and graduates of Postgraduate Studies in Project Management carried out in Warsaw School of Economics. Distribution of the research sample is shown in Table 6.1.

Table 6.1. Distribution of the Research Sample According to Positions Held in Implemented Projects

Position held	Team member	Project manager	Project board member	Expert/advisor	Another position
Indices (in %)	48.84	32.56	4.65	11.63	2.33

Source: own study.

Another reason for choosing precisely that research target group was the fact that they are practitioners of project management, equipped with the necessary knowledge in project controlling, whose the level of detail, allows providing credible answers to the questions in the research survey.

The study included 353 people, while the returned surveys (**research sample**) amounted to 33 complete sets of answers, which gives approx. 9.35% of responses in the surveyed population. Although interesting results were obtained, in the author's opinion, they should only be a contribution to the further testing because too small sample size did not give the basis to stretch the findings to the entire research population.

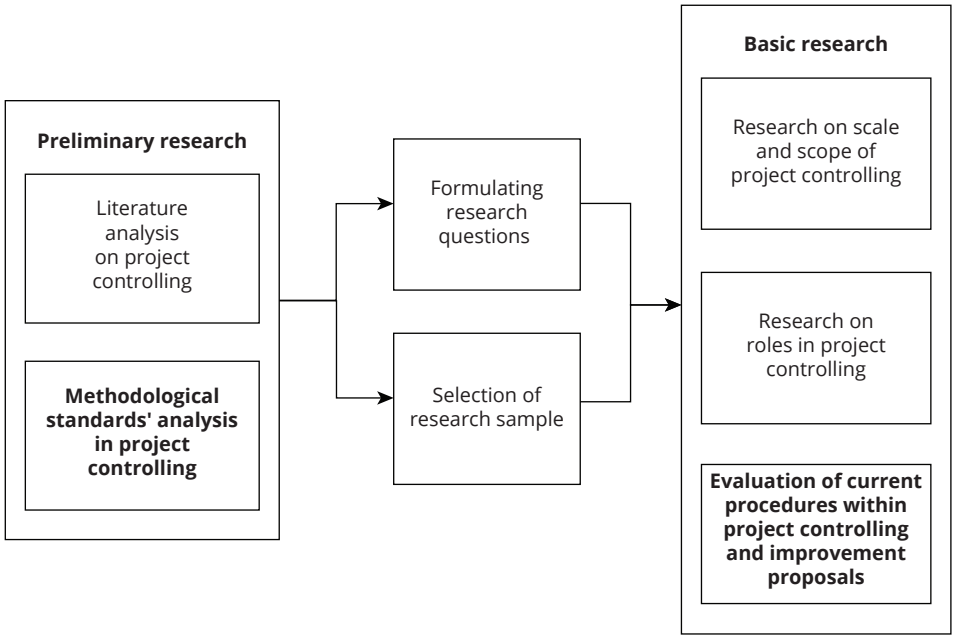
6.4.2. Research Methods and Research Model

The study consisted of carrying out a standardized survey at the above-described group of respondents with respect to operational and strategic controlling. The data

underlying the development of aggregated results included mainly the analysis of forms and types of controlling used in the practice of project management in relation to the projects implemented in Polish organizations. The studies also covered the reasons for the use and methods of introducing procedures for project controlling and the pros and cons of accepted forms of control. The studies also identified the positions playing an important role in project controlling and their main responsibilities. The current and future needs for improvements in project controlling have been analyzed. The author also made a research on approach to control of implemented projects at every stage of their life cycle, comparing the obtained results with the recommendations of project management methods worldwide, such as PMBoK, PRINCE2, PCM and Scrum.

Based on the analysis of literature and methodological standards, author formulated 20 research questions that are grouped according to the following criteria: scale and scope of project controlling, roles in relation to project controlling and the evaluation of existing procedures for project controlling and proposals for improvement.

Figure 6.1. Research Model Within Project Controlling in Organizations Operating in Poland



Source: own study.

The conducted research on practical aspects of project controlling in organizations operating in Poland is also highly innovative, because there is a complete lack of studies on this subject and world's literature with regard to a research of practical dimension of project controlling is extremely scarce. The intention of the author is therefore to fill this gap in knowledge, in particular with regard to the Polish realities.

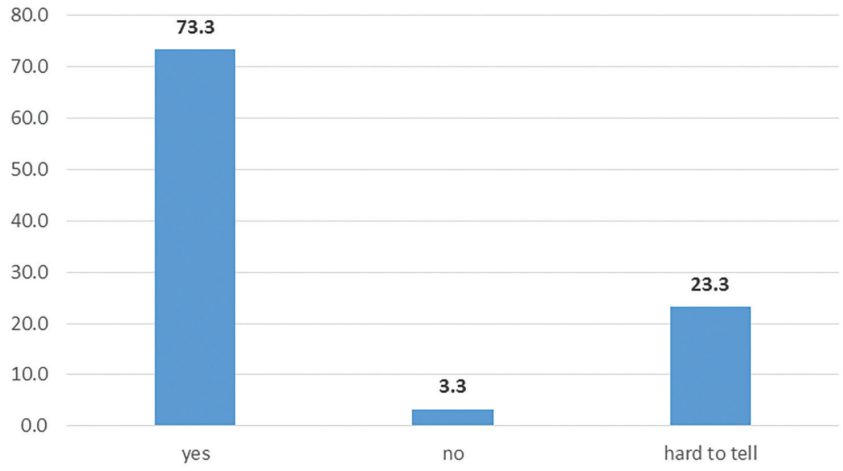
6.4.3. Research Results Within the Scope of the Current Project Controlling in Organizations Operating in Poland

The chapter will present selected results of analysis in regard to operational project controlling, taking into account each of three areas of research described in the basic research from the model (Fig. 6.1).

Question 1. Do established procedures for operational project controlling exist in your organization?

Respondents in more than 70% of the cases pointed to the existence of established procedures regarding the application of the rules of operational project controlling, while almost every fourth respondent was not sure of the existence of such rules. According to the author it indicates a high awareness of the need to include ways of the current project control into specific procedures.

Figure 6.1. The Existence of Operational Project Controlling Procedures in the Surveyed Organizations (in %)

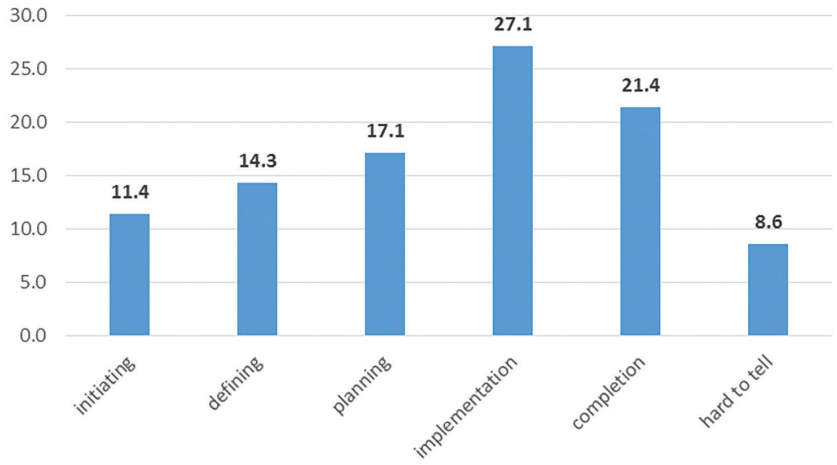


Source: own study.

Question 2. On what stages of project management does one apply tools and techniques of operational controlling in the surveyed organizations?

Most indications as to this research question related to the planning, implementation and completion stages. This means that it is then when one most intensively uses operational controlling procedures, which – given its specific character and place in the organizational structure of the project (primarily the project manager and team members) – is perfectly understandable.

Figure 6.2. Operational Project Controlling and Stages of the Project Management Cycle (in %)



Source: own study.

The author compared the responses with recommendations for project controlling included in the documentation of recognized project management methodologies (PRINCE2, PMBoK, PCM, Scrum) used in projects around the world. It turned out that the areas of project life cycle to the greatest extent covered by the operational and strategic controlling correspond with the provisions of these methodologies, each of which describes the problems of controlling with the varying intensity.

British methodology PRINCE2 (Project In Controlled Environment) and the American PMBoK methodology (Project Management Body of Knowledge) recommend the use of current controlling procedures mainly at the stages of: planning, implementation and completion of the work, and strategic also at the defining of the project stage. A special section devoted exclusively to the issues of project monitoring and control at the indicated stages of its life cycle has been set aside in the construction of two methodologies.

European methodology PCM (Project Cycle Management), especially recommended for the EU projects, focuses primarily on strategic controlling from the point of view of the sponsor and the principal of the project. In its terms, "high level" controlling elements exist primarily at the stages of initiating and defining the project (the project's compliance with the objectives of the principal, e.g. the EU aid programs), planning (relevance and effectiveness of the planned works) and the completion (evaluation and audit of the project). During the implementation stage this type of controlling occurs primarily as conclusions from control of the milestones of the project. With regard to the current controlling methodology focuses primarily on the implementation stage of the project, recommending respectively frequent monitoring of the progress of works planned in the schedule of the project.

The recommendations of the American Scrum methodology focus primarily on monitoring the implementation stage of the project (operational controlling) and the implementation and completion (stage of strategic controlling). Due to its specificity, the controlling procedures at the stage of initiating and defining are limited to a minimum, but are developed during the implementation and a summary of the work stages, when the collection of the finished product of a project takes place.

In summary, respondents' indications coincide with the recommendations of the individual project management methodologies with respect to operational project controlling. The obtained results show the greatest compatibility with the approach to controlling described in the PRINCE2 and PMBoK methodologies and partial compliance with the other mentioned methodologies.

Question 3. What were the main reasons for introducing operational project controlling in the surveyed organizations?

The respondents as the most important reasons for applying the principles of operational project controlling recognized ensuring a better flow of information, obtaining additional information about the time and cost of projects and greater engagement from the employees in the project management process. The least important reason was, according to them, contribution of controlling procedures to reducing costs and/or to improving the financial liquidity of the organization.

Notably, despite the fact that all of the above cited reasons for using operational controlling reduce the level of risk related to the conduction of projects, only one in ten of the respondents pointed to the risk as an independent reason for introducing the rules and procedures for controlling into project management. This may prove either a "blurry" treatment of the issue of risk related to the conduction of projects (divided into its individual components, presented in Table 6.2) or not realizing the role controlling plays in risk management.

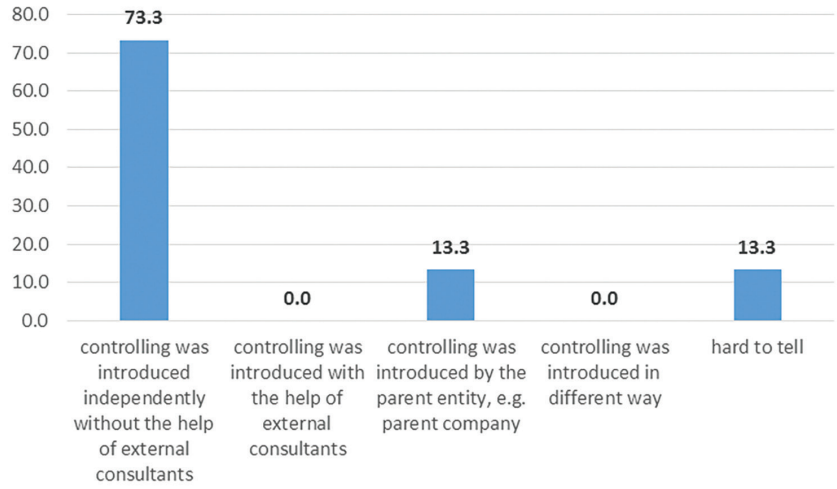
Table 6.2. The Main Reasons for Introducing Operational Project Controlling in the Surveyed Organizations

Reason	Indications (in %)
Decreasing risk of conducting project activities	9.80
Obtaining additional information about the costs of the projects	11.76
Obtaining additional information about the quality of the implemented projects	10.78
Obtaining additional information about the scope of conducted works	10.78
Obtaining additional information about the available resources	9.80
Obtaining additional information about the time of the implementation of the projects	11.76
Ensuring a better flow of information	13.73
Reduced costs and/or improved financial liquidity of the organization	7.84
Greater engagement from the employees	11.76
Hard to tell	1.96

Source: own study.

Question 4. How were the procedures for operational project controlling implemented in the surveyed organizations?

Figure 6.3. The Ways of Implementation of Operational Project Controlling Procedures in the Surveyed Organizations (in %)



Source: own study.

With regard to operational project controlling, respondents indicated that the introduction of controlling procedures took place primarily through independent implementation of them in the conducted projects without the involvement of external

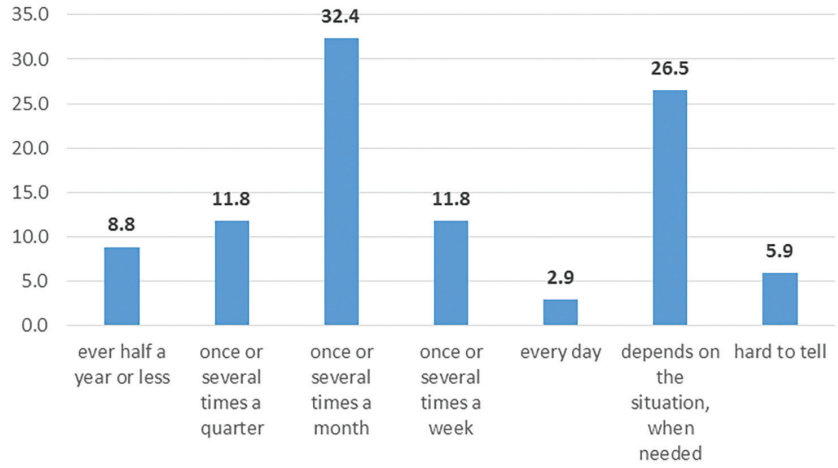
consultants (seven out of ten respondents). In comparison with the information that the respondents were mainly project managers and project team members, this means that in the implemented projects they had the greatest influence on the procedures and rules of the current control.

In the case of implementation of projects in the capital structures also arose a situation in which the operational project controlling rules were introduced to the organization by the parent entity. Such a situation was indicated by more than 13% of respondents.

Question 5. How often is usually operational project controlling carried out in the surveyed organizations?

Respondents pointed to the fact that the controls during the realization of projects are mostly carried out once or several times a week and every month (over 32% of responses) or ad hoc, depending on the situation (26.5% of responses). This is consistent, first and foremost, with the specifics of the implementation stage of the project, during which controls are often determined by the needs arising from the current situation of the project or result from arbitrarily established procedures relating to the collection and processing of management information.

Figure 6.4. The Frequency of Operational Project Control in the Surveyed Organizations (in%)



Source: own study.

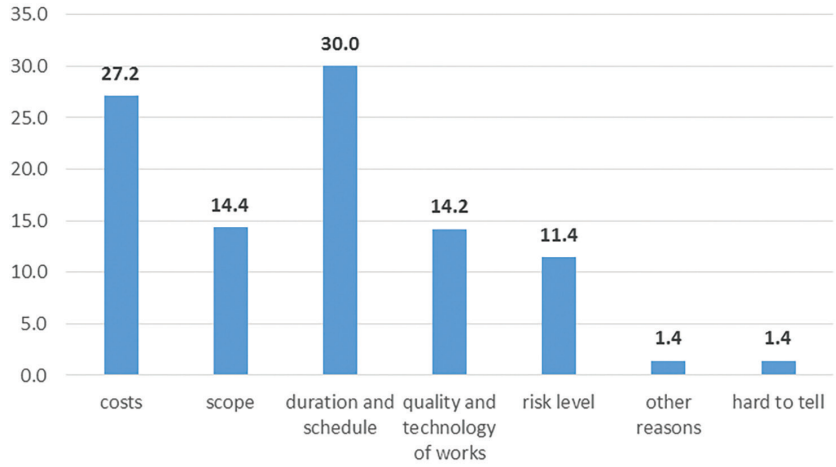
The least frequent were incidents of current controls carried out every day (less than 3% of responses), and ever half a year or less (almost every tenth of responses). According to the author in the latter case one may consider a lack of control over the

team of contractors during the project, which is certainly a situation that requires changes.

Question 6. What mostly falls under the operational project control in the surveyed organizations?

Time of realization, work schedule and costs were the most common scope within the operational control in surveyed organizations. These issues were pointed by one in three respondents. Another area of control was the scope of work to be done and the quality and technology of works. This means that project controlling applied during the current execution of works clearly refers to a project triangle constraints because on the degree of fulfilment of all its dimensions (time, cost, scope and quality of work) depends the success of the project. It is therefore necessary to control all these elements, which is understandable from the point of view of defining the success of the project by the project manager.

Figure 6.5. The Scope of Operational Project Controlling in the Surveyed Organizations (in%)



Source: own study.

It should also be noted that the actual scope of the project controlling in the vast majority coincides with the reasons for the introduction of controlling procedures described above. This may prove the effectiveness and consistency in creating procedures for monitoring and applying them in project practice.

Question 7. Do the surveyed organizations use tools to support project controlling?

With regard to operational controlling a spreadsheet was the dominant IT tool used in project management (over 40% of responses). Further in order tools were custom made, corporate programs supporting the process of controlling and dedicated software supporting project management (such as Microsoft Project, Primavera, P2Ware or similar).

Table 6.3. IT Support for Operational Project Controlling Procedures in the Surveyed Organizations

Type of support	Spreadsheet	Dedicated software for project management	Part of the organization's IT system	Custom made program	No software is used	Hard to tell
Indications (in %)	40.91	18.18	13.64	22.73	4.55	0.00

Source: own study.

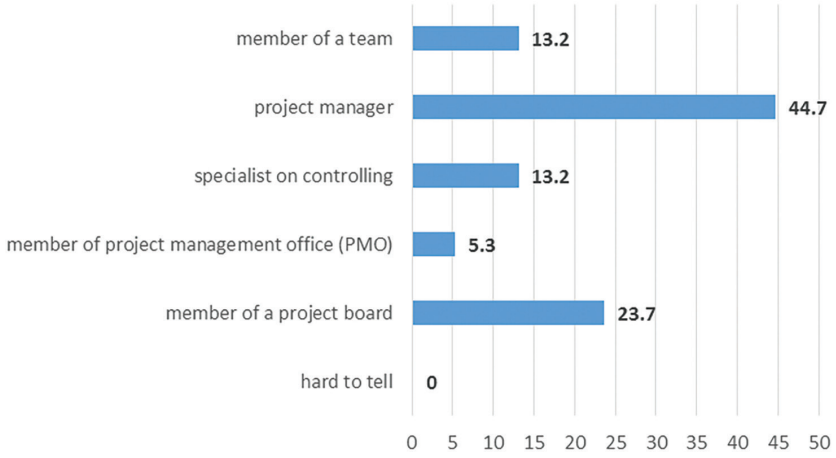
Only approx. 5% of respondents indicated the implementation of control procedures without the use of any software.

Question 8. Who usually plays the role of an operational project controller in the surveyed organizations?

In the surveyed group, project managers were usually the main people playing the role of the project controllers (almost 45% of responses) and specialists on controlling and project team members (one in ten responses). These results raise no surprise, since it is the project manager who should care to have real-time information about the progress of the project, since it is he who has greatest responsibility for the success or failure of the project.

Noteworthy is the second rank in the table above of a Project Board member as person operationally controlling projects. This answer was pointed by almost every fourth respondent. It is quite puzzling, since this group most commonly conducts strategic controlling facilitating making the most important decisions about the fate of the project in key moments of its control. It is true that the analyses performed at the level of strategic controlling stem from data collected during the project, but the Project Board should not replace the manager and the team, and especially should not make decisions in their place regarding the ongoing work carried out in the project.

Figure 6.6. The Role of Operational Project Controller in the Surveyed Organizations (in %)



Source: own study.

Question 9. What tasks is the project controller responsible for in the surveyed organizations?

With regard to operational project controlling respondents pointed out three basic tasks for which the project controller is responsible. They included: analysis of the progress and variance analysis, budgeting and cost control (both had 23% of answers) as well as internal reporting, including executives (every fifth respondent). It should be noted, however, that the other tasks included in the survey were also frequently indicated by respondents.

Table 6.4. Project Controller's Tasks in the Surveyed Organizations

Tasks	Indices (in %)
Analysis of the work progress and variance analysis	22.89
Budgeting and cost control	22.89
Planning and control coordination	9.64
Internal reporting, including executives	20.48
External reporting (e.g. to the client, sponsor)	7.23
Project risk analysis	4.82
Supplying information from the environment	7.23
Other, not mentioned above	2.41
Hard to tell	2.41

Source: own study.

The least important tasks of the project controller were project risk analysis and supplying information from the environment of the project for the purposes of making decisions arising from operational controlling.

Question 10. On whom or what do the choice of scope, techniques and procedures of operational project controlling depend in the surveyed organizations?

The choice of the scope, techniques and procedures for controlling to the greatest extent depended on the decision of the project manager (one in three respondents) and superior of the project manager and practices of the surveyed organizations (over 15% of responses). This is consistent with the above-described part of the research on the role played by project managers in operational controlling, their meaning for the ultimate success of the project and the degree of freedom in decision-making, among others, about the frequency of current control of works. Decisions of this type were less likely to be taken by the members of the Project Board and under the current project management methodologies.

Table 6.5. Decision-Makers on Scope, Techniques and Procedures for the Operational Control of Projects in the Surveyed Organizations

Decision-makers	Project manager	Superior of the project manager	Project Board members	Project management offices (PMO)	Project management methodologies	Practices in the organization	Hard to tell
Indications (in %)	32.69	15.38	11.54	5.77	13.46	15.38	5.77

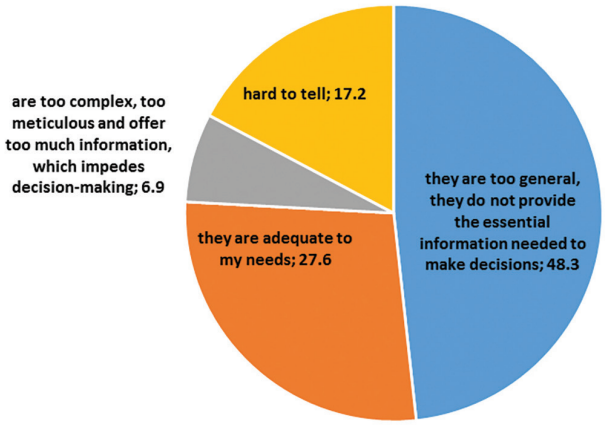
Source: own study.

The least important source of shaping decisions about operational controlling procedures are project support departments of PMO type (Project Management Office).

Question 11. To what extent do the current solutions of operational project controlling meet the expectations of the respondents in the surveyed organizations?

With regard to the usefulness of the existing procedures for operational project controlling respondents are clearly divided. Nearly half of the respondents believe that they are too general and do not provide the essential information needed to make decisions with respect to projects, while almost every third respondent argues that these procedures are adequate to meet their needs. Less than 7% of the responses indicated that current controlling procedures are too complex, too meticulous and offer too much information, which impedes decision-making, while almost every fifth respondent did not have opinion on this topic.

Figure 6.7. The Degree of Meeting the Expectations of the Respondents in Relation to the Current Operational Project Controlling Procedures in the Surveyed Organizations (in%)



Source: own study.

According to the author, this means that the current operational controlling procedures are not "exaggerated" and if they cause some discomfort, it is only in reference to the excessive generality of control information flowing from the controlling reports and entailing difficulties in unambiguous assessment of the project than their over-complexity and over-formalization. The observed phenomenon of information chaos and the need to make decisions about the fate of projects in a situation of shortage of information correlates with opinions of the respondents on the scope and frequency of controls (see research question no. 14).

Question 12. What benefits could be observed from operational project controlling in the surveyed organizations?

Respondents pointed to a number of significant benefits of the controlling procedures. They included: increase of the efficiency of the implemented projects and a better flow of information (15.5% of responses) and increase of the speed of decision making on the projects and reduction of the risk of ongoing projects (approx. 14% of responses). Somewhat less important for respondents was the reduction of the costs of the projects and obtaining additional information for decision-making, increased engagement and/or motivation of employees during the projects (one in ten respondents), and obtaining additional information in order to make management decisions.

The least significant benefit from the use of operational project controlling procedures turned out to be the increase of liquidity or profitability of the organization

through a more efficient use of resources and access to information. The lack of benefits from the application of the current controlling systems with regard to the ongoing works on the project was pointed by only one respondent.

Table 6.6. The Benefits from Current Operational Project Controlling System in the Surveyed Organizations

Benefits	Indications (in %)
Reduction of the costs of the projects	10.57
Increase of liquidity or profitability of organization	6.50
Increase of efficiency of actions	15.45
Better flow of information	15.45
Increase of the speed of decision making	13.82
Obtaining additional information for decision-making	9.76
Reduction of the risk of ongoing projects	13.82
Increased engagement and/or motivation of employees	10.57
Another, not mentioned benefits	2.44
I see no benefits	0.81
Hard to tell	0.81

Source: own study.

Question 13. What disadvantages of the current project controlling system could be observed in the surveyed organizations?

According to survey, respondents see more advantages than disadvantages of current rules and procedures for operational project controlling. However the perceived disadvantages of this system concerned mainly the increase of unnecessary bureaucracy (almost every fifth respondent), the fact of additional costs generated by the controlling procedures in the project (17% of responses) and the necessity of providing to detailed information about the project to those responsible for ongoing monitoring of the project (16% of responses). Prolonged work time in the project due to the necessity of using controlling procedures (every tenth respondent) and the involvement of too many people in the process of controlling (15.8% of responses) were further on the list.

Only approx. 6% of respondents did not see any disadvantages in the evaluated operational project controlling systems or did not have strong opinion on this subject.

Table 6.7. The Disadvantages of the Use of the Current Operational Project Controlling System in the Surveyed Organizations

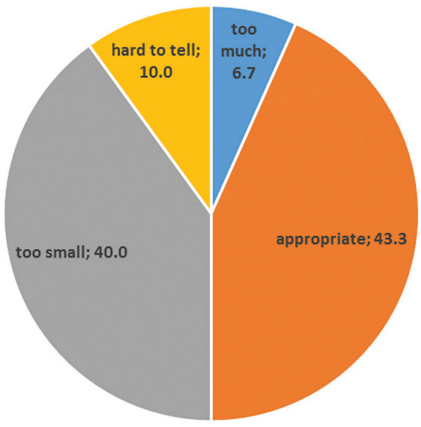
Disadvantages	Increase of unnecessary bureaucracy	Prolonged work time in the project	Involvement of too many people in the process of controlling	Providing too detailed information about the project	Additional costs generated by the controlling	Another, not mentioned before	I see no disadvantages	Hard to tell
Indications (in %)	23.53	11.76	9.80	15.69	17.65	9.80	5.88	5.88

Source: own study.

Question 14. Are the scope and frequency of operational control in the projects sufficient for their effective implementation in the surveyed organizations?

In the case of operational project controlling opinions of respondents in relation to the scope and frequency of controls in relation to the ongoing projects were divided mainly between two alternatives. According to the largest number of respondents (43.3% of responses) the extent and frequency of controls in relation to the realized projects are appropriate. However, as much as a quarter of the respondents indicated that it is too small in relation to their needs. This may prove on the one hand a clear demand for more accurate, more frequent and more detailed control information on the current project control process, and on the other hand inefficient system of access to such information at all.

Figure 6.8. The Scope and Frequency of Operational Project Control and Its Impact on the Efficiency of Their Implementation (in %)



Source: own study.

Only up to every tenth respondent thought that the current control procedures in relation to the smooth implementation of ongoing works in the project are too poorly developed; a similar number of people had no clear opinion on this issue.

6.5. Conclusions

In the conducted studies the author attempted to answer many research questions. They concerned the scope of project controlling in organizations operating in Poland, functions within it and assessment of the project controlling process. Research in project controlling shows that there are commonly used elements of operational controlling, primarily supporting the project manager and project team with information in the management process of individual tasks in the project.

Respondents indicated that the project controlling procedures are most intensively used in the stages of planning, implementation and completion of projects. Such an approach is consistent in most of the PMBoK and PRINCE2 methodologies in relation to operational controlling.

Studies have shown that the main reasons for the introduction of rules and procedures for current controlling were not only the need to obtain additional information about the costs of projects, but also their scope, schedule, duration and quality, and ensuring a better flow of information and increased engagement from employees and also reduction of risk of conducted project activities.

With regard to operational project controlling, respondents indicated that introduction of controlling procedures was done primarily through independent implementing them in the projects without the involvement of external consultants.

Respondents pointed to the fact that the controls during the project realization are mostly carried out once or several times a week and each month or on ad hoc basis, depending on the situation. The least frequent were incidents of controls carried out daily.

As a part of the operational project control in the surveyed organizations one mostly controlled costs, scope of work, duration and schedule, quality and technology or works affecting projects as well as their level of risk.

The dominant IT tool used in project management was a spreadsheet (over 40% of responses). Further in order there were custom made, corporate programs supporting the process of controlling and dedicated software supporting project management.

In relation to the functions exercised in the process of operational project controlling, the function of the project controller is usually held by a person mostly associated with this kind of controlling, i.e. a project manager. In this process they are often supported by the project team members and specialists on controlling.

It is worth noting the high, second place in this ranking occupied by members of the Project Board, formally responsible for the strategic project controlling. Least likely support in this area, according to the respondents, is provided by the project management offices.

The project controller in the surveyed organizations was most often responsible for:

- analyzing progress of works and analyzes of deviations,
- budgeting and cost control,
- internal reporting, including executives,
- coordination of planning and control,
- external reporting (including the principal, sponsor),
- providing information from the environment of the project.

Decisions on the choice of scope, techniques and procedures for project controlling depend primarily on project managers and their superiors and customs in this area in the surveyed organizations. Project management offices are the least important sources of decisions on the design of operational controlling procedures according to the respondents.

In relation to the assessments of the current operational project controlling system, opinions of the respondents on the usability of the existing operational project controlling procedures are clearly divided. Nearly half of the respondents believe that they are too complex and do not provide the essential information needed to make decisions with respect to projects, while almost every third respondent argues that these procedures are adequate to meet their needs in this regard. Such a polarization of attitudes correlates with respondents' views on the scope and frequency of controls within the operational project controlling.

Benefits of project controlling procedures in the surveyed organizations include, among others:

- increase of the efficiency of action,
- better flow of information,
- increase of the speed of decision-making,
- reduction of the risk of implemented projects,
- reduction of the cost of the projects,
- obtaining additional information in order to make decisions,
- greater engagement and/or motivation of employees in the works carried out within the projects.

Respondents also pointed to disadvantages of the current system of project controlling. While most of them were satisfied with the functioning of the operational project controlling procedures, there were some inconveniences related primarily to the increase of unnecessary bureaucracy, additional costs generated by the controlling procedures and the necessity of providing detailed information on ongoing

projects. Significant shortcomings also included extended working time in the project because of the need for using controlling procedures and the involvement of too many people in operational controlling procedures.

Respondents' opinions on the scope and frequency of controls in relation to the ongoing projects were divided mainly between two alternatives. According to the largest number of respondents scope and frequency of controls in relation to ongoing projects are appropriate. However, as much as one in four respondents indicated that control is too small in relation to the needs. This may prove, on the one hand a clear demand for more accurate, more frequent and more detailed control information on the current project controlling process, and on the other hand inefficient system of access to such information at all.

In the opinion of the author, conducted studies reveal regularities that – in regard to operational project controlling – can be seen in the context of the collected research sample. Certainly one should continue and deepen this research in the future in order to expand knowledge in this area of project management.

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Ewa Sońta-Drączkowska

7

PROBLEMS OF KNOWLEDGE MANAGEMENT IN PROJECT ORGANIZATIONS ON THE EXAMPLE OF PROFESSIONAL SERVICE COMPANIES

7.1. Introduction

Leaders of professional service firms[1] have been confronting many challenges in recent years. The increase of consulting services market slowed compared with double-digit increases in the late 90 s, and since 2009 it has been approx. 5–6% – the average for European countries[2]. The competitive pressure from smaller service companies, the so-called specialist boutiques, offering similar types of services at much lower rates also intensifies, Enterprises are increasingly using the services offered by freelancers working once in professional service companies, and now self-employed. These factors are causing intensified price competition in the market of consulting services. Very often the only criterion for choosing suppliers in the tender procedure is proposed price of the service. Polish market of business consulting has become in the last decade more mature, customer's expectations for quality of services, expertise of consulting firms, innovative solutions and the speed of their implementation have increased. Another challenge for the heads of consulting companies is to recruit the best employees and retain talent in the company. The possibility to reduce costs by lowering wages is therefore also limited because the attractive wages are one of the major factors that attract college graduates to work in consulting. These phenomena cause pressure on the sales margin of consulting services. In response to these circumstances, consulting firms are trying to change their operating models to adapt

[1] Chapter concentrates on projects implemented by the departments of consulting services in professional service companies, which are characterized by a relatively low reproducibility and each time are adapted to customer needs.

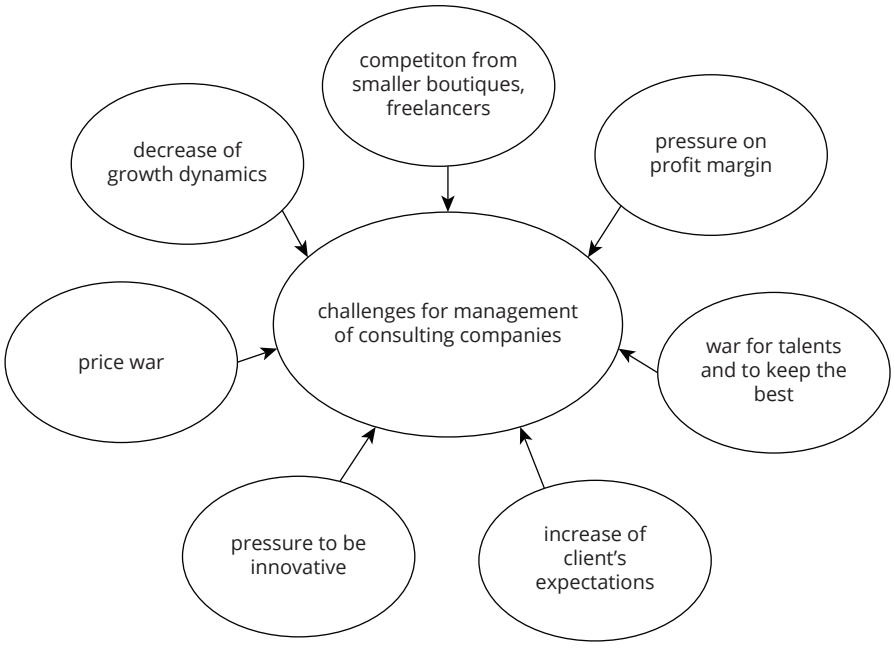
[2] Survey of the European Management Consultancy: Research Center on Management and Human Resource Management, prepared by FEACO, University of Pecs, Hungary, 2011/2012, p. 8.

to the market conditions: on the one hand improve the quality of services and on the other – conduct strict cost controlling.

This chapter focuses on the area of knowledge management in professional service companies. The importance of knowledge management in the consulting project cycle and problems in the selection and implementation of the operating model in this area were discussed. Knowledge management is essential for the smooth operation of professional service companies, it can be said that it is a kind of "engine" driving the company's revenue. The main elements important in the knowledge management system in professional service companies include: experience and references from already completed consulting projects (past track record) and the knowledge and competence of the experts employed (subject matter expertise).

In the context of the real project situation at the client, consulting firms create "tailored" solutions. In this process, they use knowledge available within the company, as well as the expertise of human resources: both substantive skills – hard and soft – personality skills. It can therefore be concluded that the knowledge (know-how) in conjunction with individual personality competences of the members of the consulting team, are the essential assets of professional service firms.

Figure 7.1. Challenges for Management of Consulting Firms



Source: own study.

The products of the consulting projects are: elaborations in the form of documentation (expert reports), sometimes calculation models, pieces of software, process maps, etc. The results of the projects are real business results (e.g. cost savings, or increase in revenue) achieved by implementing the project recommendations in the organization. While the products of work are visible and tangible at the end of the consulting project, the results of projects depend largely on the organization contracting the project and the discipline with which it approaches the implementation of the recommended solutions.

7.2. Concept Definitions

In the context of this chapter, it is important to clarify the concepts of: professional consulting company, consulting project, knowledge management system in a professional service firm. In the literature, a **professional service firm** is characterized as a company with three principal differentiators: low capital expenditures, high share of intellectual capital in the company's value and highly qualified employees[3]. These workers often have special work permissions to perform their jobs, like lawyers, architects, tax advisors and auditors. In addition, professional service firms belong to the project organizations (Project-based organization). A characteristic feature of this type of organization is to create structures (project teams) for a specified time in order to deliver unique project tasks[4]. Project organizations generate revenues mainly through the implementation of projects on behalf of an external client (usually these are private entities, but can also be a public institution or a company with state ownership). **Consulting projects** have standard project features: uniqueness, defined timeframes, specific purpose, dedicated resources. Generally the aim of each of consulting project is to provide value to the customer's organization, which the customer could not achieve within his own resources. For consulting projects typical is the fact that they require a commitment from the client, which in the most efficient manner can describe the existing problems in the organization. The project team thus consists of representatives of at least two organizations: the consulting company and the customer. In complex projects, teams may also include the number of external suppliers, the so-called consortia. Another feature of consulting projects is the difficulty in evaluating the results of their work, particularly by people outside the project.

[3] A. von Nordenflycht, *What is a Professional Service Firm? Towards a Theory and Taxonomy of Knowledge- Intensive Firms*, "Academy of Management Review", January 2010, vol. 30, no. 1, pp. 155–174.

[4] J. Sydow, L. Lindkvist, R. DeFillipi, *Project Based Organizations: Embeddedness and Repositories of Knowledge: Editorial*, "Organizational Studies" 2004, vol. 25, no. 9, pp. 1475–1489, Sage Publications, London–Thousand Oaks–New Delhi.

While it is relatively easy to evaluate the quality of documentation (deliverables of the project), the evaluation of results in the form of the desired improvements and implemented organizational changes are difficult, and often almost impossible after the end of the project[5].

Knowledge management system is a concept related to Management Information Systems, MIS. According to Maryam Alavi and Dorothy E. Leidner: "Systems of knowledge management are a new line of systems that are aimed at professional and managerial tasks by focusing on creating, gathering, organizing and spreading "knowledge" in an organization that has other meaning than "information", or "data". Knowledge management is a systematic, organized process of collecting, organizing, and communicating both tacit and explicit knowledge of employees, so that they are able to use it to be more effective at work"[6].

This definition suggests that knowledge is something more than just information and data and knowledge management should be aimed at increasing the efficiency and productivity of employees. Knowledge management systems in professional service companies generally include three layers:

1. **Technological infrastructure** designed to support knowledge management in the organization. These systems support the creation, organization and provision of information and documentation[7]. These are usually databases and tools available online to help search of knowledge. The type of knowledge that is available through the IT infrastructure is called explicit knowledge.
2. **Processes and procedures** relating to the provision of knowledge, mainly in the form of documentation of the projects, by the members of the organization to the available systems and databases. This layer of knowledge management system is extremely important, because thanks to it deliverables actually supply the available information tools. Procedures supporting knowledge management in a professional service company include, for example: the procedure for closing the project, archiving project documentation, removing confidential data from documentation (data cleansing). It is vital also to include these activities, as a part of the assessment of an employee, to incentive systems. This contributes to building an organizational culture in which knowledge building is an essential element supported by the organization.
3. **Knowledge of experts in organization**, which is not described and codified (tacit knowledge), but very important in the implementation of projects. This knowledge

[5] P.A. Wickham, *Management Consulting: Delivering an Effective Project*, second edition, Pearson Education Limited, Harlow 2004, pp. 4–8.

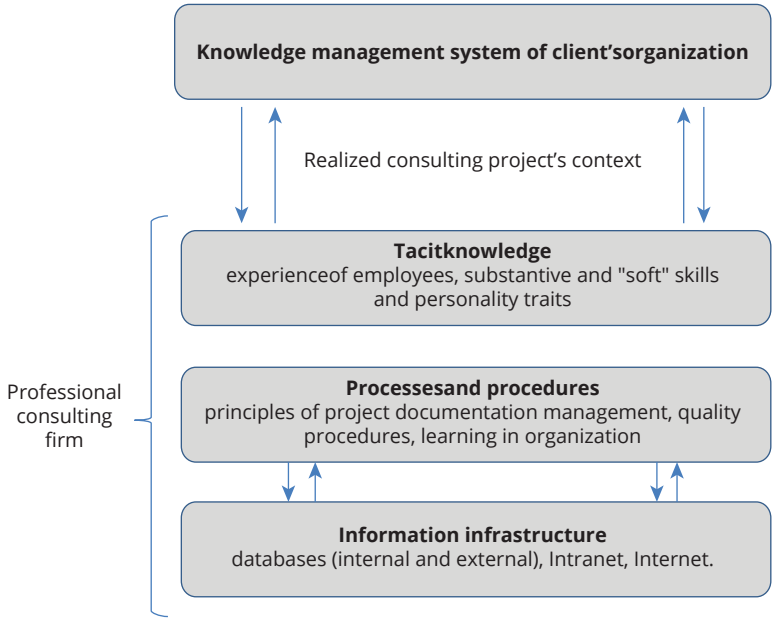
[6] M. Alavi, R.H. Smith, D.E. Leidner, *Knowledge Management Systems*: Issues, *Challenges and Benefits*, "Communications of the Association for Information Systems", February 1999, vol. 1.

[7] Ibidem.

manifests itself in a particular project situation, when members of the organization along with a client's team work on solving the customer's problem[8]. Sponsoring an aspect of the exchange and sharing at the system level is the organizational culture of the company in supporting communication and openness in sharing information and interdepartmental team cooperation.

The first and second levels in the knowledge management system comprise the infrastructure and processes that enable knowledge management (*enablers*). They are extremely important from the point of view of codification of knowledge and enabling its exchange in the organization, because only codified knowledge can be widely used and shared. The third level relating to expert knowledge (*tacit knowledge*) is the hardest to catch, but very important from the point of innovativeness and exploiting the creativity potential of employees in projects creating unique solutions for the customer.

Figure 7.2. Knowledge Management System of Professional Service Company in the Context of the Consulting Project



Source: own study based on: L. Prusak, *Knowledge in Organizations*, Butterworth-Heinemann, Newton 1997, pp. 9–12.

[8] The concept of tacit knowledge was first introduced by: M. Polanyi, *The Tacit Dimension*, First published Doubleday & Co, 1966. Reprinted Peter Smith, Gloucester, Mass, 1983. Chapter 1: *Tacit Knowing*.

Above layers of the system do not cover the whole area of knowledge management in a particular situation of a consulting project. An important issue for the progress and success of the consulting project is also the way of functioning of the knowledge management system on the client's side. The availability of information, the quality of the experts on the side of the customer's organization and sharing of information allow the efficient project work and facilitate the process of problem solving in teams consisting of consultants and clients.

7.3. Consulting Project Life-Cycle

Consulting project is established as a result of sales activities of a professional service company that ended up "selling" the project and signing a contract for carrying out the work. In the literature one distinguishes different types of consulting projects, depending on the extent and typology of work: audit, tax consulting, financial consulting, operational consulting, strategic consulting[9]. Typology of consulting projects has implications for the role of knowledge management in the life-cycle of the project. In this chapter the focus will be directed to the analysis of projects implemented by the consulting departments of professional service companies, which are characterized by relatively low repeatability. These include projects such as: operational consulting and strategic consulting.

From the point of view of a professional service firm, the phase of the project implementation is preceded by the **phase of acquisition (sales) of the project**. This stage takes place in different ways, it can be relatively short when the customer query is sent directly to the selected consulting firm bypassing the tender procedure. However, in most cases the purchase of consultancy services is preceded by sending Request for Proposal, RFP by the customer to the potential group of suppliers. After hearing the inquiry, assessment of potential possibility of implementation and risk assessment of the project and the client, the consulting firm decides on preparing an offer in response to the inquiry. If the decision is positive ("for yes"), offer is created. Development of the offer is a time-consuming process and requires a thorough understanding of the subject of the contract, taking into account the formal requirements contained in the query (e.g. bank guarantees, letters of reference from previous customers, transcript from KRS etc.), suggested approach to the implementation of the project, the proposed composition of the executive team and valuation

[9] M. Kaproń, B. Kowalczyk, B. Kozień, *Obszary działania współczesnego konsultingu*, in: *Konsulting: uwarunkowania i perspektywy rozwoju w Polsce*, eds. M. Ćwiklicki, M. Jabłoński, Cracow University of Economics, Cracow 2009.

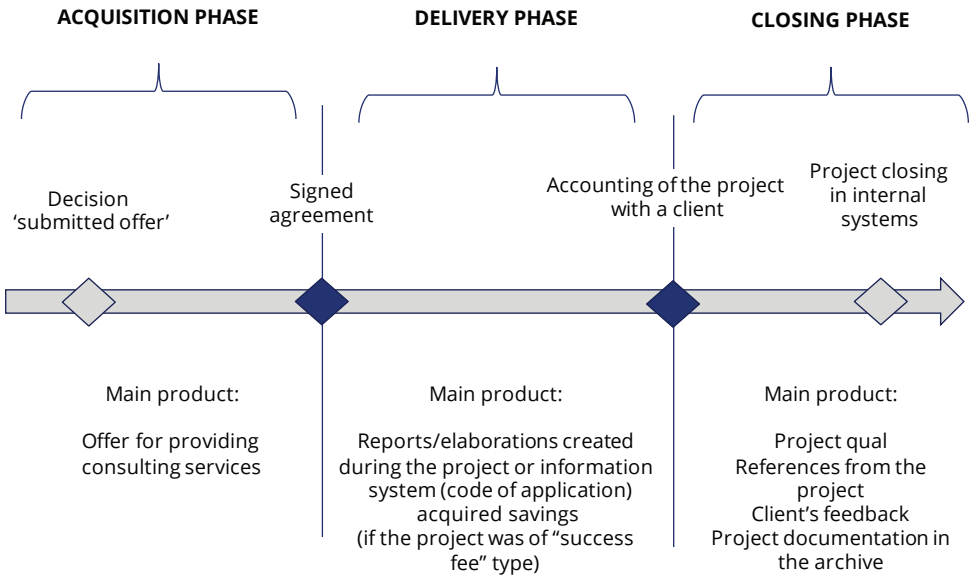
of works. Offers created in response to inquiries carried out in the framework of public tenders are characterized by high level of complexity. In such proceedings, special attention should be paid to fulfilling the formal tender requirements, because it may happen that in spite of valuable proposals, the offer is rejected due to formal shortcomings (e.g. the lack of signature of the person representing the company of supplier on each side of the offer). Rate of tenders submitted to won is shaped differently depending on the consulting firm, but on the 10 submitted tenders 1 or 2 may become success. The organization of the offer process from the point of view of the effectiveness of a professional service company is very important because the development of good offer is time-consuming and therefore expensive. Time spent on writing an offer may not be covered by the revenues from the project in the event of losing the tender, it is a kind of investment in business' development. From the point of view of consulting firm's sales force effectiveness, one should strive to minimize the rate of offers submitted in relation to the offers won. On the other hand, sales failure is a part of a business model of consulting company and a specificity of the sales process.

If the offer is accepted by the customer, it is followed by the presentation of the approach, price negotiations and, as a result, signing the project agreement, which starts **Project delivery phase.** This stage of the project is largely settled and determined by the terms of the agreement and set out in paragraphs: project scope, deliverables of the project, work schedule, payment schedule. However, also in the delivery phase customer's requirements can change and usually it happens so. The process of continuous change management in the project is the domain of the project manager and should be moderated by him in the course of the project. In the delivery phase very important is the quality of cooperation with the project team on the client's side, as well as access to information and knowledge in the client's organization, which allows for a good analysis of the situation and strengthens the adequacy of the proposed solutions. It is worth spending a lot of time to analyze the requirements and planning of the project in its initial phase, in order to avoid confusion and misinterpretation of customer's expectations. The delivery phase of the project ends up with transferring project's deliverables and obtaining the approval protocol from the customer. This is connected with the payment by the customer for all the works or a phase of the project, if it is implemented in tranches.

Closing the project is a little different from the point of view of a professional service company, and a bit different from the customer's perspective. Completion of the project for the customer is associated with the collection of the products and payment. For a professional service firm closing the project also includes the phase of archiving and project documentation completion in knowledge bases and drawing conclusions from the project (lessons learnt workshop). For this reason, almost always

internal project closing in consulting firm occurs later than in the relationship with the customer. Project Manager of the consulting company is obliged to place in the archives the final version of the project documentation: offer, deliverables, letter of reference from the project, and brief summary description of the project (project qualifications). This stage is particularly important in the process of building explicit knowledge in a professional service firm. If it is conducted in a fair way, it allows to preserve the most relevant documentation and make it available (if the project was not secret) in future, similar projects. The availability of short descriptions of completed projects with reference letters from customers is crucial for obtaining further orders and for business development.

Figure 7.3. The Course of the Consulting Project by the Main Deliverables Relevant to the Professional Service Company



Source: own study.

7.4. Knowledge Management Strategies Depending on the Type of Professional Service Company

The approach to the organization of knowledge management system in a professional service firm depends on the operating model of the organization[10]. In the literature, there are two types of knowledge management strategies in professional service companies:

- **The strategy focusing on knowledge codification** (codification strategy). It is based on the pursuit of knowledge codification and sharing it with the help of information infrastructure. In the center of the efforts of knowledge management is to create mechanisms that will encourage employees to archive available post-project information within the existing infrastructure. The main objective is to provide a stable, high-speed platform through which employees will be able to find the information they need and to teach employees how to independently use these systems.
- **The strategy focusing on the personalization of knowledge** (personalization strategy). It involves sharing individual expertise through the existing network of professional contacts within the company (networking). In companies using this strategy an emphasis is put on creating individual, tailored to the needs of the customer solutions using expert, hidden knowledge (tacit knowledge).

Discussed approaches to knowledge management are not reserved exclusively for professional service firms. The authors of the research in this area states that they are used also in IT companies and companies from the healthcare industry[11].

Comparison presented in Table 7.1 suggests that the choice of business operating model by professional service firms has implications for knowledge management strategy, the computerization of the company, recruitment and training. These elements are closely intertwined. The study's authors Morten T. Hansen, Nitin Nohria and Thomas Tierney state the thesis that the professional consultancy firms that have chosen not to implement a single, dominant knowledge management strategy, are doomed to failure. It is possible to mix both approaches, but in fixed proportions. The practice would suggest choosing one, leading approach, and the use of a second, only as a support strategy. The recommended budget allocation is 80–20: that is, e.g. 80% of funds invested in the development of systems to support the codification of

[10] Study on knowledge management strategies in professional service companies was conducted in the late 90's by M. T Hansen, N. Nohria, T. Tierney, *What's Your Strategy for Managing Knowledge?*, "Harvard Business Review", March – April 1999.

[11] Ibidem, p. 2.

knowledge, and 20% in the expansion of the network of interpersonal contacts within the company and use of the tacit knowledge.

Table 7.1. The Methods of Knowledge Management in Professional Service Firms

Area	Codification	Personalization
The economic model	Reuse economics Invest once in the knowledge resources; use them repeatedly Use large teams with a large share of partners Focus on generating high revenues	Expert economics Set high rates for customized solutions of unique problems Apply small teams with a small number of cooperating partners Focus on maintaining high margins
Knowledge management strategy	Employees have the ability to search documentation Expand the electronic documentation system, which codifies, stores, spreads and allows the reuse of knowledge	Employees have the ability to quickly establish contacts Expand the networks to help connect people with each other, so that they can share tacit knowledge
Information technologies	Invest in information technology solutions; the aim is to link people with useful codified knowledge	Keep balanced investments in information solutions: the aim is to support the conversations and the exchange of tacit knowledge of experts
Human resources	Recruit new graduates who will be using codified knowledge to generate solutions Keep training groups using computer training Reward people for the use and enrichment of the documentation database	Employing highly qualified staff at the level of the MBA who likes to solve problems and adapt to the uncertain operating conditions Lead training through mentoring Reward people for sharing their knowledge with others
Examples	Ernst & Young, Andersen Consulting	McKinsey & Company, Bain & Company

Source: M. T Hansen, N. Nohria, T. Tierney, *What's Your Strategy for Managing Knowledge?*, Harvard Business Review, March–April 1999, p. 3.

The next section will present the results of interviews with project managers of one of the leading professional service firms in the Polish market. The interviews were designed to investigate the real needs and expectations regarding the knowledge management system and preceded the phase of the reorganization of the department of knowledge management.

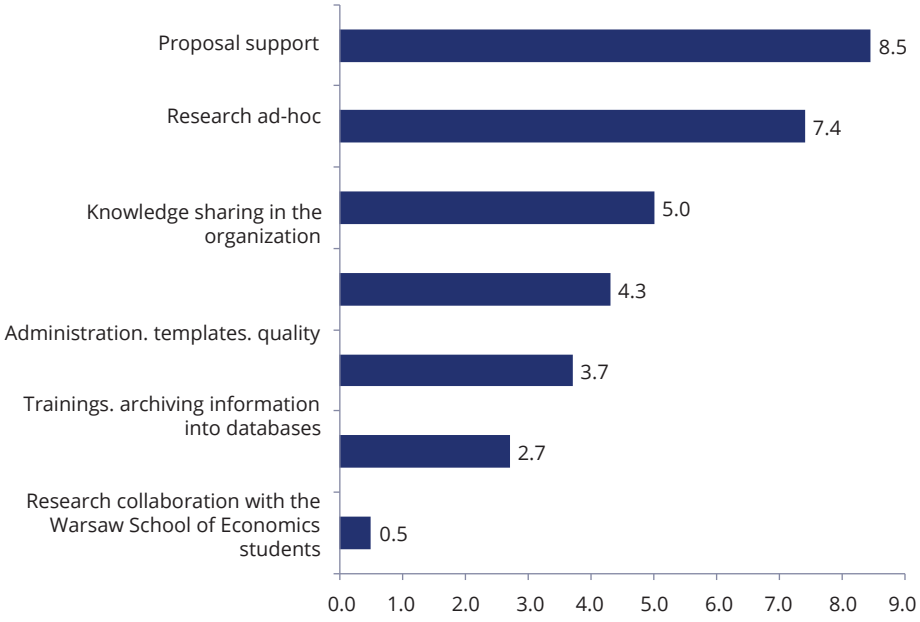
7.5. Diagnosis of Knowledge Management System Model – a Case Study on the Example of Professional Service Firm

Study discussed in this chapter was conducted in 2012 for one of the leading professional service firms operating in more than 50 countries around the world. It included interviews with 27 project managers of consulting firm, who represented the point of view of the customer of the internal knowledge management department. The survey was conducted only for the Polish consulting practice, therefore, there it is not representative for the entire globally operating company. The survey was preceded by a preparation of a new knowledge management strategy system and specifying the target catalogue of services of knowledge management department to most effectively support a business activity. The study had qualitative character. In the first step, an analysis of the current activities performed by the knowledge management department (AS-IS analysis) was conducted. Then, these activities were grouped into the areas of:

- Proposal support including: the search for references from previous projects, the search for experts, preparation of templates and the formal proposal documentation. These measures include the project acquisition phase and the bidding and are implemented before signing the project agreement with the customer. The main product of proposal support is an offer prepared to be send.
- The search for information on an ad-hoc or strategic basis (Research ad-hoc and strategic). This category includes orders of internal customers within the search for information appearing spontaneously in the course of project implementation, as well as search for information of a strategic nature in the context of business development. Such orders can be different in nature: research of market trends, the development of new products and services, customer information, industry analysis, etc.
- Sharing knowledge within the organization (Knowledge sharing support). This category includes support for the process of knowledge codification, archiving project documentation in systems after the stage of settlement of the project with the client, communication about new, winning projects and news from the life of the department, including the drafting of monthly issue 'Consulting Newsletter'.
- Administration, Quality audit, QA, templates. This group of activities includes any other activities performed by knowledge management department, including the closing of projects in internal systems, archiving project documentation templates, translations, etc.

- Training, Onboarding. This area includes activities connected with the knowledge management trainings in the organization in the form of current support, planned trainings for new employees (new joiners trainings) or trainings conducted online in the form of webinars.
- Researches, analyses carried out in collaboration with the students. This group of activities includes the program of cooperation with the students of the Warsaw School of Economics and assessment of the suitability of this program for the development of the business.
- The category "other" includes other ideas of internal customers regarding service proposals of knowledge management department, which do not fit into the above categories.

Figure 7.4. Diagnosis of Priorities for the Knowledge Management Department from the Point of View of Internal Customer – What Activities Are Crucial for Consulting Department?



Source: own study based on: E. Sońta-Drączkowska, *Knowledge Management function survey: Diagnosis of the current situation and future direction*, 2012, on behalf of a professional service firm, Warsaw 2012 (scale: 10-crucial meaning; 0 – no meaning).

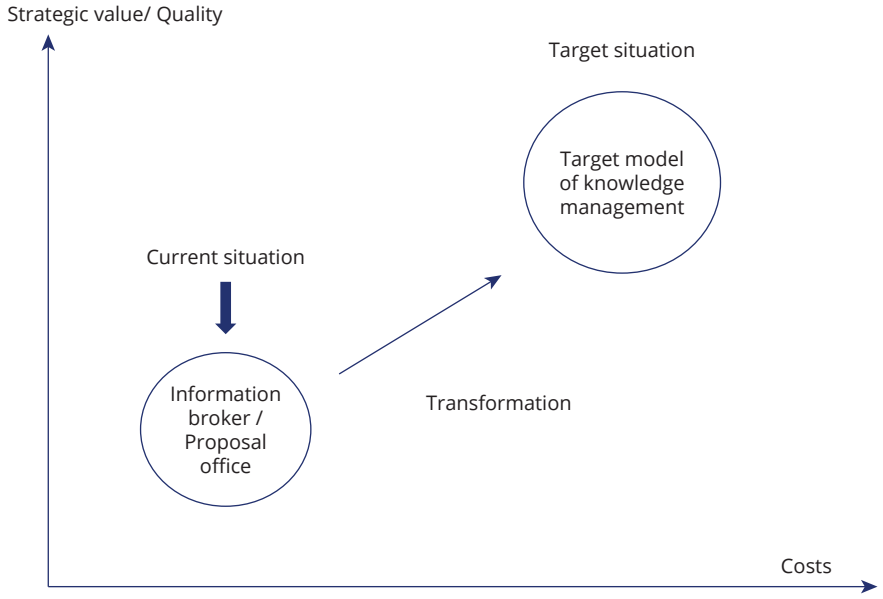
From the summary of the current (AS-IS) state results that internal customers expect from the knowledge management department primarily support in the preparation of project proposals, as well as the current search for information. Generally speaking, the current function of the knowledge management department can be

defined as "Proposal office / Information broker". From the point of view of overall knowledge management system, these are not functions of the knowledge management department, which it should undertake in the first place.

The configuration of internal customers' needs may be due to several factors:

- Mode of preparation and development of tender proposals is time consuming and does not affect the performance indicators of the consulting department managers, so tasks associated with it are readily delegated to the support functions.
- Due to resources deficiencies, especially in the area of junior staff, knowledge management department personnel aligns these gaps and implements tasks that otherwise would be passed on to younger consultants.
- Knowledge management department has a specialization in information retrieval and in many cases can quickly get to the relevant materials, which is especially important when work is carried out under time pressure.
- For historical reasons of the company's development, services catalogue of knowledge management department has expanded with activities having nothing to do with the original function of this department.

Figure 7.5. A Comparison of Current and Target Situation for the Knowledge Management Department



Source: own study.

After analyzing the expectations of internal customers some questions have been raised: Does knowledge management department acting as a proposal office and information broker support business in the most efficient way? Does knowledge management department, from the point of view of the company's development, carry out these tasks that it should? Which tasks should be prioritized in the context of a long-term development of the company? Is there an idea for a reorganization of the department, in order it could more effectively support the management of knowledge within existing resources?

A workshop with the participation of the managing partners of professional service company was conducted in the second step of the study. Its aim was to discuss the results of the study and redefine the catalogue of services for the knowledge management department in order for it to more effectively support long-term development of the company. Table 7.2 presents in a synthetic way the results of the workshop in " the new catalogue of services" area of knowledge management department.

Table 7.2. The New Catalogue of Services of Knowledge Management Department of a Professional Service Firm

Main area of services	Detailed description
Establishment and maintenance of knowledge management environment (processes and tools)	Establishment and communicating ways of gathering knowledge (references from projects, proposals, project deliverables, employee profiles and CVs) Support for archiving and recovery of information Establishing knowledge leaders in projects User support in the use of knowledge bases Managing relationships with external suppliers
Training and education in the area of knowledge management	Trainings of knowledge management for new employees Training of knowledge management on demand Education on the best practices of knowledge management; tips on how to search for information
Support of research/information search	Advising consultants where to find information Ad-hoc search for in urgent cases and in situations where this goes beyond the skills of consultants
Support of knowledge management for business development	Participation in meetings of professional service groups Meetings with experts in knowledge management and knowledge champions in order to identify their business interests Adjustment of knowledge management tea m to key business priorities through a focus on strategically important areas of knowledge
Communication within knowledge management (conferences, intranet, publications and newsletters)	Organization and participation in regional knowledge managers teleconferences Publication of "Consulting Newsletter" Updating intranet sites Networking with other areas of support in the organization (human resources, marketing, and others)

Source: own study based on: E. Sońta-Drączkowska, *Knowledge Management function survey & workshop: Diagnosis of the current situation and future direction*, 2012, on behalf of a professional service firm, Warsaw 2012.

In the new catalogue of services, the emphasis is put on the maintenance and development of information infrastructure supporting the implementation of projects, as well as on training activities of knowledge management department and onboarding. The need to involve consultants in the activities of knowledge management as knowledge champions has been stressed. Their task would be to actively cooperate with the knowledge management department and to gather the knowledge necessary for the consulting project in all its phases from acquisition through the delivery and project closing. The above catalogue of services for the department was unified with the strategic objectives of the company, aimed at supporting the learning process of the organization's participants, promoting active participation in the development of knowledge and involvement of consultants in independent research and search for information. When it comes to addressing the needs of internal customers related to proposal support, it was proposed to create an additional proposal support department and to employ professional graphic help for documentation editing.

7.6. Challenges for the Area of Knowledge Management in a Professional Service Company

Challenges for the implementation of an efficiently functioning knowledge management system in consulting firm related to business challenges, were discussed in Section 7.1. Professional service firms generally apply a strategy of differentiation, that is, to stand out from the competition and position themselves as qualitative leaders. Strategies of the professional service firms emphasize the quality, uniqueness, competence, professionalism, having a leading position in the rankings of service providers, etc. This obliges professional service firms to continuous long-term investments in the development of knowledge and competences of employees and to build a knowledge management system to support the high quality of services provided. It should however be borne in mind that the elements of a knowledge management system, such as: information infrastructure and personnel working in the knowledge management department are the costs of facilities that do not generate revenue directly. With the current competition in the market, professional service firms are forced to cut spending, which they are looking for in the support departments. So, for the leaders of the professional service firms a dilemma emerges: How to best organize the division of knowledge management, in order to, on the one hand, provide support within knowledge management for consultants, and on the other hand, not excessively expand the administrative costs? In today's rapidly changing business environment, where knowledge quickly becomes outdated, the question becomes even more relevant.

An overview of research in the area of implementing knowledge management systems confirms that in the implementation of solutions in this area businesses face many challenges. One of the interesting researches, whose results are worthy of discussion, is a survey conducted in 1999 by Maryam Alavi, Robrta H. Smith and Dorothy E. Leidner. According to the respondents problems in the implementation of knowledge management can be divided into three groups related to difficulties in determining "the value" of information, system implementation management and the technology that supports knowledge management processes. Table 7.3 summarizes the key challenges in these three areas.

Table 7.3. The Main Problems Regarding the Implementation of Knowledge Management

Information	Management	Technology
• Building vast amounts of data into usable form • Avoiding overloading users with unnecessary data • Eliminating wrong/old data • Ensuring customer confidentiality • Keeping the information current	• Change management implications • Getting business units to share knowledge • Demonstrating business value • Bringing together the many people from various units • Determining responsibility for managing the knowledge	• Determining infrastructure requirements • Keeping up with new technologies • Security of data on the Internet

Source: M. Alavi, R.H. Smith, D.E. Leidner, *Knowledge Management Systems*: Issues, *Challenges and Benefits*, "Communications of the Association for Information Systems", February 1999, vol. 1, p. 15.

The authors of the study found that respondents perceived knowledge management often as a temporary fashion (fad) and the management concept as characterized by a certain immaturity. This opinion prevailed particularly in organizations that do not have any knowledge management system. Before deciding to invest in this area, the respondents would like to better understand the objectives of knowledge management and tangible benefits for the organization, which can be expected after such a system[12]. Another interesting study was conducted in the late 90 s by the Ernst & Young Center for Business Innovation. It involved 431 European and American organizations and focused on the following questions: How does the company manage knowledge? What areas of knowledge management are seen as most important for development? What are the main barriers to the implementation of knowledge management systems?[13] Although the study was not directed exclusively to professional service firms, the results can be interesting also for the consulting industry. The results show that the

[12] The study of M. Alavi, R.H. Smith, D.E. Leidner involved not only professional service firms, consulting firms represented 15% of the study population.

[13] R. Ruggles, *The State of Notion: Knowledge Management in Practice*, "California Management Review" 1998, vol. 40, no. 3, pp. 80–89.

greatest difficulties in the implementation of knowledge management concern areas related to human resources management and organizational culture.

Figure 7.6. The Greatest Difficulties in the Implementation of Knowledge Management Systems (in %)

Source: R. Ruggles, *The State of Notion: Knowledge Management in Practice*, "California Management Review" 1998, vol. 40, no. 3, p. 87.

The main difficulties in the projects of knowledge management system implementation, according to respondents, are: changing people's behavior, measuring the value and performance of knowledge assets and determining what knowledge should be managed.

The main obstacles to knowledge sharing in the organization include: an organizational culture not supporting knowledge sharing, a lack of visible support of top management for knowledge sharing and a lack of common understanding of the business model in which the enterprise operates.

It should be noted that these studies were carried out approx. 15 years ago, when the consulting market noted large increases and was not as competitive as it is today. However, many of the above problems and concerns appear to remain valid. One can argue that in the face of business difficulties faced by heads of professional service companies, new challenges and problems emerge[14]. **New mobile technologies and social media have increased the volume and speed of information flow**. Consultants

[14] Discussed in the introduction to this chapter.

are now confronted with a huge number of messages delivered by e-mail, available on smartphones and generated by the professional social networks like LinkedIn or Goldenline. Movement of the electronic information is incomparably higher than 15 years ago. The sheer volume of information makes it particularly difficult to select this important from the point of view of the development of the consulting practice, acquisition of new projects and creation of value for the customer. **Information becomes outdated in a fast manner**, which means that it must be continually evaluated. Updating information is time consuming and labor intensive. The traditional concept of a library as a repository of knowledge (library model) does not keep up with the variable business reality. New knowledge must be available in real time and based on the latest data, in order to have value. A similar phenomenon also applies to the **portfolio of products and services offered**. Consulting companies no longer offer products and services that were offered approx. 10 years ago. The product portfolio has to adapt to changes in the business environment and include products such as business intelligence, business strategies to compete in the Internet, emerging technologies, new business models as a result of new business trends, such as collaborative economy, etc. These phenomena also affect the area of knowledge management, which must follow the same volatility.

Figure 7.7. The Biggest Obstacles to Knowledge Sharing (in%)

Source: R. Ruggles, *The State of Notion: Knowledge Management in Practice*, "California Management Review" 1998, vol. 40, no. 3, p. 88.

Another issue to be discussed in the context of designing knowledge management systems, which is somewhat at odds with the concept of knowledge sharing, is the **need to protect confidential information**. This applies in particular to consulting projects of strategic importance for the client's organization, where already at the stage of contract with the consultant, one concludes a confidentiality clause. In most cases, the materials of the projects covered by confidentiality clause should not be shared with anyone outside the narrow circle of the project team, and the violation of the confidentiality clause threatens consulting firm with far-reaching legal consequences. In connection with rigidities concerning the confidentiality, a large part of the project documentation, and in the case of companies providing strategic consulting services – virtually all documentation, is excluded from the possibility of internal and external reuse. Therefore, professional consultancy firms building management system face the next obstacle, which by definition makes it difficult or even impossible to share knowledge. The solution for this problem, which is used in practice, is the implementation of "data cleansing" (Cleansing) of confidential information before placing it in databases and knowledge management systems. In practice, it is difficult to perform it on regular manner, as it requires great discipline from a team closing a project, who will find time and will prepare such reports and project deliverables, in order to, on the one hand, they could be reused, and on the other hand, did not expose the consulting company to breach of confidentiality clause. Some organizations establish even data cleansing teams. However, this in turn again increases the costs of company's facilities.

In the context of reuse utility of codified knowledge (documentation of previous projects), the question arises: To what extent is this possible and reasonable in the contemporary, variable economy? **The use of repeatable solutions, proven in previous projects, may be inappropriate** in a particular customer's business situation. David Maister points to this particular specifics of professional service firms in the book *Managing the Professional Service Firm*[15]. The author states that the provision of professional services requires a high level of customization and taking into account the context of customer's actions. Element of uniqueness in consulting projects is high, no room here for routine and repetitive activities. The use of standardized supervision, product marketing and management activities, not only is not advisable, but it can have disastrous consequences. In addition, most of the projects carried out by the professional service firms are based on a high proportion of direct interaction between customer and consultants. In such projects, the role of consultant's personality traits

[15] D. Maister, *Managing the Professional Service Firm*, Simon and Schuster, London – New York 1993, pp. 10–13.

gains on importance, as well as the tacit knowledge[16]. Given this specifics of work, arises recommendation for knowledge management systems in consulting firms to extensively support tacit knowledge management. This means that they should encourage people to communicate, facilitate the flow of information and to create incentives to cooperate within sales and delivery of solutions for the customer[17].

Another problem of knowledge management is related to the fact that this area belongs rather to important tasks, but not urgent, and therefore often neglected in the heat of current sales and project activities. **Building knowledge requires a long-term approach and consistency**, while conducting business operations and management priorities focus primarily on sales and ongoing projects maintenance. Practice shows that resources and funds are allocated on the front lines, while long-term investments in the development of knowledge often remain neglected. The support of the leaders of the organization has a very large impact on the knowledge building. They have a decisive influence on shaping of organizational culture in the spirit of knowledge sharing and the implementation of discipline regarding the delivery of project deliverables to knowledge bases. Consultants must be given time to complete the project, to lean on the development and project documentation's archiving, writing a summary of the project (*project qualification*), and to draw conclusions from the project within the framework of the *lessons learnt* workshop. At the time when there is a lack of such project closing, as well as communicating the results of the project closing to the organization, the part when organization is learning does not have a chance to occur. If the leaders of consulting companies do not sufficiently support a culture of knowledge sharing and codifying knowledge after the completion of the projects, it will be difficult to enforce supportive attitude from the staff.

Organizational culture is another extremely important element limiting the effectiveness of knowledge management systems in professional service companies. Consulting companies are known for pretty aggressive, focused on competition and on the financial results organizational culture. With a difficult market environment, the attitude of rivalry between employees exacerbates. In such conditions, it generates a climate of rivalry for knowledge, which effectively destroys the tendency of employees to share knowledge. Employees take the attitude "it is my knowledge", which in extreme cases leads to a situation where the most valuable studies and analyzes remain only on laptops of individual employees. The damage is difficult to estimate when the accumulated project knowledge leaves the company with a worker.

[16] M. Alvesson, *Organizations as Rhetoric: Knowledge-Intensive Firms and the Struggle with Ambiguity*, "Journal of Management Studies", November 1993, vol. 30, no. 6, Blackwell Publishers, Cambridge, p. 1.

[17] S. Al-Hawamdeh, *Knowledge management: re-thinking information management and facing the challenge of managing tacit Knowledge*, "Information Research", October 2002, vol. 8, no. 1, p. 1.

7.7. Conclusions and Directions for Future Development

The chapter discussed problems of knowledge management in project organizations on the example of professional service companies. In the face of turbulent and variable business environment in which consulting industry operates, challenges for the effective operation are getting even tougher. Taking into account the conclusions of this chapter, one can make the following recommendations for top management of consulting firms:

- Before starting the investments one must define and communicate the business model of the company. Model of knowledge management should be tailored to the company's business model.
- The area of knowledge management should have a clearly defined catalogue of services, for the internal customers to know what they can expect from this department.
- Consulting companies operating on an international scale will organize knowledge management in the form of Shared Service Centers. This allows on the one hand to save costs, and on the other to use specialization effects[18]. The decision to set up shared service center should take into account the quality of the available workforce in the region and proximity to research centers. Placing centers in countries with low labor costs could negatively affect the quality of supplied products.
- Knowledge management systems architecture should be designed and integrated into the entire IT architecture and IT strategy of the company. Effectively shaped and adapted to users' needs infrastructure reduces time to search for information, and consolidates the available sources of knowledge.
- Knowledge management should be one of the priorities of leaders of professional service firms. They should foster a culture of knowledge sharing, transparency of the sales process and the open sharing of the conclusions of the projects, especially those that have failed. This approach of the management shapes organizational culture and is a role model for younger staff.
- Sharing knowledge and cooperation between employees in the sales process and the provision of consulting projects should be highly rewarded and be a part of incentive systems of the company.

[18] Such trends are already visible in the business activity of such firms like McKinsey that built such centers in Poland by using the market with skilled, relatively inexpensive employees and financial incentives from the EU funds. These centers currently operate in Wroclaw and Poznan.

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Witalij Metelski

8
RESEARCHES IN THE FIELD OF HUMAN RESOURCES MANAGEMENT IN PROJECTS IN POLAND

8.1. Introduction

Project management understood as management of complex undertakings is now a very common form of pursuing the objectives of organizations worldwide. Human resources management concerns, of course, every organization and is the competence of its managers, while human resources management by project managers has its own specific character. It requires them to have other competences and to use appropriate tools and techniques. The area of human resources management was identified as one of ten areas of expertise by the Project Management Institute.

Scientific and practical achievements in human resources management have a broad set of solutions, which are used by managers of organizations and projects. Multinational companies, professional associations, universities, government agencies and specialized consulting firms have developed a number of comprehensive and detailed methods of human resources management for both the organization and projects. The organizations in different ways use this set of methods.

This chapter contains the results of studies that aimed to analyze the factors affecting the level of human resources management in projects in Poland. The chapter contains the general characteristics of human resources management and discusses the issues of given subject in terms of project-oriented organizations.

8.2. General Characteristics of Human Resources Management

The issues related to the organization of working teams began to grow rapidly when the need of leading different forms of collective human activity, proper selection of people in teams and division of work among its members came to existence. Management of human resources as a separate function within the organization

appeared in the late nineteenth and early twentieth century and was related to the general development of management sciences.

According to several sources, Henry R. Towne is considered a pioneer of management science. He has started to systematize management methods since 1870. His work entitled *The Engineer as the Economist* and released in 1886 probably inspired Frederick W. Taylor[1], who has begun research on the scientific organization of work since 1895. At the same time Frank B. Gilbreth wrote about work mechanics, whose publications probably helped Henry L. Gantt[2] to develop a system of tasks and bonuses, diagrams and schedules of work, which today are used in project management.

In Europe, the beginnings of a classical management and administration school are associated with Max Weber, who in 1880 presented the concept of bureaucratic organization. In 1888 Henri Fayol introduced the division of functions and management principles that have found wide acceptance in practice. For this reason, Henri Fayol is considered the founder of the basic science of administration[3]. One should also mention a Polish management theoretician Karol Adamiecki, who formulated the laws of harmonization of collective work, optimization of production and ahead of Henry L. Gantt, already in 1896 used schedules of work division. Unseen and incomprehensible to contemporary scientists was the work of Alexander Bogdanov, who was a critic of Frederick W. Taylor, published in the years 1913–1917 entitled *General science of the organization. Tectology*[4], which was translated into English only in 1980 and has found its place in the general systems theory and the theory of the organization[5].

The views of Henri Fayol and Frederick W. Taylor are complementary to each other[6]. Henri Fayol based his findings not on scientific observations, but on his own experience and looked at management from the bottom upwards, emphasizing managerial skills, i.e. planning, organizing, managing, coordinating and controlling. In contrast, Frederick W. Taylor approached the management from the upwards, focusing on the technical aspects of production, i.e. an analysis of workplace, the movements of employees, time standards, etc. This approach and dynamic technological progress

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1 J.K. Nanda, *Management thought*, Sarup and Sons, New Delhi 2006, p. 40; S.G. Claude, *The history of management thought*, Prentice-Hall, New Jersey 1972, p. 84.

2 J.K. Nanda, *Management thought*…, opt.cit., p. 58.

3 Ibidem, s. 73.

4 В.И. Маршев, *История управленческой мысли*, Инфра-М, 2005, p. 573.

5 Э.Б. Корицкий, *История управленческой мысли, Организационные идеи А.А. Богданова и их резонанс, Российский журнал менеджмента*, "Издательство «Antiquariat», Германия" 2003, no. 2, p. 139.

6 R.K. Sapru, *Administrative theories and management thought*, PHI Learning, New Dehli 2008, p. 120.

in the first half of the twentieth century created foundations of the classical school of management and the traditional model of human resources management[7].

The interest in the psychosocial approach in human resources management has been increased in the next stage of development in this area and a model of interpersonal relations has been created. Great emphasis was placed on the psychology of employees, meeting social needs as a source of satisfaction and work efficiency. Douglas McGregor formulated a general directive involving the humanization of labor relations and the organization itself by changing to a democratic leadership style, ensuring greater autonomy and flexibility of the organizational structure and integrating the interests of employees and organizations[8]. It has extended the science of management to new areas, but did not give the expected sustainable growth of efficiency. On the basis of this model another model of human resources was built, this time by William Ouchi[9], based on more comprehensive personnel measures, collaboration and involvement of different organizational units in the management of human resources and broad instrumentation of functions performed in connection with this.

The fundamental role and responsibility in the management of human resources fall to management staff. In the 80 s of the twentieth century a strategic approach to human resources management has developed, which is now considered as a major area of strategic management.

Table 8.1 presents the definitions of human resources management by various authors, showing many aspects of this issue.

Table 8.1. Summary of Definitions of Human Resources Management

M. Armstrong	Strategic, integrated and consistent approach to hiring, development and welfare of people employed in the organization[a].
M. Beer, B. Spector, P. Lawerence, D. Quinn Mills, R. Walton	It applies to all decisions and actions of executives affecting the nature of the relationships between the organization and the employees – the human resources of the organization[b].
D.E. Guest	The set of policies of the organization designed to maximize organizational integration, employee involvement, their flexibility and quality of work[c].
H. Król, A. Ludwiczyński	This is the current concept of realization of the HR function of the organization whose mission is to adjust the features (nature) of human resources for the purposes of organization that are harmonized with the needs of employees, under certain external and internal conditions[d].
T. Listwan	Human resources management is a set of activities related to human beings, aimed at achieving the objectives of the organization and meeting the needs of workers, related to, among others, their development[e].

7 *Słownik zarządzania kadrami*, ed. T. Listwan, C.H. Beck Press, Warsaw 2005, p. 38.
8 Ibidem, p. 38.
9 Ibidem, p. 39.

T. Oleksyn	It consists of determining and effective application of such a philosophy, methods, techniques and tools that allow one to fulfill the mission and achieve the objectives of the organization, skillfully attracting, developing and utilizing this potential, combining the interests of owners and employees, and other stakeholders related to the organization, while respecting the general principles of effort economy and rational management[f].
A. Pocztowski	The specific management concept in the area of personal function of enterprises in which human resources are seen as an asset to the company and a source of competitiveness, one calls for the strategic integration of personal matters with business matters, the active role of linear management addressing personal issues and points to the need to shape the organizational structure, integration of HR processes and building employee engagement as tools for achieving goals[g].
A. Sajkiewicz	Management of the company, ensuring size and quality of staff needed for competitive activity, an important role is played here by decisions aimed at optimal utilization of labor potential for increased efficiency and company's value[h].
P. Zbigniew	It involves developing and applying the company's human resources in a way to fully achieve the objectives, taking into account the interests of employers and employees[i].

[a] M. Armstrong, *Zarządzanie zasobami ludzkimi*, Oficyna a Wolters Kluwer business, Warsaw 2011, p. 26.
[b] M. Beer, B. Spector, P. Lawerence, D. Quinn Mills, R. Walton, *Managing Human Assets*, The Free Press, New York 1984, p. 1.
[c] D.E. Guest, *Human resource management and industrial relations*, "Journal of Management Studies" 1987, vol. 14, no. 5, p. 503.
[d] H. Król, A. Ludwiczyński, *Zarządzanie zasobami ludzkimi: tworzenie kapitału ludzkiego organizacji*, PWN Press, Warsaw 2006, p. 55.
[e] *Zarządzanie kadrami*, ed. T. Listwan, C.H. Beck Press, Warsaw 2010, p. 16.
[f] T. Oleksyn, *Praca i płaca w zarządzaniu*, Międzynarodowa Szkoła Menedżerów, Warsaw 2001, p. 117.
[g] A. Pocztowski, *Zarządzanie zasobami ludzkimi: strategie – procesy – metody*, PWE, Warsaw 2003, pp. 36–37.
[h] A. Sajkiewicz, *Zasoby ludzkie w firmie: organizacja, kierowanie, ekonomika*, Wydawnictwo Poltext, Warsaw 1999, p. 18.
[i] Z. Pawlak, *Zarządzanie zasobami ludzkimi w przedsiębiorstwie*, Poltext Press, Warsaw 2011, p. 34.

Source: own study.

The aim of human resources management is to help the company to achieve competitive advantage, increase the skill level of the organization, to achieve its objectives by making the best use of resources. Tadeusz Listwan has identified the following objectives of human resources management[10]:

- efficiency and humanistic goals connected with the increase of employee productivity while fostering the subjective treatment of employees, taking care of development, participation and participation in management;
- individual and organizational goals, which are the basis for interaction, on the one hand, in the motivation, skills and expectations of employees, and on the other hand, in the implementation of collective tasks;

[10] *Zarządzanie kadrami*, ed. T. Listwan, C.H. Beck Press, Warsaw 2006, p. 3.

- intermediate targets that need to be translated into concrete results, desired effectiveness, ability to improve and adapt, as well as other final objectives.

The above description does not exhaust the multi-dimensionality and multi-threading of human resources management area. More attention was paid to the issues of human resources management in projects in the third section.

8.3. Human Resources Management in Project Oriented Organizations

Apart from the evolution of the fundamental trends in human resources management one can observe a trend of development related to the field of project management. Project-based organizations must demonstrate not only openness to change, but also the flexibility in human resources management. Flexibility of an employee is defined as the ability and willingness of potential adaptive readiness to new or changing conditions[11]. In contrast, organizational flexibility has three basic dimensions: reaction time, scope (depth) and the cost of reaction[12]. After taking into account the dimension of quality, it is possible to design project triangle model.

In the 80 s, Martin Barnes introduced the first version of the project triangle model that takes into account three interdependent objectives of the project: time, cost and quality[13]. Project triangle model and its variations are shown in Figure 8.1. The project manager, with an emphasis on achieving one or two selected project objectives, always does it at the expense of other objectives. Therefore, the project manager's decisions are a compromise among these three objectives. This model underwent various transformations, among others, thanks to the standards of the Project Management Institute, one included a new goal of the project: scope, i.e. the sum of all products (results) supplied by the project[14]. Ralph L. Kliem drew attention to the most important resource in projects – people, placing it in the center of the project triangle[15]. Good governance, organization and motivation of the people involved in the project cannot be in advance taken for granted. They require a decision before the start of the project.

[11] M. Juchnowicz, *Zaangażowanie pracowników: sposoby oceny i motywowania*, PWE, Warsaw 2012, p. 16.

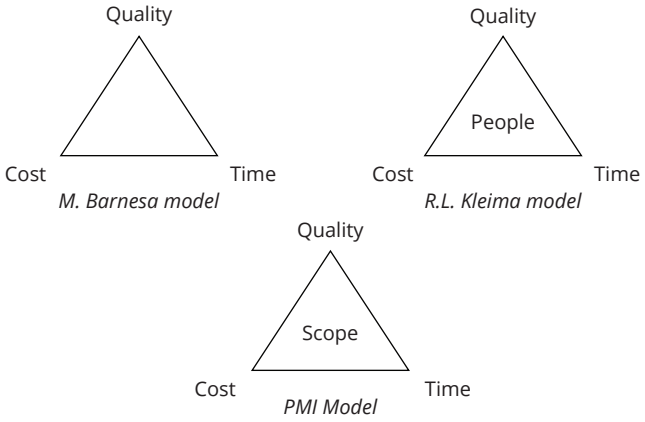
[12] Ibidem, p. 17.

[13] D. Lock, *Project Management*, Ashgate Publishing Limited, Burlington 2007, p. 22.

[14] *A Guide to the Project Mangement Body of Knowledge (PMBOK® Guide)*, fourth edition, Project Management Institute Inc., Newtown Square 2008, p. 440.

[15] R.L. Kliem, *The Invisible Cornerstone: The People Side of Project Management*, "Systems Practice and Action Research" 1994, vol. 7, no. 6, p. 700.

Figure 8.1. Project Triangle Models



Source: own study.

Adaptability of enterprises to changes in the environment is a key element of organizational flexibility. The flexibility of the organization's management can be achieved by orienting it towards the projects, as a permanent part of the business.

Adaptive possibilities of the organization[16] are dependent on the density of the network relationships. Hierarchical organizations are less adaptive than organizations with more diverse structure of the relationships, which allows for reconfiguration of the structure in the case of significant changes in the environment. Power in a network structure belongs to the people who control resources regardless of their position in the hierarchy. Organization's adaptability is a derivative of the structure of network relations, environment's external constraints and presumably speed of their changes. Typically, individual rationality and adaptability are predetermined, while the rationality and adaptability of organizations do not have to reflect this. This issue is one of the research areas of modern scientists in the field of management.

Project-based organizations require the skills, tools and human resources management processes different from traditionally managed organizations. Projects are limited in time and should be treated as a temporary organization established to achieve the objectives. Based on the findings of the PMI on human resources management in project-oriented organizations following conclusions[17] have been formulated:

[16] C.K. Prahalad, G. Hamel, *The Core Competence of the Corporation*, "Harvard Business Review" 1990, vol. 68, no. 3, pp. 79–87.

[17] J.R. Turner, M. Heumann, A. Keegan, *Human Resource Management in the Project-Oriented Organization*, Project Management Institute, Newton Square 2008, pp. 5–8.

1. The processes of allocating human resources to projects that require the identification of the necessary people for the project exist. In small organizations, projects are usually assigned to specific people, in large organizations is opposite – people are assigned to projects, and unlike the average size of the organization, this process is accompanied by the annual budgetary cycle.
2. The performance evaluations of employees are carried out on the basis of the projects, where project managers are responsible for collecting data about the members of the team, but also everyone involved in the project assesses the work of project managers. In large organizations, there is a staff evaluation model based on the concept of 360 degrees.
3. The remuneration of the members of the team is based on the results of the projects.
4. Projects determine the increase of the competences of employees in the organization, because in the new conditions of limited budget and time they acquire the relevant experience and expertise to carry out project tasks. Competences can also be obtained from new employees from outside the organization through the transfer of knowledge between employees. An important issue is also financing the training of employees depending on specialization. Organizations approach it in different ways. Increasingly, employees are trained within the project budget.
5. After finishing the project an increase of available working time of employees involved in the project occurs. Subsequently, these employees are assigned to new projects or return to earlier work carried out in the organization. Some organizations are trying to retain staff under contracts, in order to take advantage of their expertise in the future, paying them for their time availability.
6. The process of selection and recruitment in project-oriented organizations aims for organic recruitment process[18]. During the time of the projects one mostly acquires "secondary" workers.
7. Most organizations have worked out a career path for project managers with defined levels and profiles of competence. This requires the implementation of an appropriate system of assessment and dedicated training programs.
8. The knowledge acquired by the project team during the project period is passed after its completion to the other workers, thus leaving the results of the work of the team in the organization. On the other hand, many organizations experience a loss of exceptional competences after the departure of secondary employees, so they take steps to keep them. The costs of keeping specialized, proven employees are lower than re-recruitment.

[18] J.R. Turner, *Handbook of project management*, Gower, Burlington 2007, p. 668.

9. There is insufficiently efficient system of managing the workload of employees in the organization. This system could provide better results at the individual level and across the organization.
10. Adjusting projects to the career development of employees is a new challenge for the organization. If an employee does not feel right in a new project, a well-oriented manager shifts him to other projects. Otherwise, the employee will take the opportunity and find work outside the organization.
11. In most cases employees involved in projects are more satisfied with their jobs than workers on permanent positions. This stems mainly from the fact that the involvement in projects is based on their own choice and creates conditions for self-development.

Additional clarification is needed regarding point 6 on organic recruitment process. The classic model of human resources management by Frederick Taylor designed for large organizations is not suitable for project-oriented organizations. The standard selection procedure is as follows[19]:

- identification of the scope of expected work (determining staffing needs),
- description of the scope of work (job description),
- identification of the competencies required to work (defining requirements),
- identification of people who have such competencies (creating a list of candidates),
- employment of best suited person.

In conditions of high uncertainty of requirements for future employment in the project, the above first two steps cannot be achieved. Project-based organizations are looking for people with general competences appropriate for the project, expecting that the project team will define the scope of work to be done in the project. Persons participating in the projects usually need to meet higher demands, especially the project manager. The structure of the project team is unstable and the involvement of people working permanently in the organization creates additional motivational and personal problems and could be crucial for the success of the project[20].

Therefore, in practice, it is recommended that in the recruitment process of employees one takes the following steps[21]:

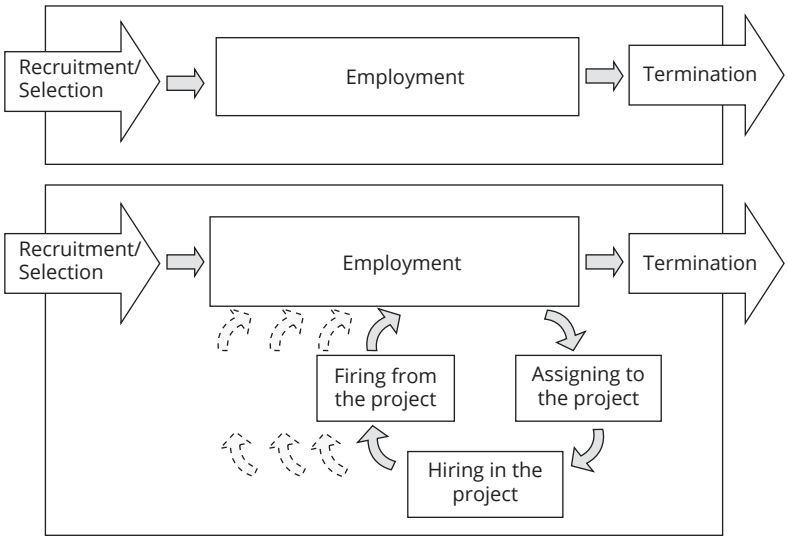
- hiring for the project temporary employees who meet the needs of the organization; after the completion of the project organization may propose them permanent employment;

[19] J.R. Turner, M. Heumann, A. Keegan, *Human Resource Management*…, opt.cit., p. 30.
[20] P. Wachowiak, S. Gregorczyk, B. Grucza, K. Ogonek, *Kierowanie zespołem projektowym*, Delfin, Warsaw 2004, p. 24.
[21] Ibidem, p. 30.

- avoiding mechanical type of decision-making of *go/no go* type, because it's more about learning by trial and error;
- networking and the search for potential employees, rather than placing job advertisements and inviting potential candidates.

Differences in the processes of recruitment, selection, employment and termination in traditional and project-oriented organizations are shown in Figure 8.2.

Figure 8.2. The Process of Employment of Employees in Traditional and Project-Oriented Organizations



Source: J.R. Turner, M. Heumann, A. Keegan, *Human Resource Management in the Project-Oriented Organization*, Project Management Institute, Newton Square 2008, p. 132.

8.4. Selected Researches in the Area of Human Resources Management

The project-oriented organizations have not been studied in Poland so far. The most recent study in the area of human resources management is a study done by the Institute of Value Management in the Warsaw School of Economics. Research[22] related to companies located in the "List of 500", i.e. with the highest value of sales. Research shows that "human resources management in the surveyed sample generally is at

[22] T. Oleksyn, I. Stańczyk, J. Bugaj, *Diagnoza i kierunki zmian w zarządzaniu zasobami ludzkimi w przedsiębiorstwach z Listy 500*, Warsaw School of Economics Press, Warsaw 2011, pp. 207–213.

a high level[23], better than in most entities outside the "List of 500". These organizations have managers responsible for human resources and their strategy and the resulting organizational culture gives special importance to human resources management.

The studied organizations showed a mature attitude to the role of HR department in human resources management and a subjective approach to employees. Managers of Human Resources highly evaluate (% of positive answers) the following functions related to human resources management:

- recruitment and selection of staff (74%),
- introduction to the work and professional adaptation (60%),
- quality and efficiency of the remuneration (67%),
- professional development of employees (61%),
- professional development of managers and leaders (50%).

For the following functions dominated low and average assessment:

- competence management (69%),
- preparation of succession and promotions (55.6%),
- outsourcing (27.1% and it doesn't exist in 45%),
- strategic management (58%).

Studies have shown certain stagnation in terms of more traditional methods and forms of labor dimensioning, because the companies generally do not withdraw from them, nor update or develop them. Almost 40% of work collective agreements are based on lists from before at least 15 years. In contrast, three-quarters of surveyed companies define corporate values, and nearly half have implemented codes of good practices.

The level of human resources management in projects has been studied indirectly on the occasion of project organization maturity research. In studies for 65 organizations from the IT industry on Mauritius (2004) the area of human resources management was rated at 2.29/5.00[24]. On the other hand, in studies conducted in Poland by Matthew Juchniewicz for 107 organizations, the average level of human resources management in the projects was estimated at 2.83/5.0[25].

[23] Ibidem, p. 208.

[24] A. Sukhoo, A. Barnard, M.M. Eloff, J.A. van der Poll, *An Assessment of Software Project Management Maturity in Mauritiusz*, University of South Africa, Pretoria 2004, p. 677 after M. Juchniewicz, *Dojrzałość projektowa organizacji*, Bizarre, Warsaw 2009, p. 103.

[25] P. Wyrozębski, M. Juchniewicz, W. Metelski, *Wiedza, dojrzałość, ryzyko w zarządzaniu projektami – Wyniki badań*, Warsaw School of Economics Press, Warsaw 2012, p. 175.

8.5. Research Results

This study is a continuation of research on a narrow scope in the area of human resources management in projects. Studies are quantitative in nature and cover organizations with different characteristics of project activity, i.e. both project-based organizations, as well as one's implementing projects occasionally.

Literature research indicates that human resources management occupies an important place in project management. In the project management methodologies human resources management has been recognized as an important element of project activities, penetrating virtually all areas of project management. The review of methodologies shows that the human resources management processes occur throughout the project life cycle from initiation phase through phase of planning, implementation and monitoring to completion of the project. Omission of human resources management in any of these processes may result in difficulties in achieving project goals. Human resources management is a continuous and ubiquitous process, which is managed by the project manager at every stage of the project's realization and organizational level.

The study was based on a survey investigating project maturity of organizations, which takes into account the area of human resources management. The survey was conducted in organizations operating on Polish territory in 2009–2012. 466 questionnaires were obtained, of which 383 were correctly filled.

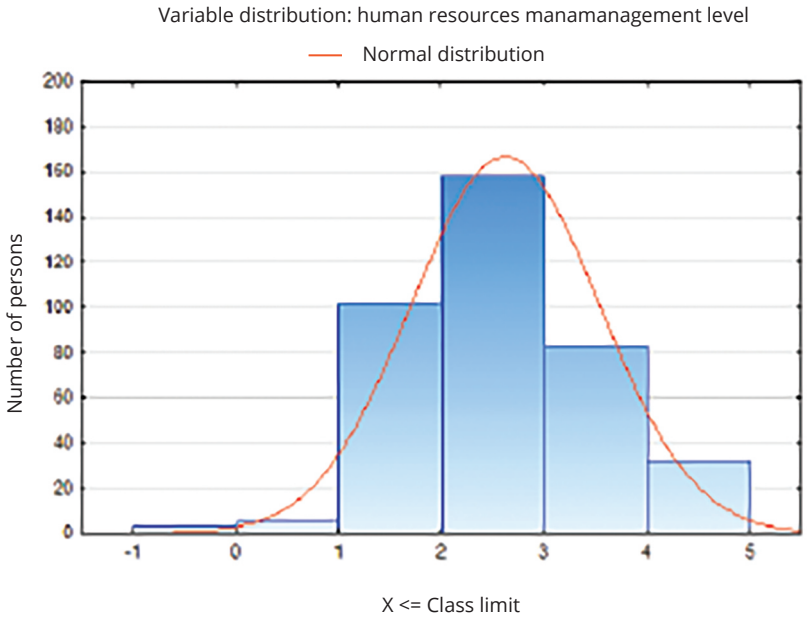
Survey consisted of six elements. The first part concerned the seniority, the role played in projects by the person filling the questionnaire and the types of projects most frequently implemented in the organization. In the second part one was supposed to indicate the sector in which the organization achieves the highest revenues. In the third part, respondents were asked to indicate the basic parameters of the organization, i.e. the level of employment, the scope of the organization, scope of organization's support in the field of project management by the parent organization. The fourth part consisted of questions related to the intensity of project activities of the organization. The fifth part included questions concerning the characteristics of the approach to project management in the organization. In the sixth part, respondents were asked to assess how often a process of human resources management in projects is implemented in the organization. It was assumed that lack of the existence of the process should be treated as the lowest, "zero" level of human resources management in projects. On the basis of 10 questions calculations, summing up the scores for each question and dividing the result by 10 have been made. In this way the level of human resources management in projects was achieved.

Survey included only selected types of factors that may condition the level of human resources management in projects. Due to time and cost constraints of the survey, one can not include all kinds of factors in the study.

The levels of human resources management in projects should be interpreted as follows:

- level 1 (score from 0 to 1) – HR management processes in projects are performed partially, or not at all;
- level 2 (score from 1.01 to 2) – HR management processes in projects are implemented, but it is done in an uncoordinated manner;
- level 3 (score from 2.01 to 3) – HR management processes in projects are coordinated and implemented according to established procedures;
- level 4 (score from 3.01 to 4) – HR management processes in projects function as a system and are constantly monitored;
- level 5 (score from 4.01 to 5) – HR management processes in projects are coordinated between each other and constantly improved.

Figure 8.1. Variable Distribution: Human Resources Management Level



Variable human resources management level has a distribution different from normal (Shapiro-Wilk test: W=0.99; p=0,003).

Source: own study.

Two research hypotheses have been formulated, the first of which required detailing in the form of six sub-hypotheses. Table 8.2 presents the hypotheses and collective results of their verification.

Table 8.2. The Results of the Hypotheses Verification

Sub-hypotheses	Verification	Result
H.1 The level of human resources management in projects is determined by various factors. The impact of individual factors on the level of human resources management is varied.	Statistically significant	Three factors that have an impact on the level of human resources management in projects have been identified.
H.1.1. The level of human resources management in projects is determined by the type of projects.	Statistically insignificant	Type of projects does not differentiate significantly the level of human resources management in projects.
H.1.2. The level of human resources management in projects is determined by the degree of support for the organization in the area of project management by the parent organization.	Four statistically significant intergroup comparisons	Organizations which do not have support, or have minimal support, have lower levels of human resources management in projects than organizations with support on medium or intense level, while there is no difference between organizations with lack of support and the minimum support and between support at a medium level and intense level.
H.1.3. The level of human resources management in projects is determined by the characteristics of project activities of the organization.	Three statistically significant intergroup comparisons	Small activity has a lower average human resources management than large and very large, but very large has a higher average than medium and large project activity.
H.1.4. The level of human resources management in projects is determined by the sector in which it operates.	Statistically insignificant	Implementation of projects in selected sectors does not differentiate significantly the level of human resources management in projects.
H.1.5. The level of human resources management in projects is determined by the range of the operations.	Statistically insignificant	Range of the organization's functioning does not differentiate significantly the level of human resources management in projects.
H.1.6. The level of human resources management is determined by the characteristics of the organization in terms of number of employees.	One statistically significant intergroup comparisons	In organizations employing from 20 to 100 people there is a lower level of human resources management than in organizations employing more than 1000 people.
H.2. The level of human resources management in projects is determined by the approach to project management in the organization.	Statistically insignificant	Organizations methodically oriented towards project management are characterized by a higher level of human resources management.

Source: own study.

The conducted studies allow the following substantive conclusions. First of all, function performed in a team differentiates assessment of human resources

management level. People involved in the implementation of projects and performing other functions than the representation of the sponsor or employer, the member of the project team and the project manager, worse evaluate how human resources are managed in projects. It should be noted that in the study the level of competence of project managers, which requires a different method of analysis was not taken into account. It can be assumed that a different assessment of the level of human resources management in projects is due to at least two reasons. Firstly, people carrying out the project, in particular sponsor or a member of the project board, assess higher their competences or the situation of human resources management in projects than it actually is. Secondly, persons performing other functions or performing supporting work in projects do not have sufficient knowledge and practice to assess the facts, comparing this situation to the classic human resources management occurring in organizations.

The research shows that the assessment of the level of human resources management in projects depends on the degree of support for organizations in project management by the parent organization. Organizations which are not supported or receive minimal support in project management have a lower level of human resources management in projects than organizations with support on medium or on intense level. It can be assumed that in order to improve the human resources management in projects, management of the organization should provide in this regard support for the project team, and that support should be characterized by at least a medium or high intensity.

The level of human resources management in projects depends on the characteristics of the project activities of the organization. Organizations that implement more projects at once, create and shape appropriate procedures and processes, achieve higher and higher competences in human resources management. It can be assumed that shaping of a suitable organizational culture conducive to project management also occurs there. The level of employment in the organization has an impact on human resources management in projects too. In organizations employing from 20 to 100 people there is a lower level of human resources management than in the organizations employing more than 1000 people. In very large organizations in terms of employment there are complex, multi-stage relationships and organizational relations. The management is forced to implement and improve the tools and techniques of human resources management, in particular if the carried out activity needs also implementing projects involving significant part of the staff.

Another factor that has an impact on the level of human resources management, is the organization's approach to project management. Organizations methodically oriented towards project management are characterized by a higher level of human resources management. This is due to the fact that in the methodologies of project

management an appropriate attention is paid to human resources management. Project management methodologies indicate the validity and continuity of human resources management processes in both the projects and at every management level within the organization. Such procedures and higher maturity of project management organization are a factor supporting better management of human resources in the project. In the near future one can expect a further increase in the importance of project management and human resources management in projects. The existing project management methodology will be developed in terms of new tools, techniques and methods of human resources management and it can be assumed that there will be created specialized methodologies supporting projects in order to manage this area.

One of the main perspectives of further research is to extend the analysis of the level of human resources management in the area of program and portfolio management, among others examining the effectiveness of coordinated actions and processes in human resources management in these two areas. The research results give only a general picture of the factors influencing the level of human resources management in projects. It would be valuable to conduct surveys in organizations with different characteristics of project activities and extracting the most important factors affecting the level of human resources management. On the other hand, from the perspective of the organizations in Poland, it would be advisable to carry out comparative studies with other organizations in the world.

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Katarzyna Kandefer-Winter

9
COMMUNICATION IN PROJECT MANAGEMENT

9.1. Introduction

Communication plays a vital role in project management. On the one hand, investigating the failures in the projects shows that the lack of professional communication support at any stage of the project's life cycle can lead to problems in the project and project failure. On the other hand, research shows that professional communication is an important factor in the success of the project. In the perspective of importance of communication in the project, there is a strong need to focus on this subject.

The chapter discusses the issue of communication in project management and the importance of communication for effective project management. In addition, the results of research were shown which explain what support in this area is applied by project management specialists and what factors affect the complexity of the support used in the communication area, as well as what practices in the area of communication management are used and to what extent by organizations.

9.2. Communication in Project Management

The uniqueness and complexity of the projects, a time limit for their implementation, defined quality requirements in relation to the results of the project, make it necessary to efficiently manage projects. Professional communication and communication skills, as well as comprehensive and planned approach to communication management can significantly support the projects. Skills of project managers in the field of communication are crucial. This is confirmed by *Arras People* survey conducted among 1,000 project management specialists, where these skills are at the second place, while technical skills are found only in 7th place[1]. On the other hand,

[1] Arras People, Arras People Project Management Benchmark Report 2010, http://www.arraspeople.co.uk/assets/ckeditor/ckfinder/userfiles/files/BenchmarkReport/ArrasPeople_PMBR_2010-4PRINT.pdf (9.06.2014).

in a project management, there is communication management, an area of knowledge, which "includes the processes required to ensure timely and proper development, collection, distribution, storage, search for information regarding the project and their final disposal"[2].

As it is clear from the definition of communication management, the basic actions of the project manager include timely and correct:

- development of information, which needs careful planning of communication, project manager identifies stakeholders, defines their needs and communication expectations, so as to complete the project in accordance with agreed objectives;
- collection of information, consisting of gathering key information in the initiation, planning and implementation phases of the project, arranging them in an accessible way so that one at any time could easily benefit from them;
- distribution of information, i.e. transfer (transmission) of information to stakeholders, in accordance with the communication plan or additional request of stakeholders;
- storing information so as to be prepared for providing any information, if the need arises;
- search for information on the project – information should be stored in such a way that it is easy to use;
- final disposal – collected project information is used by the project manager, not only during the project, but also after the completion in the documentation reflecting the acquired knowledge.

The definition proposed by the PMI seems to be a complete one. It is worth, however, emphasizing the aspects of communication and skills in this area. In order to effectively implement these measures it is necessary to apply the knowledge and skills related to communication. This aspect requires special emphasis due to the fact that it differentiates communication and information management. Implementation of communication management processes is associated with constant matching of communication management processes with specific stakeholder, requires to know their expectations, preferences of media, frequency or format. It also requires continuous interaction with stakeholders and two-way communication, both in planning and initiating the project and its completion. Taking into account these elements forms an effective and efficient communication management.

From the above definition of communication management results that its primary objective is to provide the relevant stakeholders with the right information at the right time using properly selected measures. In other words, the transfer of

[2] *A Guide to the Project Management Body of Knowledge, Fourth Edition*, Project Management Institute, Management Training Training and Development Center, Warsaw 2009, p. 257.

information with details matched to customer's expectations while minimizing the communication barriers that could distort the communication process and hinder mutual understanding of a message. Such a communication management implementation requires a full understanding of the recipient, needs and conditions of the environment[3].

Professional communication is competent, at a high level in the field of project management. Thus, communication in the project context is seen not only as an interpersonal communication of project participants, but also as communication management in the project. Professional communication covers the whole period of project management, from the moment of initiating through a phase of planning, implementation and monitoring after completion of the project.

Effective communication and communication management in the project are two important features. Firstly, communication is an continuous and ubiquitous process, which is managed by a project manager at every stage of the life cycle of the project and organizational level, being one of the most important aspects of a project manager's work. "It is understood that the communication accounts for 50–70% of daily activity of managers"[4]. Monitoring the work of the project manager indicates that he spends a lot of time on communication – more than half of the time in the meetings, and approx. 80% on communication[5]. Some sources say that project managers spend up to approx. 90% of their time on communication[6]. Second, effective communication requires the involvement of project stakeholders in the implementation of communication processes. Effective communication management creates a bridge between the project manager and stakeholders, enabling the implementation of diverse and complex tasks.

9.3. Communication and the Success or Failure of Projects

David Baccarini points out that despite numerous discussions on this topic, concept of success of the project does not have a clear definition or an agreed methodology

[3] C. Pritchard, *The Project Management Communications Toolkit*, Artech House, Londyn 2004, p. 1.
[4] S. Frydrychowicz, *Komunikacja interpersonalna w zarządzaniu*, Forum Naukowe PASSAT Press, Poznan 2009, p. 27.
[5] M.W. Newell, *Preparing for the Project Management Professional (PMP) Certification Exam,* AMACOM, New York–Atlanta–Brussels–Chicago–Mexico City–San Francisco–Shanghai–Tokyo–Washington 2005, p. 203.
[6] J. Phillips, *PMP Project Management Professional Study Guide*, McGraw-Hill Osborne Media, Emeryville 2004.

for measuring it[7]. The standard approach to the success of the project is to consider the criteria of so-called golden triangle, which includes: time, budget and approved project objectives. In this approach, the emphasis is put on implementation of the accepted assumptions about time, financial resources and control of the final product. More and more often, however, also other determinants of success are considered and include also the perspective of the stakeholders, in particular the customer for whom the project has been completed[8]. In this case, success can be measured by such indicators as: the level of customer satisfaction, increase of market share, improvement of the company's competitiveness and tangible profits that the firm achieves thanks to the completion of the project[9].

On the one hand, investigating the failures in the projects shows that the lack of professional communication support at any stage of the project life cycle can lead to problems in the project and to project failure. Project managers generally believe that communication problems are one of the key factors contributing to failures in a project or to significant problems in the project[10]. This may include various aspects related to the preparation, execution or completion of the project. In the case of initiating a project one most often points to the problems related to the lack of identification of stakeholders, communication needs and their sources, and inadequate communication with key stakeholders. During the planning phase of the project difficulties arise due to the lack of planned communication in the project, selective communication of plan to stakeholders and lack of commitment of key stakeholders. On the other hand, in the implementation phase there is often a lack of information about the status of the project or changes, insufficient exchange of information and number of meetings with stakeholders, the lack of a detailed review of the project, inadequate stakeholder management, the lack of communication when making decisions, and no formal communication during completion of the project, no process of communicating project experiences and best practices.

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[7] D. Baccarini, *The logical framework method for defining project success*, "Project Management Journal" 1999, vol. 30, pp. 25–32.

[8] E. Westerveld, *The Project Excellence Model: linking success criteria and critical success factors*, "International Journal of Project Management" 2003, vol. 21, pp. 411–418.

[9] W. Walczak, *Uwarunkowania i czynniki wpływające na sukces projektu*, "e-mentor" 2010, no. 35, vol. 3.

[10] J. McManus, T. Wood-Harper, *Understanding the Sources of Information Systems Project Failure*, "Management Services", Autumn 2007, pp. 38–43; J. Nicholas, *Project Management for Business and Engineering: Principles and Practice*, Elsevier Butterworth-Heinemann, USA 2004, pp. 539–540; D. Po-Chedley, *Client Relationship Management: Using Relationship Management and Project Service Excellence to Create a Competitive Advantage*, HRD Press, Massachusetts 2001, pp. 35–36.

On the other hand, studies show that professional communication is an important factor for the success of the project (it was included in 20 of 43 studies) [11]. However, elements of communication and communication management can be found in a much larger number of indicated success factors in the project, including: support from management, or customer/user engagement requires proper communication and the use of communication processes (e.g. the proper recognition of the interests of key stakeholders in order to acquire their engagement and support); proper planning, or effective monitoring and control – also include communication planning process, which is essential for proper project implementation, monitoring, communication, and behavior of stakeholders; reporting of current work progress is one of the key processes of communication management in the implementation phase of the project; leadership – requiring effective communication skills; committed and motivated team – effective teamwork requires the ability to communicate.

What's more, the study *The silence fails* suggests that effective communication during the project minimizes the problem areas, increases significantly the effectiveness and efficiency of projects and improves their performance[12]. The survey results distinguish five critical areas referred to in the study as *crucial conversations for flawless execution*. Among the five critical areas identified in the study are:

a) planning separated from reality (*fact-free planning*) – deadlines, allocated resources do not fit the reality,
b) lack of commitment from sponsors (*AWOL sponsors – absent without official leave*) – sponsors do not engage in the project, do not provide support,
c) improperly implemented prioritization of tasks (*skirting*) – ignoring the priorities by the project team members,
d) concealing the actual status of the project (*project chicken*) – not signaling emerging problems or troubling situations in the project,
e) the incompetence of the team (*team failures*) – the team members do not have adequate knowledge, which is required for the project.

Study highlights the crucial role of communication in solving problems in the project. Increasing the efficiency even in 1 out of 5 designated areas improves the results of projects from 50% to 70% and even more. In the opposite situation, the likelihood of the project failure (defined as exceeding the planned budget and time, and failure to meet customer requirements for quality and functionality of the manufactured product) rises to 85%.

[11] M.H.N. Nasir, S. Sahibuddin, *Critical success factors for software projects: A comparative study*, "Academic Journals" 2011, vol. 6, no. 10, pp. 2174–2186.

[12] *Silence fails. The Five Crucial Conversations for Flowless Execution*, VitalSmarts, 2006, http://www.pmi.org/~/media/PDF/Surveys/pp_maxfield.ashx (9.06.2014).

Despite the fact that some of these problems do not seem to be directly related to communication, it is the application of communication skills by the project manager that minimizes the problem areas and increases the chances for success of the project. Research indicates that if the project manager takes such an action then:

a) the likelihood that the project will exceed the budget is reduced by 50%,
b) the probability of project implementation within an established time limit is increased by 40%,
c) quality is improved by almost 60%,
d) the likelihood that the project team will have high morale after the completion of the project and correct relationships with stakeholders is almost 70% higher.

Therefore, the results of *The silence fails* study effectively confirm the conclusions of the analysis of the factors of failure of projects: taking action in the field of communication by the project manager increases the likelihood of success.

Analysis of the results of the project management shows that approx. 30% of projects do not end with satisfactory results (projects are interrupted or terminated, but significantly exceeding budget and schedule). Studies show that rarely failure of the project is the result of interaction of a single factor, but rather it is the impact of some of them. Moreover, even with the IT or technologically complex projects, management factors, including those related to communication, are just as important or even more important to the success of the project than the technical ones.

9.4. Project Maturity in Communication Management

Communication management area is one of the elements included in the project maturity. A study presented below lets one to specify which practices in the area of communication management are the most widely used in organizations and what factors affect the level of maturity in the field of communication management, and therefore the effective implementation of projects and effective achievement of its objectives.

Project maturity is "an organization's ability to effectively and in compliance with the strategy and objectives of the organization, select the portfolio of projects and to professionally use techniques, tools and project management methodologies that will lead to successful completion of the project and allow one to translate that success to the next projects"[13]. This means that with increasing level of project maturity, the organization manages projects more efficiently, achieves its objectives better, has better quality results at a lower costs of the project. Project maturity models allow one to evaluate the degree of development of the organization in the field of project

[13] M. Juchniewicz, *Dojrzałość projektowa organizacji*, Bizarre, Warsaw 2009, p. 45.

management and its readiness to implement unique projects. Some models of project maturity, beyond the general level of maturity of the organization, include a detailed analysis of nine knowledge areas of project management, including communication management. Analogous to the general level of project maturity, the higher the level of project maturity in different areas of project management knowledge is, the more effectively the organization implements the projects and more efficiently achieves its objectives.

Original project maturity model by Matthew Juchniewicz was developed as a part of his doctoral thesis titled *Dojrzałość projektowa organizacji w Polsce*[14]. Just as in the PM Solutions model, the presented model takes into account 9 knowledge areas of project management and 5 levels of project maturity. In this model, communication management has been defined as "planning, generation, collection, distribution and archiving of information in the project. Communication management consists of identifying, description and control of channels of communication between individuals and units involved in the project, it might be project team members, customers, users, and other important stakeholders"[15]. Assessment of the project maturity level in the communication management takes place through the evaluation of 10 practices in this area, which is presented in Table 9.1.

Table 9.1. Practices in the Field of Communication Management

Practices in the field of communication management used for the assessment of the level of maturity in this area	
Practice 1	Principals are involved in projects.
Practice 2	Principal is familiar with the project team.
Practice 3	The communication plan is created for each project.
Practice 4	Starting a new project is generally announced – both in the organization of the principal and the contractor.
Practice 5	After every official meeting one prepares a report.
Practice 6	Procedures of reporting work progress are established.
Practice 7	Project information is regularly updated and widely available to key stakeholders.
Practice 8	Information on the implementation of the budget and project schedule is distributed regularly.
Practice 9	Regular meetings on reporting progress with management, principal and suppliers take place.
Practice 10	The success of the project is documented (indicated source of success), archived and available for every member of the project team.

Source: M. Juchniewicz, *Dojrzałość projektowa organizacji w Polsce*, doctoral thesis of Warsaw School of Economics, Collegium of Management and Finance praca, Warsaw 2011.

[14] M. Juchniewicz, *Dojrzałość projektowa organizacji w Polsce*, doctoral thesis of Warsaw School of Economics, Collegium of Management and Finance, Warsaw 2011.

[15] P. Wyrozębski, M. Juchniewicz, W. Metelski, *Wiedza, dojrzałość, ryzyko w zarządzaniu projektami. Wyniki badań*, Warsaw School of Economics Press, Warsaw 2012, p. 162.

Each practice in the field of communication management is assessed by the respondent on a scale of 0 to 5, where 0 means I don't know, 1 – never, 2 – sometimes, 3 – usually, 4 – often, 5 – always. The model assumes that not being aware of the existence of the process should be treated as the lowest, "zero" level of communication management in projects. Based on 10 questions, the calculations by adding the scores for each question and dividing the result by 10 were made. In this way, a level of project maturity in the area of communication management in projects was achieved. Different levels of project maturity in the communication management area in projects should be interpreted as follows:

- level 1 (score from 0 to 1.00) – no awareness of the importance of communication in projects, no or almost no solutions for communication management,
- level 2 (score of 1.01 to 2.00) – communication management processes in projects are implemented, but it is done in an uncoordinated manner and truncated,
- level 3 (score from 2.01 to 3.00) – most of the processes in project communication management are coordinated and carried out according to established schedules,
- level 4 (the result from 3.01 to 4.00) – project communication management processes function as a system and are constantly monitored,
- level 5 (score from 4.01 to 5.00) – project communication management processes in organization are coordinated with each other and constantly improved.

The results below are the conclusions of the study *Analysis of the factors influencing the level of project communication management in Poland*[16]. The survey was conducted in 2009–2012 in organizations conducting their activities on Polish territory. Analysis of project maturity in the field of communication management was based on the results of a survey among 381 respondents.

The average level of project maturity in the field of communication management was 2.79. Thus, the organizations in the studied sample are at level 3 of project maturity in the field of communication management, which means that most of the processes in project communication management are coordinated and carried out according to established schedules. As can be seen from Figure 9.1, the average degree of maturity for each communication management practice ranges from 2.1 to 3.26. Respondents assessed lowest following practices of communication management:

- Practice 1 – the principals are involved in projects (2.17)
- Practice 2 – the principal knows well the project team (2.1).

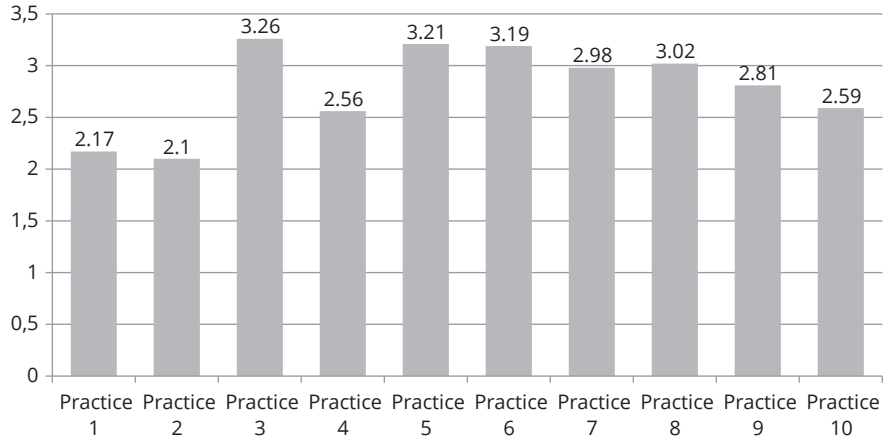
[16] K. Kandefer-Winter, W. Metelski, *Analiza czynników kształtujących poziom zarządzania komunikacją w projektach w Polsce*, under the direction of M.A.W. Metelskiego within the specific grant of the Ministry of Science and Higher Education to conduct research and development work and related tasks contributing to the development of young scientists, Collegium of Management and Finance of Warsaw School of Economics, Warsaw 2012 (no. 04/BMN/35/12).

Such a low assessment of these practices indicates that only sometimes the principal is engaged in the project, it is not a rule in project management in the sample.

The following practices have been best rated. Their level of communication was 4 (it ranges between 3 and 4), which means that these practices are used for the majority of projects:

- Practice 3 – communication plan is created for each project (3.26)
- Practice 5 – after every official meeting a report is prepared (3.21)
- Practice 6 – procedures for reporting the progress of work are established (3.19)
- Practice 8 – information on the implementation of the budget and project schedule is regularly distributed (3.02).

Figure 9.1. The Project Maturity Level in Communication Management Practices



Source: own study.

The conducted studies also helped to determine that the maturity level of project communication management in Poland in the research sample depends on:

- **the degree of support for organizations in project management by the parent organization.** Organizations not having or having minimal support have a lower level of communication than organizations with support on medium or intense level.
- **characteristics of the organization's project activities.** Organizations whose entire activity is the realization of the projects have higher communication maturity level than organizations having less project activities. Also, the average level of project management maturity in the field of communication management in organizations characterized by high project activity (continuous, simultaneous execution of many projects) is higher than in organizations with low project

activity (sporadic implementation of single projects) and medium (continuous realization of single or few projects).

- **the number of employees of the organization.** In organizations employing from 20 to 100 people there is a lower level of maturity in the field of communication management, than in organizations employing more than 1000 people.

What's more, studies have confirmed that the level of project communication management depends on the approach to project management in the organization. Organizations methodically oriented towards project management are characterized by a higher level of project management maturity in the field of communication management. Methodical approach of organization has been verified by variables such as: the functioning of project management methodology, use of the methodology across the organization, use of portfolio management in the organization and implementation of training programs on project management. Project management methodologies include the area of communication management and organizations applying them to a greater extent use the practices from this field.

9.5. Research Model

The aim of the study conducted by the author was to investigate the support used in the communication management and the importance attributed to communication by specialists in project management in organizations conducting their activities in Poland.

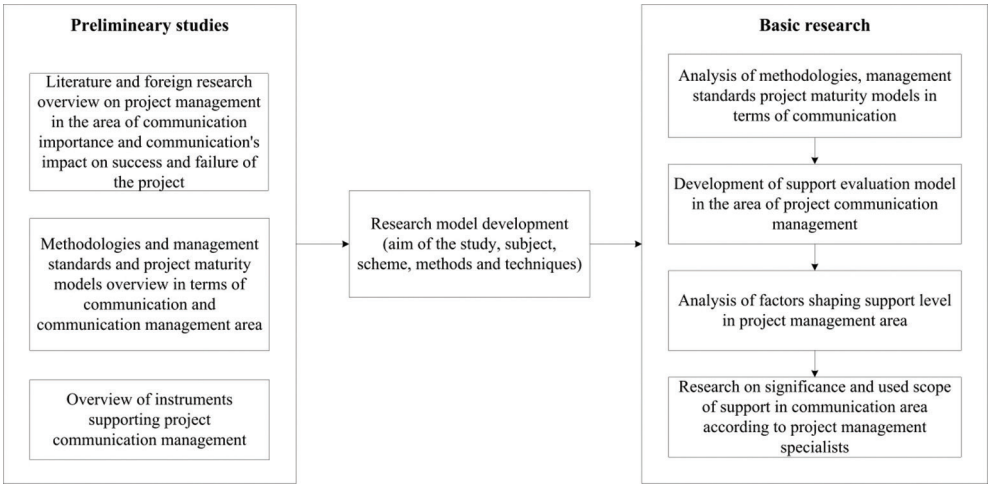
The developed research model includes preliminary studies and basic research. According to the research model presented in Figure 9.2 in order to develop an evaluation model of the support in the field of communication and the importance of communication, it was necessary to conduct a detailed analysis of:

a) the importance of communication in the project and the impact of communication on the success and failure of the project,
b) selected universal project management methodologies and project management standards for an area of communication management, including:
   - PMBOK®: Project Management Body of Knowledge – project management methodology developed by the Project Management Institute,
   - PRINCE2®: Projects in Controlled Environments – project management methodology developed by the Office of Government Commerce,
   - PCM: Project Cycle Management – project management methodology created for European and development projects,
   - IPMA Competency Baseline 3.0 ICB – project manager competency model developed by the International Project Management Association,

as well as project maturity models, for an area of communication management:
- PM Solutions' Project Management Maturity Model,
- original model of M. Juchniewicz, on the basis of which the research on the level of project maturity level in the field of communication management in organizations in Poland was conducted.

c) the instruments supporting communication management.

Figure 9.2. The Research Model of Project Communication Management in Organizations Operating in Poland



Source: own study.

Summary of the results of above preliminary studies made it possible to specify the most important processes, tools and documents supporting the project communication management. For each variable a four-level scale of support illustrating the growing level of complexity of used support has been developed. The list of areas of communication management support and ordinal scale of support have been integrated into a morphological matrix forming the fundamental and ultimate model of evaluation of used support for project communication management.

A morphological analysis was used to construct the assessment tools of support in communication area. Morphological analysis is "a logical-analytical method for the search for solutions to problems through a systematic analysis of all elements defining the solution to the problem"[17]. It is a versatile technique that can be used

[17] Z. Martyniak, *Organizacja i zarządzanie. 60 Problemów teorii i praktyki*, Antykwa Press, Cracow–Kluczbork 1996, p. 163.

to solve complex and comprehensive problems in various fields of science and technology. This method was chosen because of the comprehensive and complex nature of the support used in the field of communication management.

The analysis of methodologies and standards and maturity models allowed to develop a set of 14 problem variables – project communication support areas that can be divided into three groups: communication management processes, instruments to support communication and project experiences in project communication. Table 9.2. provides a detailed list of communication support areas.

Table 9.2. List of Communication Support Areas in Project Management

No.	Problem variable	Description
A.	Initiating communication	The method of identification of stakeholders in the project
B.	Stakeholder analysis techniques	The way the information on stakeholders are collected and analyzed
C.	Participants of the kick-off meeting	The approach to the issue who participates in the kick-off meeting of the project
D.	Communication planning	The scope of recognition of the communication needs of stakeholders and establishing ways to communicate in the project
E.	Communication principles within the project team	The approach to information sharing and cooperation between project team members
F.	Identification of the risks associated with communication and stakeholders	Approach to risk management and opportunities related to communication and stakeholders
G.	Communication with stakeholders during the project realization	The way in which runs the communication implementation process, how information is made available to stakeholders
H.	Monitoring needs and expectations of stakeholders	Approach to observing and reacting with stakeholders in order to meet their needs
I.	Monitoring and management of difficult issues	The way of reacting and solving problems in the project
J.	Reporting on the progress of work	The approach to the process of collecting, organizing and sharing information on the progress of the project
K.	Communication of completion of the project	Way of communicating project closure and termination of cooperation
L.	Documenting the knowledge acquired within the field of communication	The method of gathering project experience in the field of communication
M.	Using the project experiences within communication	The approach to the use of project experience in the field of communication
N.	Templates/forms in communication processes	How to use standardized forms covering the issue of communication in the project

Source: own study.

An individual four-level measurement scale of used support in the field of communication, illustrating the growing level of complexity of the used processes or utilities has been created for each variable. Level 1 means that virtually no support is used in the area of communication; level 2 means that support is used on the basic level, level 3 points to more comprehensive support, while level 4 illustrates the most comprehensive support in this area.

The model assumes that the complexity is understood as:

- more overall embracement of the area, as in the case of variables: communication planning and kick-off meeting participants,
- increasing detail and formalization of the used processes, as in the case of variables for defining the principles of communication within the project team or monitoring needs and expectations of stakeholders.
- more advanced tools and their forms, i.e. stakeholder analysis techniques.

The scale of measurement was created and standardized, and the final shape of the morphology matrix was evaluated by the professional, experienced practitioners and professionals familiar with the specifics of project management methodology and project management standards and project communication support instruments.

9.6. Information on Research and Research Sample

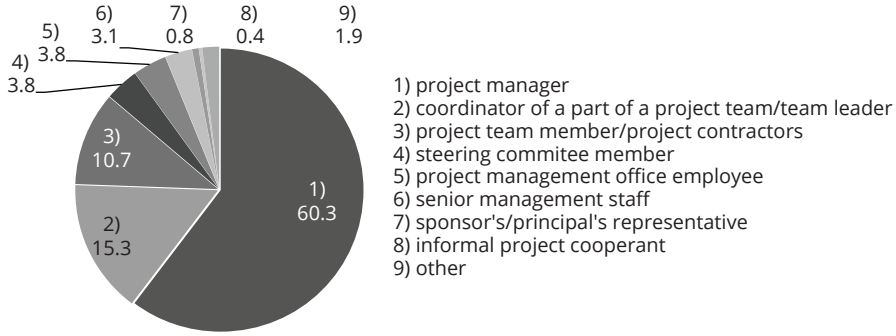
The study was conducted using survey forms among specialists in project management of various industries and specialties, working in organizations operating on Polish territory. The survey was conducted between September 2012 and January 2013 on a sample of 262 respondents.

Characteristics of the research sample will be restricted to three aspects:

- most common role of the respondent in the projects,
- respondent's experience in project management,
- degree of involvement in the project activity of an respondent's organizational unit.

Project managers performing managerial functions in relation to their team of employees were most strongly represented in the study (158 of 262 people – 60.3%). The coordinators of part of the project team (team leaders), who accounted for 15.3% of the respondents (40 people), were the second most represented group. Every tenth respondent was a member of the project team or a project contractors team – 10.7%. These three groups accounted for over 86% of all respondents (Figure 9.3).

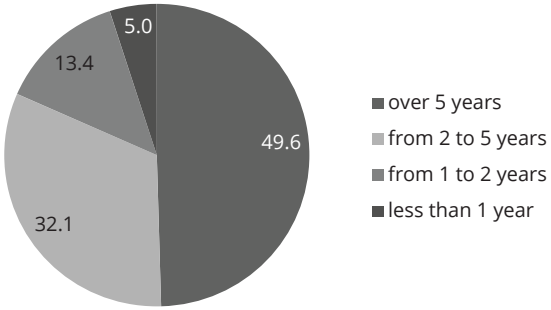
Figure 9.3. Distribution of the Most Common Role in the Project (in %)



Source: own study.

Almost 50% of respondents have over 5 years of experience in project management, while 32% of respondents from 2 to 5 years. It means that over 80% of respondents had a minimum 2 years project experience (Figure 9.4)

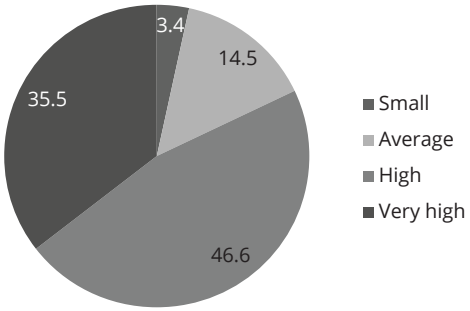
Figure 9.4. Respondent's Experience in Project Management (in %)



Source: own study.

Over 80% of respondents work in organizational units, in which the role of project management is significant – high and essential (35.5%) or very high (46.6%). Only 14.5% of respondents identified the intensity level of implemented projects as average and 3.4% as small (Figure 9.5).

Figure 9.5. The Degree of Involvement of the Organizational Unit in the Project Activities (in%)



Source: own study.

9.7. Significance of Communication in Project Management

The study verified the importance of communication in the various stages and areas of project management. The survey clearly confirmed that the project management specialists believe that communication plays an important role in the projects. For the stage of initiating, planning, implementation, and monitoring and control of the project the dominant answer is that communication is very important in projects. On the other hand, for closure and evaluation stages of the project most answers indicated rather high importance of communication. Small and rather small importance of communication was indicated by a small percentage of the respondents. Most indications in this group concerned initiation of the project (6.8% of respondents), and the closure of the project (6.9%). In the case of project implementation no respondent indicated that communication is of small and rather small importance, which points to a particularly strong importance of communication during project implementation.

The study also confirmed unequivocally that the project management specialists believe that communication plays an important role in various areas of project management. For all areas, except for order management, dominant responses of the respondents indicated the high importance of communication in these areas. For orders management respondents frequently indicated the answer "rather large". Small and rather small importance of communication was pointed by a small percentage of the respondents. Most indications in this group referred to the area of order management (13.7% of respondents), cost management (7.3%) and risk management (5.7%), while the least concerned time management (1.5%), quality management and human resources management (both 2.7%). According to the respondents, communication

in the areas of time management and risk management has no small significance (no indications for an answer "small").

9.8. Used Support in the Area of Project Communication

Obtained results of a study are presented in Table 9.3. Percentage indicators inform about the frequency of indications concerning value within a given problem variable (frequency of indications are color coded, the darker, the higher the level of indications).

Table 9.3. The Overall Profile of the Used Support in the Field of Project Communication (in %)

Problem areas/ problem variables		Complexity level			
		1	2	3	4
A.	Communication initiating	13.0	**42.7**	16.8	27.5
B.	Stakeholder analysis techniques	33.6	**45.0**	13.4	8.0
C.	Kick-off meeting and its participants	5.7	24.8	27.1	**42.4**
D.	Communication planning	15.6	26.3	21.8	**36.3**
E.	Principles of communication within the project team	4.2	**61.5**	23.3	11.1
F.	Identification of the risk associated with communication and stakeholders	29.8	**49.2**	8.4	12.6
G.	Communication with stakeholders during the project	1.1	**45.8**	38.2	14.9
H.	Monitoring needs and expectations of stakeholders	4.2	**49.2**	38.9	7.6
I.	Monitoring and management of difficult issues	1.9	16.8	30.5	**50.8**
J.	Reporting on the progress of work	0.4	13.7	**80.5**	5.3
K.	Communication on completion of the project	7.3	38.2	**47.3**	7.3
L.	Documenting the knowledge acquired in the field of communication	18.7	**35.9**	24.0	21.4
M.	Using the project experiences in terms of communication	19.1	**59.5**	12.2	9.2
N.	Templates/forms of communication processes	23.7	32.1	**38.2**	6.1

Source: own study.

Analyzing the overall profile of the used support in the field of communication it can be observed that the higher rate of indications characterizes fields belonging to the column no. 2 of the morphology matrix (for 8 of 14 examined variables). One can draw a preliminary conclusion that the respondents use some support in the areas of communication, but they are rather basic than comprehensive forms. This is the case for the following areas of communication:

a) **initiating communication** – 42.7% of respondents diagnose key project stakeholders without preparing their characteristics or a strategy to involve stakeholders,
b) **stakeholder analysis techniques** – 45% of respondents use only a descriptive analysis of the stakeholders, without the use of an in-depth stakeholder analysis,
c) **the rules of communication within the project team** – 61.5% of respondents discuss the principles of communication, however, adopted rules are not formalized,
d) **identification of the risks associated with communication and stakeholders** – 49.2% of the respondents generally discuss the risks associated with communication, without developing a plan of prevention,
e) **communication with stakeholders during the project** – 45.8% of respondents provide project information *ad hoc* when the need arises,
f) **monitoring the needs and expectations of stakeholders** – 49.2% of respondents monitor them *ad hoc* when the need arises,
g) **documentation of the knowledge acquired in the field of communication** – 35.9% of respondents indicate that although their organizations accumulate project experience, they do not cover the area of communication,
h) **the use of project experience in the field of communication** – 59.5% of respondents indicated that they benefit from the experience of the project when the need arises,

The areas in which respondents indicated the use of the most sophisticated and complex forms of support include:

a) **kick-off meetings** – 42.4% of indications for the participation of the entire project team, the project manager and key stakeholders,
b) **planning of communication** – 36.3% of respondents specify what information will be needed, how often, in what form and by whom it will be communicated to key stakeholders,
c) **monitoring and management of difficult issues** – 50.8% of respondents discuss, prioritize and resolve the difficult issues together with the project team.

For any of the areas related to communication, indications in the column numbered 1 were not characterized by the highest frequency. However, among three problem variables, the answers in this column were the second most common indications:

a) **stakeholder analysis techniques** – 33.6% of respondents do not apply at all stakeholder analysis techniques,
b) **identification of the risks associated with communication and stakeholders** – 29.8% of respondents indicated that this process does not occur,
c) **use of project experiences in the field of communication** – 19.1% of respondents indicated that is not the case.

9.8.1. Profile of Support in the Field of Communication and the Respondent's Experience

Statistical analysis revealed the statistically significant correlation between the level of experience in project management and some communication management areas in the research sample (areas are listed according to a decreasing rsp Spearman coefficient value):

- use of templates/forms in the communication processes N (rsp = 0.245; $\alpha^* = 0.000$),
- communication planning D (rsp = 0.239; $\alpha^* = 0.000$),
- identification of the risks associated with communication and stakeholders F (rsp = 0.218; $\alpha^* = 0.000$),
- rules of communication in the project team E (rsp = 0.204; $\alpha^* = 0.001$),
- stakeholder communication during the project G (rsp = 0.154; $\alpha^* = 0.012$),
- kick-off C meeting participants (rsp = 0.148; $\alpha^* = 0.017$),
- communication initiating A (rsp = 0.143; $\alpha^* = 0.021$).

A positive correlation of rsp coefficients was obtained for the above-mentioned areas. It means that the higher the respondent's experience in project management is, the more complex tools and processes for communication management are used. The resulting correlation rsp coefficients values are however small (within the range of 0.143 to 0.245), which indicates that the relationship in the research sample is not very strong, although it is statistically significant. In addition, it is worth noting the value of the reliability of the correlation, which is statistically highly significant for areas such as communication planning, principles of communication within the project team and identification of the risk associated with communication and stakeholders (significance has a value of 0.001 and lower).

Interestingly, the correlation was identified between the respondent's greater experience in project management and using more complex forms in processes such as: initiating, planning and implementation of communication while one did not find dependencies with completion communication of the project. It can be concluded that the greater experience in the project is, the more importance to the proper preparation and implementation of communication is given.

While the study found a relationship between experience and realization of communication in the project, however a correlation between experience and using more advanced techniques during the project, e.g. such as monitoring the needs and expectations of stakeholders, monitoring and management of difficult issues or reporting on the work progress, has not been identified. The relationship between increasing experience and the collection and use of project experience in the field of communication has not also been identified.

9.8.2. Profile of Support in the Area of Communication and the Level of Intensity of the Projects in the Activities of the Organizational Unit

Statistical analysis revealed the presence of a statistically significant correlation between the level of intensity of the projects implemented in the activities of the organizational unit and the following areas of communication management (areas have been arranged by decreasing value of rsp Spearman coefficient):

- use of templates/forms in the processes of communication N (rsp = 0.260; $\alpha^* = 0.000$),
- reporting the progress of the work J (rsp = 0.236; $\alpha^* = 0.000$),
- communication about project completion K (rsp = 0.225; $\alpha^* = 0.000$),
- stakeholder communication during the project G (rsp = 0.198; $\alpha^* = 0.001$),
- rules of communication in the project team E (rsp = 0.192; $\alpha^* = 0.002$),
- monitoring the needs and expectations of stakeholders H (rsp = 0.191; $\alpha^* = 0.002$),
- communication planning D (rsp = 0.190; $\alpha^* = 0.002$),
- monitoring and management of difficult issues I (rsp = 0.182; $\alpha^* = 0.003$),
- documenting knowledge acquired in the field of communication L (rsp = 0.176; $\alpha^* = 0.004$),
- initiating communication A (rsp = 0.175; $\alpha^* = 0.004$).

Positive values of rsp correlation coefficients have been achieved for above areas. This means that the higher the level of intensity of the projects in an organizational unit is, the higher the complexity and comprehensiveness of the indicated processes and tools in the area of communication are. The resulting values of rsp correlation coefficients are in the range of 0.175 to 0.260. Values are low, indicating that the correlation is not strong in the sample, although statistically significant.

In the sample, the intensity of the projects had the greatest influence on the processes and tools of communication in the project (the positive correlation one identified for up to 10 of 14 areas).

Interestingly, although there is a relationship between the increase in the intensity of the projects and the documentation of the acquired knowledge in the field of communication, there is no such a relationship between it and the use of project experience in the field of communication. This may indicate that the organizations in the research sample do not use knowledge and experiences from other implemented projects.

9.8.3. Profile of Support in the Area of Communication and the Average Duration of Projects and the Number of People in the Project Team

The obtained results indicate the occurrence of a statistically significant correlation between the average length of life of the projects carried out in the organization unit, as well as the number of members of the project team and the following two areas of communication management:

- rules of communication in the project team E,
- identification of the risks associated with communication and stakeholders F.

For these areas a positive values of rsp correlation coefficients has been achieved: the longer the projects in the organizational unit are and the larger the project team is, the more specified the rules of communication in the project team are and more detailed the identification of the risks associated with communication and stakeholders is.

In addition, with the increase in the number of people in the project team, one approaches more comprehensively the communication with stakeholders during project implementation, monitoring and management of difficult issues, one uses a more formalized approach to reporting the progress of work, as well as one uses to a greater extent templates and forms in the process of communication.

For both variables there was no correlation with the areas associated with more complex initiating, communication planning, or reaching out to the techniques used in those stages.

9.8.4. Profile of Support and Other Explanatory Variables

In a situation where the explanatory variable has a nominal character, one uses a chi-square independence test to investigate the occurrence of a statistically significant stochastic relationship between variables. Cramer's V convergence coefficient was calculated to determine the stochastic strength of correlation of features in the sample[18]. The obtained values of correlation are relatively small (coefficient values range from 0.176 to 0.365), indicating that the correlation in the sample is not strong, but statistically significant. Below there are the most correlated variables in the research sample, for which the Cramer's V coefficient has a value above 0.2, and their interpretations:

[18] This analysis, however, could not be fully carried out due to not meeting the condition of the test for some variables from the communication management area.

a) the application of project management methodology in the organization is associated with a use of more comprehensive and complex solutions in the field of communication planning (V = 0.232; $\alpha^* = 0.003$), as well as initiating communication (V = 0.209; $\alpha^* = 0.011$).
   Analysis of universal project management methodologies shows that they take into account and highlight the importance of proper preparation of the project manager and his team for the project realization, with an emphasis on initiation and communication planning. Thus, respondents in organizations that use project management methodology, use more comprehensive and complex solutions in the initiation and communication planning phases.
b) The functioning of the project management office is associated with the use of standardized templates and forms in the processes of communication involving a larger number of project communication issues (V = 0.274; $\alpha^* = 0.000$), as well as more complete establishment of the principles of communication within the project team (V = 0.213; $\alpha^* = 0.009$).
   The task of project management office is to maintain continuity in the environment of implementation of time-limited projects and project management support from the point of view of the organization as a whole. The results of the study seem to be consistent with the objective, which is put before the project management office.
c) Providing trainings within project management in the organization is associated with more complex processes of communication completion in the project (V = 0.218; $\alpha^* = 0.007$).
   Trainings on project management, which often rely on a variety of methodologies and standards of project management, probably draw attention to the whole area of communication management, including the communication completion.
d) The use of the software or project management system in organizations is associated with a more comprehensive documentation of the knowledge acquired in the field of communication (V = 0.365; $\alpha^* = 0.000$), the use of more complex techniques of stakeholder analysis (V = 0.247; $\alpha^* = 0.001$), the use of templates/forms covering more fully the issues of communication (V = 0.218; $\alpha^* = 0.007$) and more advanced forms of communication initiating A (V = 0.212; $\alpha^* = 0.009$).

The use of project management software facilitates the collection, distribution, storage, searching and disposal of project information. Thus it allows reaching out to the more advanced and complex techniques in the area of communication management.

9.8.5. Relationships Between the Areas of Project Communication Support

The study also revealed the existence of the mutual, internal interdependencies in the application of processes project communication management tools. For four pairs of variables in the areas of communication management the interdependency between attributes can be defined as moderate or even as strong:

e) communication initiating (A) and techniques of stakeholder analysis (B) – rsp = = 0.643; $\alpha^* = 0.000$.

The more comprehensive way to identify stakeholders in the project is, the more comprehensive and complex ways of collecting and analyzing information about stakeholders are used in the projects. It seems that the collection of more detailed and diverse information requires more standardized approach and help of techniques for their correct systematization and to allow proper conclusions.

f) documentation of the knowledge acquired in the field of communication and the use of project experience in the field of communication – rsp = 0.565; $\alpha^* = 0.000$

The more systematically project experiences in the field of communication are collected, the more frequent and more organized the use of project experience in terms of communication is.

g) communication planning and communication with stakeholders during the project – rsp = 0.545; $\alpha^* = 0.000$.

The more detailed the scope of recognizing the communication needs of stakeholders and identification of communication ways in the project are, the more comprehensive and orderly manner in which the communication implementation process and way of sharing information with stakeholders are.

h) communication initiating and communication planning – rsp = 0.505; $\alpha^* = 0.000$.

The more accurately the stakeholders of the project are recognized, the more information about them is gathered, the more fully defined and determined the communication needs of stakeholders and better described way of communication are.

9.9. Conclusions

Communication is an important part of project management. Studies show that professional communication during the project significantly increases the efficiency of projects and improves project results. In contrast, the lack of professional communication support at any stage may lead to problems in project, and in consequence to the failure of the project. Methodology and project management standards often

indicate communication as a key success factor and relate in some way to support areas of communication in the project, as well as good organizational practices in this field.

Organizations and project management professionals have at their disposal a variety of means of communication support in the project, hence the attempt to evaluate what support in the area of communication is used by project participants and on which factors it depends.

The developed tool enables the assessment of the complexity of the support used in the field of project communication. Assessment model can be used in the practice of project management, among others, for audit of how communication is supported in the project. Thus enabling identification of areas related to communication or processes, instruments and project experiences, in which the support is minimal.

The extension of the conducted studies would be to identify the scope of support in the area of communication, which is optimal for the projects as well as to verify whether the industry determines in some way the profile of the use of support in the area of communication. It would be valuable also to develop ways and measures of project communication management audit or factors of effective communication in project management. Among other directions of research one should also point out: the analysis of the specificity of communication in various project structures, or effectiveness of the media.

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Krzysztof Wąsowski

10

PUBLIC-PRIVATE PARTNERSHIP IN POLAND – ANALYSIS OF THE FIRST PROJECTS IMPLEMENTED IN POLAND FROM THE PROJECT PERSPECTIVE

10.1. Public-Private Partnership – Project Perspective

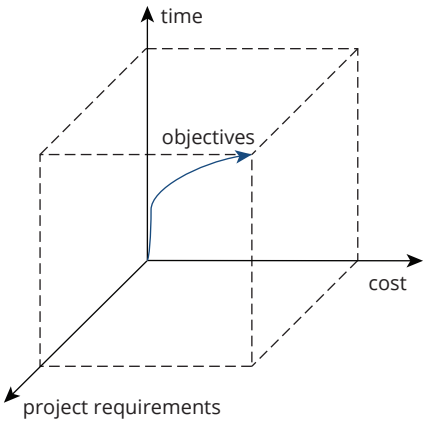
Public-Private Partnership (PPP) in the world's practice and in the literature is perceived and analyzed on different levels, as a specific form of cooperation of public and private sector in the implementation of the tasks which are traditionally the domain of the public sector. Realization of investment projects by public entities in the formula of Public-Private Partnership has a strictly project nature. Partnership projects have a complex organizational structure, including the public sector and usually a group of private entities organized in the form of a consortium. Financial sector that provides funding and many stakeholders representing complex environment of partnership project have a high influence on projects. Organization of PPP projects is a complicated undertaking, determined mostly by the complex procurement procedure involving a long process of negotiations with several bidders. The projects are multi-level and long-term (time horizon of up to several decades), and each of the phases of the implementation of the project involves a risk for both parties involved. Thus, the potential analysis of the PPP phenomenon should take into account the project dimension of the partnership.

Analysis of considerations on the nature of the project in the literature allows one to define a project as complex undertaking of a unique character, including coordinated actions of a unit or more often an organized group of people (the project team), time-limited (defined beginning and end), characterized by a specific budget, implementation schedule (actions divided into stages), the objectives and results and demands on their quality and ways to achieve them[1]. The relationship

[1] E.C. Frigenti, *The practice of project management: a guide to the business-focused approach*, Kogan Page Publishers, London – Milford 2002, pp. 9–13; N. Howes, *Modern Project Management. Successfully*

between time, cost, requirements and objectives of the project in the literature are most often described by the following function (Figure 10.1): f (goals) = (time, cost, project requirements).

Figure 10.1. The Relationship Between the Objectives of the Project and Time, Cost and Project Requirements



Source: own study based on J.S. Nicholas, *Project management for business, engineering, and technology: principles and practice*, 3 rd edition, Butterworth-Heinemann, Burlington–Oxford 2008.

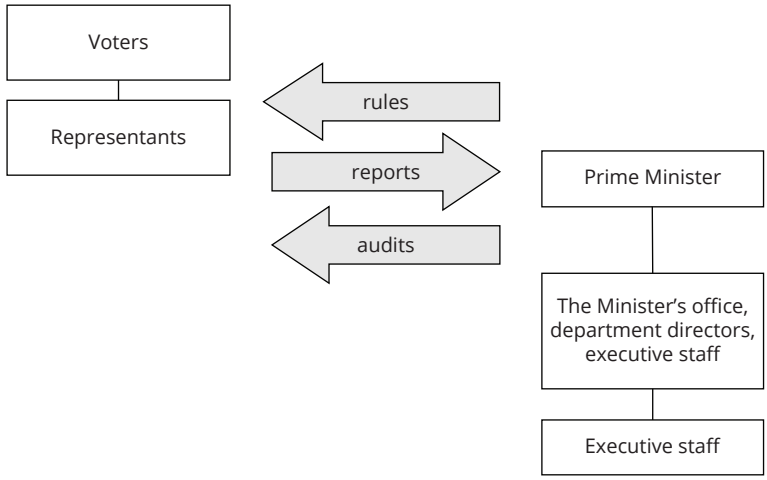
Analysis of the nature of the project in the context of the PPP should be extended with a specific public dimension. The study[2] separated two characteristics that distinguish public project. Public projects are controlled by elected authorities and are financed by taxes and fees. PPP projects do not, however, have only the public nature and narrowing the analysis of public projects only to PPP requires a different approach. The authorities chosen in modern democracies at the central level have a limited impact on PPP projects implemented in the country. They do not also participate directly in the projects, and at most are responsible for formulating policy framework in terms of partnership market and in general for the state of the

Integrating Project Management Knowledge Areas and Processes, AMACOM, American Management Association, New York 2001, pp. 11–12; A. Lester, *Project Planning and Control: Managing Engineering, Construction and Manufacturing Projects to PMI, APM and BSI Standards*, Fourth Edition, Butterworth-Heinemann, Oxford – Burlington 2003, pp. 1–4; D. Lock, *Project Management*, Eight Edition, Gower Publishing Limited, Hampshire 2003, pp. 4–6; H. Maylor, *Project Management*, Third Edition, Pearson Education, Harlow 2003, pp. 4–6; M. Trocki, B. Grucza, K. Ogonek, *Zarządzanie projektami*, PWE, Warszawa 2009, pp. 17–20; M.K. Wysocki, *Effective Project Management: Traditional, Adaptive, Extreme*, Third Edition, Wiley Publishing Inc., Indianapolis 2003, pp. 3–6.

[2] *Government extension to A guide to the project management body of knowledge (PMBOK Guide)*, 2000 edition, Managing Government Projects, Project Management Institute, Newtown Square–Pennsylvania 2000.

country's infrastructure, in particular of the nationwide character[3]. Tasks are usually ceded to the appropriate public agencies or local and regional authorities. The latter are also often chosen in general elections and thus their responsibility within the implementation of projects has a much greater impact on preferences and decisions of voters. The general scheme of the relationship between voters and the authorities is shown in Figure 10.2. A detailed picture of these relationships is derived in relation to the political and administrative system prevailing in the country where the project is being realized and the level (central, regional, local), on which the project is implemented.

Figure 10.2. Network of Relationships in Public Project



Source: own study based on *Government extension to A guide to the project management body of knowledge (PMBOK Guide)*, 2000 edition, Managing Government Projects, Project Management Institute, Newtown Square – Pennsylvania 2000.

In the case of PPP also a way of funding does not correspond to the classical meaning of public project, since in many projects there is a source of financing in the form of fees from recipients of services and infrastructure. For some projects, for example, implemented under the licensing system, usually there is no financing from public funds at all. In this dimension within defining public projects one mentions responsibilities of the project manager in achieving the objectives of the representatives elected by the voters. These objectives are reported by the voters and it is

[3] The government in most countries is not directly involved usually even in the largest projects. Despite the fact that these projects are dealt with by separate agendas, they are directly dependent on the government and thus he carries sole political responsibility.

assumed that they will be funded under the budget coming from taxes. This type of direct impact on the line electors – representatives – project manager is in the PPP extremely rare, usually only at the level of projects of a local character.

Analysis of the project in the context of PPP apart from the public dimension should be extended with the construction aspect, because the vast majority of PPP projects includes a component associated with the construction, expansion or modernization of facilities and infrastructure. Garold Oberlander introduces the concept of ordering party into the definition of a construction project[4]. In this perspective, the project is an undertaking aimed at providing certain results, which are expected by ordering party. In the construction dimension these results contain the architectural design and/or the execution (construction). The construction project includes the scope of work to be done, a budget expressed in monetary units and man-hours and the implementation schedule, understood as a sequence of specific actions needed in order to achieve the objectives of the project. In the PPP project public sector is the ordering party, while the object of the contract is usually far more complex than indicated above areas of design and construction, as it is often related to the provision of services based on the above components. The project in construction understanding is therefore mostly integral component of the PPP project (construction phase), however, it is only a part of the wider project.

From the point of view of construction companies, participating in the PPP project has no particular dimension, because the whole sector activity has a project character (*project-based industry*)[5]. Companies in the framework of their activities undertake many time-extended projects, requiring different actions and geographically diversified. Most of these projects are individualized and implemented in accordance with the requirements and customer specifications. These features fully correspond with the characteristics of the PPP project, and construction companies are therefore one of the best prepared to fulfilling the contract obligations of the partnership project.

In terms of PPP project, areas of routine, of repetitive nature for the participants, e.g. in respect of the supply of materials appear there. Suppliers and other indirect PPP participants from the industrial sector in the implementation of the projects rely more on the specific rules for implementing the industrial projects (*industrial project management*) [6]. The specificity of industrial projects and management issues to a limited extent relates only to the PPP, usually only in terms of the exploitation phase.

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[4] G. Oberlander, *Project Management for Engineering and Construction*, Second Edition, McGraw Hill Books Co., Boston 2000.

[5] R. Fellows, D. Langford, R. Newcombe, S. Urry, *Construction Management in Practice*, Second Edition, Blackwell Science, Oxford 2002, p. 3.

[6] A.B. Badiru, *Industrial Project Management: Concepts, Tools, And Techniques*, Crc Press, Boca Raton 2007.

To summarize the above considerations, in practice, only a few authors define PPP not as a specific form of cooperation sectors, but literally as a project. It is done, for example, by Mary Rose Brüsewitz: "PPP are medium- and long-term projects, in which there are contract and legal relationships between the public and private sectors. PPP refers to projects that involve collaboration between the public and private sectors in one or more areas such as development, construction, management (exploitation), property or asset financing of an infrastructure character or the provision of services"[7].

Based on the above analysis of the nature of the project in general, the public and construction sector, one can characterize the PPP phenomenon in the project context. John M. Nicholas separates seven major characteristics of each project, in which PPP can be synthetically enclosed[8]. These characteristics, together with a reference to the specificity of PPP are presented in Table 10.1.

Table 10.1. Basic Characteristics of the Project and the PPP Specificity

Area of project's definition	PPP specificity
Goal, outcomes, final results	provision of certain services, with defined parameters and quality, at the intended level of availability (supply-side aspect)
The uniqueness of action	combination uniqueness of factors such as location, the requirements specificity in terms of services, the engagement of different subjects
Limitation in time	strict time schedule of PPP implementation, established moment of completion of the project in the PPP contract
Penetration of activities, competencies and decisions through the organizational and functional division of participants' organization	scale and complexity of PPP require the involvement of many parties and individuals, and within those, different organizational units of public and private sector
Risk	PPP generates a high level of risk in many areas for all involved parties
Areas of benefit / loss of participation in the project	PPP is associated with a number of potential benefits for the parties involved, and may have a negative impact on the parties involved in the case of failure in the implementation of the project
Process, life cycle	Easily identifiable stages of the PPP with clearly defined boundaries between different phases of project implementation occur there

Source: own study based on J.S. Nicholas, *Project management for business, engineering, and technology: principles and practice*, 3 rd edition, Butterworth-Heinemann, Burlington – Oxford 2008.

[7] M.R. Brusewitz, *Public-private partnerships in the United States*, "Project Finance", December–January 2005, p. 71.

[8] J.S. Nicholas, *Project management for business, engineering, and technology: principles and practice*, 3 rd edition, Butterworth-Heinemann, Burlington–Oxford 2008.

The project, based on the specific characteristics assumes a defined goal, final effects and results that can be measured in the form of costs, schedule and specific project requirements. The PPP project's objective is to provide the services, with defined parameters and quality, at the intended level of availability. The construction of certain facilities, infrastructure is an extremely important stage of the project, but does not constitute its proper and ultimate purpose, which is the case with traditional public procurement in the area of infrastructure. Each PPP project, after closing the tender phase and selecting the best offer, has a specific timetable for implementation, defined budget and requirements concerning the performance of the project, included in the PPP contract. PPP project looks different, however, from the perspective of its participants, including in particular public and private sector. Although partial goals and expectations of certain entities involved in the project can be divergent, the PPP agreement, however, imposes minimum requirements and standards, and thus automatically the enforcement activities that contribute to the achievement of the desired intermediate stages of the project and final objectives.

The project has a unique dimension and requires actions and activities that were not previously undertaken or will not be undertaken in a given configuration. In the PPP project due to its scale and scope, there are many variables such as location, time (degree of technological and financial development of a market), the current legal status, constituted project team, the required parameters of the project, which give it always a unique form. Even the attempts of standardization the scope of the PPP market (contract issues, funding models, technological solutions) have a limited use in practice, which leads to the uniqueness of each project.

Projects have a temporary nature, which involves creating a temporary group of people and allocating specific resources within the framework of the tasks. After reaching the objectives of the project, team is disbanded, and the unused resources reallocated to other projects. In this dimension of defining a PPP project, the first phases of the project, i.e. planning, tender and construction are time-limited and have a strictly project character. As signaled earlier, questionable may be the definition and assignment of the operational phase, due to the duration (up to decades) and high repeatability of activities in this phase. Taken as a whole, despite the fact that it is spread out in time, it is an integral part of the project and in the analysis of PPP in project context it must be considered as a project component.

Projects permeate the organizational and functional divisions of identified participating units. They also require interdisciplinary skills and people who meet various functions in organizations, representing different competencies. In the case of PPP, of which contract arrangements concern several areas such as law, economics and engineering sciences, one requires a cooperation of many specialists from various fields, who in the organizations have different functions at different levels of competence.

Due to the uniqueness of projects, they are accompanied by a great deal of uncertainty and risk. This is related to, among others, the use of new technologies and processes in the project. PPP is accompanied by a lot of risk categories whose proper identification and allocation to partners are a key factor in the success of the project implementation. The essence of PPP implementation involves, among others, using innovation both in terms of organization and project management, as well as innovative solutions in the architectural, ecological, technical and technological dimension.

In the case of the project, participating organizations can potentially get a lot of benefits. However, if the project fails, they risk losing not only the specific benefits, but also resources allocated to the project. Therefore, organizations have to add a special effort in the field of project management. In this aspect, defining the project should be divided into two dimensions, i.e. public and private. The functioning of the public sector in the PPP has a specific, non-market dimension. Gross negligences in the project are associated almost exclusively with political responsibility, and only in extreme cases with administrative or penal sanctions. Moreover, the PPP project may be an important area of activity of the public entity responsible for the PPP contract, but non-exclusive and sole. The failure of the project has therefore a limited impact on the functioning of the public entity. In the case of private sector benefits and risks of participation in the project are associated with the volume of business of entities involved. Mostly, however, the project is only a part of a broader project portfolio of consortium participants. Culpable failures in a project usually mean a damage to business reputation and measurable financial losses. In extreme cases, the end of the contract in the case of companies with a small project portfolio may result in a bankruptcy.

The project has a process character and is characterized by a certain life cycle, under which it passes through different identifiable phases. Phase of the project requires the implementation of various tasks and the involvement of employees with different competencies representing the various parties involved in the project. In the literature there is a consensus now that each project has a specific life-cycle (*project life-cycle*) [9]. However, due to the complexity and diversity of projects, one has not yet created a universal and reference model of the project life-cycle, which would reflect the unique specificity of the implementation of the majority, and much less all projects. Researchers, practitioners and think tanks propose in this respect

[9] H. Kerzner, *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, 10th edition, John Wiley & Sons, Inc., New Jersey 2009; M. Trocki, B. Grucza, K. Ogonek, *Zarządzanie projektami*…, op.cit.

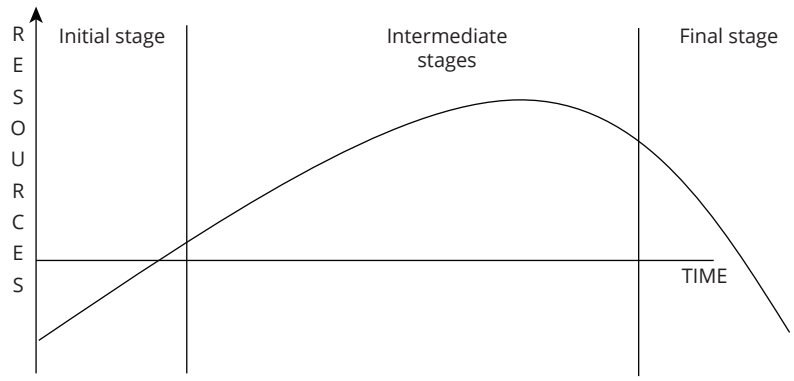
slightly different models. In some guidelines for the project management[10], it was found that the life-cycle of the project can be standardized at the level of the organization, specific sectors of the economy and by the same project managers according to their needs and recognition. The criteria for the division of certain phases are the derivatives in respect to the specific nature and size of the projects, generated risk, cash flow, the level of involvement of stakeholders in the project and other factors.

Most of the stages in the project determine[11]:

a) the scope of work carried out in the given stage,
b) the scope of the goals set for each stage and how the degree of their achievement should be verified,
c) the number of entities that are involved in the current stage of the project,
d) the way in which a stage is controlled and how the user authorizates achievement of the objectives and the transition to the next stage.

In view of the foregoing, the closure of a particular stage should be characterized by an accomplishment of assigned partial goals for a given stage of the project. Model division of the project life-cycle (initial stage, the intermediate stages, the final stage), with regard to the average, for the most projects, level of commitment of the necessary resources (funds, staff), are shown in Figure 10.3.

Figure 10.3. Stages of the Project with Regard to the Use of Resources



Source: own study based on *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, Fourth Edition, Project Management Institute, Newtown Square–Pennsylvania 2004.

[10] *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, Fourth Edition, Project Management Institute, Newtown Square–Pennsylvania 2004.
[11] Ibidem.

Halim Boussabaine and Richard Kirkham for the needs of analysis of whole life cycle costing of investment projects, which also applies in the case of PPP, divided the project into five phases[12]: substantiating the investment for the customer and his requirements, conceptual project development, design phase, production phase (construction), the operational phase, end of economic life phase. Slightly different is the project life cycle from the perspective of the public sector. The guidelines for public projects are separated into three basic phases, i.e. initiation, planning and design, and public procurement[13]. In the first phase it comes to the development of basic documents and project plan as a basis for application for budgetary resources. During the planning phase one prepares tender documents. In the third phase one organizes public procurement and the proper execution of the project. This division, however, seems to be more feasible for the market of traditional procurement, rather than PPP projects.

As a part of the analysis of the various guidelines for the division of the construction project into phases Nigel Smith, Tony Merna, and Paul Jobling state that the number of phases ranges from 2 to 12[14]. Furthermore, analogous phases in the area of content and scope of activities are called differently by various authors and analysts. Most often in the construction project one allocates the following phases: initial feasibility assesment (*pre-feasibility*), feasibility assesment (*feasibility*), the development of the project (*design*), contract/procurement, implementation, commissioning, handover and operation. Due to the complexity of construction projects, in practice phases are further divided, in particular it concerns the implementation phase[15].

In most PPP one can separate four main phases of the project implementation: initiation and planning, procurement, construction and operational. Framework overview of the PPP implementation phases of the project was presented in Table 10.2.

Each PPP phase (Tab. 10.2) requires a different level of commitment of the project participants. Phases are characterized by a different degree of use of material resources allocated to the project. Due to the high complexity of the PPP, the division into four phases of the project has a framework character. Each of the main stages is further divided into sub-steps, as appropriate for the needs of party responsible for the implementation of the phase.

[12] H. Boussabaine, R. Kirkham, *Whole life-cycle costing: risk and risk responses*, Blackwell Publishing, Oxford–Malden–Carlton 2004.

[13] *Government extension*…, op.cit.

[14] N. Smith, T. Merna, P. Jobling, *Managing risk in construction projects*, Blackwell Publishing, Oxford–Malden–Carlton 2006.

[15] H. Sommer, *Project Management for Building Construction*, Springer, Heidelberg 2010.

Table 10.2. Framework Division of the PPP Project Implementation Phases

PPP design phase	Initiation, planning	Procurement	Construction	Operational
Average time of duration	2–3 months – 1 year	3 months – 2–3 years	6 months – 2–3 years	3–5 years – 30–50 years
The main scope of activities characteristic of the given phase	analysis of the feasibility of the project in the form of PPP, adequate PPP model selection to the specifics of the project	procurement procedure, negotiations with the bidders, the choice of the best offer	construction works related to the subject of the PPP contract, i.e. the construction / expansion / modernization of the facility / infrastructure	provision of services on the assumed in the PPP contract level of supply and quality
The criteria for the completion of the phase, the required results determined for a given phase	preparation of procurement guidelines, organization of procurement	selection of the winning tender and the signing of the PPP contract	completion of work, commissioning, start of operation	termination of the PPP contract, the transfer of infrastructure / facilities to the public sector, or signing another management contract
Generated risk (treated in general)	low	medium	High	medium, decreasing over time
The allocation of resources (funds) public sector private sector	medium no or low	medium medium	low or no high	medium – spread over time low, medium – spread over time
The allocation of resources (human resources) public sector private sector	medium no or low	high medium	low high	low low or medium

Source: own study.

10.2. Goals, Scope and Used Research Method

The primary objective of the carried out PPP study was an attempt to capture the general characteristics of PPP undertakings implemented in Poland from the broadest possible project perspective. This chapter focuses on the presentation of research results and conclusions within the PPP project management from the perspective of the public sector. The survey was conducted in the form of a case study analysis. Analysis of a case study is currently important in the study of the PPP market and one can identify many examples of its application in the world[16]. In Poland a lot of case

[16] C. Lattemann, S. Stieglitz, S. Kupke, A. Schneider, *Impact of PPPs to broadband diffusion in Europe*, Transforming Government, "People, Process and Policy" 2009, vol. 3, no. 4; M. Handley-Schachler,

study researches have not been conducted yet, however, method or its elements are used to study the PPP[17]. To a large extent, PPP project research focuses on the use of qualitative methods, in particular in the case study, is dictated by the problem of lack of financial data in terms of the PPP market and its still opened cycle of realization of a specific group of projects that could potentially be a test sample for quantitative studies. This problem especially concerns the Polish market.

The conducted study included four projects:

- Construction of an underground parking, along with the necessary infrastructure under Nowy Targ Square in Wroclaw and the pavement of the square and its development[18];
- Design, construction and operation of an underground parking on the Square on Groblach in Cracow[19];
- Construction of the cemetery in Podgorki Tynieckie in Cracow with the ceremonial building and cremation facility[20];
- Development of the railway station in Sopot and adjacent areas, with the participation of private entities[21].

The main source of information was semi-structured interviews with employees of the City Offices directly involved in the projects. Interviews were conducted with members of the project teams. From 3 to 6 interviews have been carried out for each project and they lasted between 1–5 hours. Interviews were supplemented with a detailed analysis of the project documentation provided by the public authorities. The documentation review conducted earlier on the basis of the submitted documents and during visits on the documents available only for inspection contained also a detailed analysis of, among others:

S.S. Gao, *Can the private finance initiative be used in emerging economies? – lessons from the UK's successes and failures*, "Managerial Finance" 2003, vol. 29, no. 5–6; T. Lemos, D. Eatonb, M. Bettsb, L. Almeida, *Risk management in the Lusoponte concession: a case study of the two bridges in Lisbon, Portugal*, "International Journal of Project Management" 2004, vol. 22, no. 1; C. Hurst, E. Reeves, *An economic analysis of Ireland's first public private partnership*, "International Journal of Public Sector Management" 2004, vol. 17, no. 5; S. Trafford, T. Proctor, *Successful joint partnerships: public-private partnerships*, "International Journal of Public Sector Management" 2006, vol. 19, no. 2.

[17] E.g. K. Kula, *Termomodernizacja obiektów publicznych w trybie partnerstwa publiczno-prywatnego na przykładzie Miasta Radzionków*, Polish Foundation for Energy Efficiency, 2011.

[18] The concessions agreement for construction works No. 237/2010 concluded on 16 July 2010 for "Construction of underground parking, along with the necessary infrastructure under Nowy Targ Square in Wroclaw and the pavement of the square and its development", Wroclaw City Office, Wroclaw, 2010.

[19] Agreement No. W2/151/GO/5/2006 on the concession for the design, construction and operation of underground parking on the Square on Groblach in Cracow, Cracow City Office, Cracow 2006.

[20] The concessions agreement for construction works WII/46/WJ/17/2011 of the cemetery in Podgorki Tynieckie in Cracow with the ceremonial building and cremation facility, Cracow City Office, Cracow 2011.

[21] Agreement on public-private partnership for a project involving the "Development of the railway station in Sopot and adjacent areas, with the participation of private entities" dated 23 January 2012, Sopot City Office, Sopot 2012.

a) a) strategic/ planning documents for the development of the investment policy of the studied cities,
b) b) analyzes prepared by external consultants or of internal nature in terms of PPP form profitability selection within the framework of the project in relation to other available options,
c) c) tender documentation in the field of project, in particular information provided to potential investors/contractors, notices of proceedings, in particular contract notices posted electronically in the Official Journal of the European Union, the terms of reference (TOR), protocols of negotiations with bidders,
d) d) signed agreements on the project along with attachments,
e) e) the agreements governing the relations between the public sector and external consultants involved in the project, including the conducted proceedings on selection of consultants,
f) f) the internal regulations of the work of organizational units of City Offices, including the scope of duties of people involved in the project,
g) g) resolutions of the City Council/President on all aspects of projects, including the appointment of project teams/tender committees and their functioning,
h) h) any information on the projects posted on the Internet and in the local press, in particular the description and comments about the project from the point of view of stakeholders and people without expert preparation concerning projects.

The first researched project in Wroclaw includes the construction and operation of a parking lot in the form of concession. Scope of the concession included the development of the concept and design documentation, including obtaining building permits, preparatory work and execution of all construction works related to the object, i.e. at least two-storey underground car parking for min. 300 – max. 800 vehicles under Nowy Targ square. Contractor of the project is a consortium of several Portuguese entities and Polish company. The project is implemented under the provisions of the law on concessions. Its estimated value is 39 million PLN and implementation is planned for a period of 40 years. At the time of the study the contractor has already obtained a building permit and implemented construction phase.

The first researched project in Cracow covers the design, construction and exploitation of underground parking for 600 parking spaces on the Square on Groble. Contractor of the project is a Spanish company. The project is realized in the concession model, and its value is estimated at 63 million PLN. In the period of conclusion of the contract there has been no law on concessions dedicated to such projects yet. Therefore, the agreement is based on civil law, the Commercial Code, and the contractor has been selected in accordance with the provisions of the then public tender law. The researched parking project in Cracow is characterized by an unusually long duration of the concession, i.e. 70 years. The agreement on granting

the concession was concluded in November 2006, and now the project is, as the only researched, in the operational phase.

The second researched project in Cracow includes the construction of a cemetery with the ceremonial object and cremation facility in Podgorki Tynieckie. Contractor of the project is a consortium of Polish-Italian companies. The concession was granted for a period of 30 years, and the value of the project is estimated at 24.5 million PLN. At the time of the research, a project was in the initial construction phase, the operator was preparing to obtain a building permit. This project also has a high degree of pioneering character due to the thematic area of the project. It is an example of the innovative expansion of applying the partnership model. Firstly, in the Municipality of Cracow there are no cremation facilities functioning next to cemeteries. Secondly, Poland has not implemented a similar project in the concession model yet.

The last of the analyzed projects consisted of designing, financing and constructing, along with facilities fully equipped by the private partner (communication system, green areas and land development plan, the space for the functioning of the railway station, commercial buildings, two- or three-star hotel, underground car parks and ground car park) on the area of the railway station in Sopot and neighboring areas, and with the comprehensive maintenance and management of facilities. Contractor of the project is a Polish company, and its estimated value was set at the level of 100 million PLN. At the time of the research, a design phase was implemented, and the main contractor was preparing documentation to apply for a building permit. The project in Sopot is the largest (by value) and the most complex in terms of legal and technical projects among the researched undertakings. It is also the only researched project implemented on the basis of the Law on PPP and actually one of the first projects implemented in Poland in accordance with its provisions. It is therefore proven to be extremely valuable from an analytical point of view. Detailed study design is presented in Table 10.3.

Table 10.3. Used Research Procedure

Main research questions	Preliminary research questions	Preliminary research	Research problems	Main research	Hypotheses verification/ a reference to the outlined research problems
What are the prospects for the development of the PPP market in Poland, taking into account the analysis of the projects implemented in Poland?	What are the aspects of initiation and implementation of PPP projects in Poland that one should pay special attention to when planning the study, taking into account the worldwide theory and practice in the implementation of investment projects, in particular PPP?	Analysis of conditions of implementation of PPP projects on the basis of the worldwide theory and practice. Defining the framework and scope of the analysis. Development of the questionnaire for semi-structured interviews.	Creation of a model of the development of the PPP market in Poland in the field of local government projects (PPP scope, form, leading centers, the dynamics of the market).	Proper qualitative research – analysis in the form of a case study of four PPP projects.	Presentation of the results of the research on the shape of the market development.
What are the current market conditions for the development of PPP projects from the perspective of attempts to implement projects in Poland?	What criteria of selecting project research sample should one adopt in order to get the broad picture of the PPP project market in Poland?	Determining criteria for selection of projects for the research sample.	Identification of positive project practices in the field of PPP. Identification of current barriers for implementation of the projects.	Proper qualitative research – analysis in the form of a case study of four PPP projects.	Synthetic description of analyzed projects. Presentation of the results of the research concerning the conditions of project implementation.
	What is the current market of PPP projects in Poland? What projects are being implemented and what is their level of advancement?	Analysis of PPP project market in Poland. Identification of implemented projects and selection of four projects for the research sample, which reflects as widely as possible the specificity of the Polish PPP market.			

Source: own study.

10.3. Research Results

The process of initiating the implementation of PPP projects in urban centers was run in two ways. For many projects that are currently or will soon be implemented in partnership model, for many years one has searched for a suitable organizational form and for a way of attracting potential sources of financing, not affecting directly the level of debt of local governments. These projects were often not of a high priority. With the emergence of the real possibilities of their implementation in the PPP model, one decided to adapt or reformulate specific investment ideas in such a way that one could implement them in the form of a partnership. It should be emphasized that in this process, for each implemented project fall many projects, which for various reasons, despite the efforts, failed to be implemented in PPP model. The dominant reason for the rejection of the PPP model for this type of projects was the inability to create their legal and financial structure in order to be potentially attractive to the private sector. In particular, in terms of revenue generation, taking into account the estimated level of investment risk. It is a phenomenon characteristic of a PPP market and desirable from the point of view of prospects for its development. The more so that in the conducted research one did not identify the tendency of PPP projects abuse, which due to the nature and specific characteristics, are not suitable for implementation in the PPP model.

The second channel of idea generation for PPP projects implementation was, in the opinion of many interviewees, the same "legal opening" of capacities to implement projects in this model by passing the first, and then the current PPP law[22]. The emergence of a formula generated new ideas for projects in the public sector. It seems that taking into account the desired higher dynamic of the PPP market development, these two approaches are equally valuable and equally contribute to the development of the market. The increased number of ideas, initiatives and attempts of tenders translates directly into the number of successful tender procedures and functioning projects.

Scheme used to generate ideas for PPP is similar in the studied City Offices. The initiative of Presidents and Vice-Presidents usually responsible for the investment policy is of key importance. Also important are the opinions and ideas generated by the departments, or units responsible for the implementation of investment projects in the surveyed cities, urban planning and urban development planning. In selected cities, within the framework of special sessions organized in the formula of "brainstorming", one invites representatives of various City Office units and departments, and the authorities of municipal companies of various activity profile. During such

[22] The Act of 19 December 2008 on public-private partnership (Journal of Laws 2009 No. 19, item 100).

sessions they are considering the possibility of using PPP forms in already planned projects. Special departments dedicated to the coordination of all projects implemented in a given city supervised by City Office and the units responsible for strategic planning development of the city also have a significant impact on the implementation of specific projects. At the stage of generating ideas and vulnerability analysis of their implementation in the PPP form, one did not identify in the surveyed cities significant barriers to the application of the partnership. In addition, awareness of the availability of PPP option is widespread, and most public sector workers have undergone adequate training in this field.

The dominant form of partnership project management by the public sector in the studied cities is done by a specially appointed project teams most often called "negotiating board", or "the tender board". The number of members ranges from a few to a dozen people representing different areas of substantive project's functioning. Incidentally teams were also supported by representatives of other municipal units located outside the structures of City Office. The director, deputy director or head of department or City Office's unit responsible for urban investments usually take the role of managers (leader) of such teams. For large projects, this function is usually reserved for the vice-president responsible for the investment budget of the city. Often the establishment of such a team is done in a formal manner by the appropriate resolution of the President/City Council.

The above solution has been widely used in the researched projects. It is planned, however, that in projects with specific thematic profiles, project managers and key team members will be from outside investment departments. For example, in the framework of the planned projects for council housing and sports facilities, the leading role belongs to the directors or deputy directors responsible for housing or sports and tourism. They will be, however, supported by the knowledge and experience gained by the staff of the departments responsible only for the investment process, including through their participation in tender boards. It seems that now it is in these city's organizational units where much knowledge and experience in the implementation of the PPP is accumulated and the transfer of this knowledge is necessary from the point of view of initiating new projects. A similar process will have to take place for the planning and implementation of projects not directly by the City Office's organizational departments, but by separated municipal companies.

Establishing of the project team usually takes place in an advanced stage of initiation of the project, when a certain idea becomes more structured and it is planned to select advisors (usually through a formal procedure, sometimes considerably simplified in the case of contracts of lesser value). At this stage it is basically a foregone conclusion, that an attempt will be made to organize a tender in the formula relevant to the results of the analyzes. The appointed team is rotational, i.e. is composed of

specialists with the substantive knowledge and expertise on the different areas of the project. The team initially usually consists of several members responsible for the selection of advisors, the assessment of their analyzes and the selection of correct variant of implementation of the project (legal, technical and economic analysis), followed by a public presentation of the project offer.

The structure of a rotary project team with a permanent project manager and his deputy seems to be optimal, taking into account the time of the organization and implementation of the project in large urban centers. Taking into account the length of the process from the initiation phase (idea) to the phase of deriving benefits (operational phase) from the project (sometimes several years), it would be inefficient to create permanent and extended project teams. In the public sector for each of the projects one must, however, separate narrow groups of several people who at any time have a complete picture of the project and knowledge in the field of the proceedings and detailed arrangements with the contractor, which did not always take place in the studied projects. In some cases, there was a trend for a strong concentration of responsibilities and focusing knowledge on projects on a small number of employees. In the case of them leaving job or other random causes, this may adversely affect the quality of the project management process.

The mentioned common formal names of the project team actually reflect the enormous emphasis in terms of implementation cycle and project management by the public sector on the tender phase[23]. This has certain consequences from the point of view of project management cycle. The tender phase undoubtedly accumulates the greatest risk of the project from the perspective of the public sector and the involved public officials. In this phase it is agreed on the final shape of the project from the point of view of the public sector. This phase also carries huge legal and institutional risks for the public sector, as a possible procedure for checking the correctness of the project by the authorized institutions will be focused on this area of project implementation.

From the perspective of the public sector most tasks and potential difficulties in the implementation of PPP projects are cumulated in this phase, and it largely determines the success of the project. In practice it has been observed that the phases of initiation and analysis, construction and operational one are considered decidedly less important. That prospect remains debatable from the point of view of managing the entire life-cycle of the project. In the initiation phase of the project, when there are

[23] Signing of the project is its culmination. Such an understanding of the end of tender phase within the conducted research and submitted findings seems to be most appropriate. The very process of contract negotiation is often a very demanding and time-consuming, and has a huge impact on the final shape of the project. In addition, selecting the best offer and the contractor is not always identical with the signing of the project agreement.

carried out multivariate analyses, actually one determines the model of the project, making decisions affecting to a large extent its final shape. In the negotiation process one agrees on the issues of the adoption of detailed solutions, but the skeleton of the project and its overall structure are determined by the decisions taken in the planning phase. This points to its particular importance, since many decisions cannot be undone without serious consequences for the success of the project's implementation. Equally important are the construction phase and the beginning of the operational phase.

The highest level of broadly defined project risk when using a formula of partnership is generated by the construction phase, while this risk is largely transferred to the private sector. As part of the conducted research on the project management process, one has observed a strong orientation of public sector towards risk areas that have not been transferred to the private sector. This is an understandable phenomenon and it represents the essence of PPP. However, it creates a dual optics perception of the project in terms of risk generated by the project. It also affects directly the mentioned level of attention and allocated resources in the process of project management from the perspective of the public sector at various stages of the project. This means, in particular, in extreme cases, that actually in the implementation of a PPP project, from the perspective of good management practices of the project cycle and the allocation of risk, two parallel projects in which there are two parties, i.e. public and private sectors[24] are carried out. This problem is impossible to be completely eliminated, even with very advanced PPP markets in the world. The success of the development of these markets in the process of project management is determined, however, by their organization and regulation in such a way that the specific objectives of the implemented projects should be consistent for all parties, and the individual contract provisions should make it impossible to go beyond the designated common area of benefits included in detail in the PPP contract.

An interesting aspect, observed in the study, of cooperation in the sectors of project management in Poland, is the fact that the partnership project, despite the significant organizational and capital commitment of the private sector, is often seen as a project with a specific public status. This phenomenon has certain disadvantages (the problem of real allocation of project risks from the point of view of the public sector) and positive dimension and consequences for the private sector (for a potential investor and the contractor). In this area, the characteristic attitudes and behaviors of the parties have been observed, which indicates the formation of specific relationships

[24] It should be emphasized that the prospects of the private sector in this regard were not subject of research. In particular, the study did not enable an accurate determination of the level of potential integration of the project team in the public sector with the same group in the organizational structures of the private sector.

between sectors within the framework of the implementation of joint projects, which are constitutive for the PPP. First of all, the study found that the projects are often a priority for the public sector, including directly involved in them public officials. Taking into account the issues of prestige and time used for analyzes, the tender and signing the contract, the withdrawal of the private partner of the project would be seen as a major failure of the public sector. It affects the specific approach of the public sector to PPP projects. One can specify them as a kind of "privileged" projects in the portfolio of projects being implemented against other initiatives within the current legal regulations[25]. In interviews it was pointed out that the authority of the office of the President of the City is so big for parties involved that it may create, in more or less formal manner, certain administrative behaviors in the environment of the project, in particular accelerate certain decisions regarding the project or affect other public entities in the area of impact on the project.

For example, undoubtedly the implementation of construction phase is determined by the efficient process of obtaining a building permit. In this regard, the respondents pointed out that thanks to the intervention of public authorities, this process was accelerated for selected projects. The second important area in terms of negotiation phase of the terms of the project is to create and possibly change local land use plans according to the needs and expectations of private investors. In one of the projects under the negotiations there was a problem of supplementary exits and entrances to the parking lot, which potentially would significantly affect the profitability of the project (additional entrances from certain streets would allow to significantly increase the occupancy of parking). The local development plan has been expanded to include such options for the investor practically during the negotiations with the bidders within three months. In the opinion of interviewees it would be in practice extremely difficult for other projects. Another example illustrating the observed tendency, indicated during the interviews was the need to make many arrangements between agencies and municipal companies in terms of connections to the network and media delivery and cost estimation under the multivariate analysis of potentially available solutions. After the intervention of the city authorities, one was able to obtain the relevant data, interview the parties involved and realize the analysis virtually within one meeting. According to the interviewees, similar analysis of the projects, conducted only by the private sector could take in practice few months[26].

[25] Of no small importance is the fact that City Offices implementing projects based on PPP are seen as modern and highly innovative in Poland. This involves undoubtedly prestige for the city authorities.

[26] In the case of an efficiently functioning public administration this positive aspect would not have been revealed in the study, because theoretically all the problems of investors would be efficiently and competently solved. Officials themselves in the study repeatedly pointed to the great weaknesses in this area. One of the indicated solutions to face the issues in the case of PPP projects would be a formal

Taking into account the above considerations, one of the key success factors of PPP projects in Poland is undoubtedly giving them a high priority by the public sector. Such a high priority of PPP projects was basically the case for the entire sample. This phenomenon raises significantly the attractiveness of the perception of PPP project market by private investors, who see in it a good chance to effectively overcome potential legal and administrative difficulties occurring usually during the implementation of infrastructure projects. Unwanted and risky, however, is lack of estimation of administrative and political risks generated by the projects by the private sector. Excessive expectations toward the public sector in regard to the estimated impact on the environment of the project are also wrong. It is also difficult to say with certainty whether the observed phenomenon is permanent. In practice, the phenomenon may have a short-term dimension, related to the immaturity of the market and, together with its development and increase in the number of implemented PPP projects in Poland, it may be marginalized. Undoubtedly, however, it influences the current situation and environment of PPP projects in Poland and it should be included in any analysis of market partnership.

According to respondents high priority of projects should translate into strong mandate of the person directly involved in the negotiation process. Such a person does not necessarily have to be the direct manager of the project team, and the people involved in the negotiation process with the private sector must have a constant awareness that the process is supervised by a person of high authority and having the ability to make quick and binding decisions on behalf of the City Office. This person should also exercise direct control over the project after the completed negotiation phase and during the construction phase. The ideal candidate for such a function, taking into account personal qualities and professional qualifications, is a person who has worked in the private sector with experience in project management and negotiations, characterized by a high charisma. From the point of view of placing in the organizational structure of the city, the most right person is the vice-president responsible for the investment policy for large projects under the act on PPP, or the director of the unit responsible for municipal investments in smaller projects undertaken in accordance with the law on concession.

The formulation of the provisions of PPP contracts in Poland is of pioneer character. Public entities in Poland, to a small extent share their experiences in this regard, although the agreements themselves are available on request. Desirable solution

preference of PPP investments by giving them high priority and a specific faster procedure in the field of, e.g. the handling of complaints and decisions issuing (*project fastrack*). In practice, such a solution would be extremely difficult from the point of view of settlement in the applicable law. In a market economy in no way one should favor public projects at the expense of the corresponding private initiatives, apart from exceptional cases and special circumstances.

in this respect, on the basis of the conducted research, covers the preparation of 'unilateral agreement', i.e. in fact favoring the project owner (public entity) and securing the interests of the public sector and limiting the risks to the maximum extent. The very process of negotiations with the private partners should actually rely on a more flexible contracts and be moving away from its restrictiveness until reaching a compromise with the private sector, i.e. determining the conditions and the level of project risk transfer to the private sector, acceptable to it, taking into account the potential benefits resulting from the project. The private partner should be actively involved in this process and have a real influence on the final shape of the agreement.

As part of the analysis, a very strong tendency to stick to procedures and guidelines has been observed in the participants from the public sector in the process of project management. It is justified to some extent by the complexity of projects and the contracts requiring significant extension of decision-making areas, which must be subject to the regulation. Furthermore, given the long period of planning and implementation of projects, design assumptions in many areas must be highly estimated. Many areas in the scope of the agreement, e.g. the area of risk assessment associated with projects or financial projections must have a very framework character, taking into account the time horizon of projects (sometimes decades). In addition, it is required of the parties involved a great deal of flexibility, and sometimes a willingness to make quick decisions to modify certain assumptions and parameters of the project, sometimes burdened with high level of risk. These postulated desirable attitudes in terms of speed and flexibility of certain decisions, in particular from the public sector, however, imply a very high degree of freedom in the interpretation of the accuracy of the adoption of specific project solutions. Thus, these decisions are extremely sensitive to criticism and can be easily challenged in terms of the specific solutions adopted. In particular, this applies to the period when the critical allegations are formulated, e.g. 2–3 years after the signing of the project agreement when the socio-economic determinants of the project have changed dramatically.

High discretion of assumption estimations and high level of conventionality of provisions and solutions is a characteristic feature of PPP contracts and fully acceptable in the world's practice. This, seemingly less important, issue seems to be, however, one of the fundamental barriers to the functioning of the PPP market in Poland and one of the major threats and challenges in terms of the pace of its development. Associated with it are fully legitimate concerns of public sector institutions directly responsible for the implementation of projects in the field of treatment and control of PPP by public entities with supervisory powers. Most of the respondents were convinced that a detailed controls of the first signed agreements and projects by the institutions such as the Central Anti-Corruption Bureau or Supreme Audit Office are highly likely. The probability of inspection is enhanced by the mentioned immaturity

of the market and the fact that many projects are pioneering. Of great importance is also still the perception of PPP by a part of Polish society and part of the political class as inherently suspicious phenomenon, of which an indispensable feature is a susceptibility to all kinds of abuses that occur at the interface of collaboration of public and private sectors.

The level of complexity of the decision-making process in the field of PPP is raised by legal conditions. An important issue indicated in particular within the legal aspects of the implementation of projects during discussions with legal advisers, is an extremely short duration period of legislation acts (law on concessions, PPP Act), under which the tender procedure was organized and projects were implemented. In the opinion of interviewees development of practices based on new laws on such a level of complexity will require at least a few to dozen years. In particular, they believe that extremely important is the process of "encasing" of legal acts by the interpretations and decisions on the various aspects of PPP. The optimal solution for the fast and efficient development of the PPP market is to find a compromise between excessive legalism and administrative decisions automatism, and leaving officials the freedom and the high degree of confidence in them (a kind of flexibility guarantee and understanding during future controls of projects) in terms of project decision-making. Taking into account the historical and current conditions of the functioning of Polish administration, this process is extremely difficult. Completely unjustified, however, is to consider public entities the only responsible for the excessive formalism during project implementation and lack of flexibility in the management of PPP projects. Such a criticism is typical due to the frequent lack of understanding of the administrative and legal context, in which the decisions are made.

One of the proposed partial solutions to the problem is the introduction of a project pre-authorization procedure. Pre-authorization would be made by the special unit for PPP through, e.g. the statutory mandate in the planned amendment of the Act on PPP. Pre-authorization with regard to the correctness of the procedure carried out and the provisions of the partnership agreement, naturally would not release entities directly implementing projects from the responsibility and possible future inspections by the authorized institutions. It would also not infringe the autonomy of agencies implementing projects in regard to the project decisions. The assumptions were, however that the unit for PPP would accept the scope and method of implementation of the project and would examine the conformity of the decision taken with the applicable regulations. Positive feedback prepared by it could be presented during any future disputes or in face of raised objections, as a kind of protection that decisions regarding the project, especially the final choice of contractors, were undertaken with care, taking into account the economic viability in terms of using public funds. The second area to minimize the effects of the problem is the need for comprehensive training of

the supervisory institutions in Poland within the procedure for selecting the private partner in the PPP proceedings and the specifics and conditions of implementation of such projects, in particular with regard to the above outlined context (the degree of complexity of the project, the length of its duration, specified conditions at the moment of decision-making and often their pioneering nature).

The analysis of projects in the form of a case study in the limited way concerned the attitudes of stakeholders of projects, particularly local communities and potential buyers of services created on the basis of implemented infrastructure projects. In practice, it would require the use of sophisticated quantitative research survey. Nevertheless, the issue of stakeholders was raised during the conducted interviews. The analysis indicates very strongly unjustified politicization of the implementation of selected projects. This means that projects are often criticized not meritorically. In particular, this applies to larger projects. The problem intensifies when the conflict is already on the line President – City Council – local activists. This is partly due to the immaturity of the Polish democratic system, which makes it impossible to reach a consensus on the need and form of realization of a specific project, the effects and influence of which go far beyond the immediate, political short-term prospect (4–5 years). This would allow "pushing" of the project beyond the area of non-related discussions of the political character. This problem, however, has a far broader dimension in terms of the efficiency of the local government in the political system in Poland and the realization of large investment projects, in particular PPP is just one of the areas of its specific manifestation.

Apart from purely political determinants sometimes hindering efficient implementation of PPP projects, of great importance is also the acceptance of projects at the local community level. For all surveyed projects, public consultations, sometimes as a part of a broader action such as Transport Round Table in Cracow were carried out. According to the respondents participating in interviews opposition was aroused usually not by the chosen model of the project (PPP), but by potential nuisances relating to the construction phase, as well as the direct influence of the location of the project on residents (noise, potential decrease in the value of neighboring properties, impact on the environment at the local level). The selected projects were also criticized for issues of applied architectural solutions (architectural projects) and inappropriate, in the opinion of many protesters, locations in the strict historical city centers. The study examined the majority of reported protests and formal responses to the protests. All of them have been rejected as unjustified, either by the court or by the authorities of the city, depending on the mode of protest[27].

[27] In this regard, the proper examination of the issue would require in-depth analysis of a sociological character. As part of the interviews, officials pointed to some common characteristics of the protesting

The issue of permanent protests against location and scope of investment projects carried out in Poland seems to be an inherent aspect of the reality of the expansion and modernization of infrastructure in Poland. PPP formula is not an exception in this respect. This problem has a wider dimension concerning seeking a compromise between the interests of local communities and potential users of the new infrastructure. In addition, it concerns democratic governance mandate, i.e. the extent to which democratically elected authorities can impose a solution for the common good at the expense of benefits of minority and to what extent this minority has the right to block certain administrative and investment decisions within the limits of the law. The specific hazards in the area of local protests for the successful development of the PPP market were not identified under the analysis. In the case of analyzed projects, protests and complaints have been efficiently dealt with and did not significantly impact the delays in the projects implementation schedules. The number and intensity of the protests, however, show that the social protests against various aspects of the projects will undoubtedly accompany the majority of implemented PPP in Poland. In the case of well-prepared and reasonable projects there is a small real chance to block them. It should be strongly emphasized that the same applied PPP formula was not the subject to direct criticism in the context of the analyzed protests.

It should however be borne in mind that researched projects were in the majority in the initial stages of the implementation. In case of failure of the implementation of any of these projects, it is highly likely that, regardless of the actual reasons for such a scenario, the public will determine the partnership formula as the basic cause of failure of the project. In particular, there is a danger that it may unreasonably point out the errors of the private partner and the presumed bad faith and his willingness to abuse at the expense of the public sector. Therefore, the key for the development of this market seems to be to realize successfully at least a dozen of well-prepared projects in Poland. The spectacular failure in this regard in the first phase of development of the Polish market can actually initiate a discussion about the legitimacy of the use of PPP in the Polish socio-economic reality. The discussion, which will be focused on failures and negative aspects of the implementation of projects can effectively discourage public entities, in particular local government units to implement projects based on PPP and stop the use of the partnership model.

population in terms of age, education, scale of political commitment at the local level, etc., which were basically characteristic for all surveyed projects for the appointed attempt. They are, however, due to the scale of research, unrepresentative, and there is not possible to draw any conclusions in this regard. These issues were not the direct object of the carried out study.

10.4. Final Conclusions, Research Limitations and Potential Directions for Future Research

Below are the synthetic conclusions of the study:

a. The most commonly used formula of project management from the perspective of the public sector, i.e. tender board managing the project in the tender phase, and then rotating project team in terms of the personnel work well and are organizationally appropriate to the scale of the challenges in the City Offices related to the structure of partnership projects.
b. Experience gained during the implementation of projects supported by the EU funds (pre-accession funds, Structural Funds and the Cohesion Fund) had a large positive impact on the administrative capacity of the public sector at local and regional level and on preparation for the initiation and management of PPP projects.
c. Cooperation between the two units representing the public sector in the implementation of the project definitely complicates the process of project management, in which case one needs a strong mandate of the parties involved in the governance process and a large autonomy in decision making concentrated within a small group of people representing both entities, in particular, it concerns large units of the complex organizational structure.
d. A focusing of project attention and resources on the tender phase at the expense of the other phases has been observed, it is postulated to consider more the management of the whole project life-cycle. There is no practice of monitoring and controlling the project in the operational phase, it is desired to intensify attention to the project at this phase and the allocation of larger project resources.

The conducted research is limited by all the weaknesses of the used research method, i.e. the analysis of case studies[28]. By far the biggest limitation of conducted qualitative research was the relative immaturity of the Polish PPP market and derivative markets (consulting, finance, etc.). Therefore, a small group of operations was functioning, upon which a sample was selected for this study. The study was in particular hampered by the lack of completed projects (closed cycle of the project and the fulfillment of the conditions of the original contract), or a significant number of projects that are in advanced stages of development, e.g. are in operation for at least several years. Such projects would make it possible to deepen the analysis by examining the potentially achieved objectives and gained additional benefits from

[28] Broad critical discussion in regard to the application of the case study method was conducted by, e.g. B. Flyvbjerg, *Five Misunderstandings About Case-Study Research*, "Qualitative Inquiry" 2006, vol. 12, no. 2.

the application of PPP for the public sector and the degree of acquiring the desired level of profitability of projects from the point of view of a private sector.

A more in-depth picture of the market, in particular in regard to the potential benefits derived from the use of PPP will be possible only after closing implementation cycle of at least a dozen projects in Poland. Given the number and the time horizon of PPP contracts signed today it is unfortunately the distant perspective (several years). It would be valuable in particular to examine in the future the four analyzed projects, when they will be in advanced stages of operation. Equally desirable extension of the study would be to look on the projects solely from the perspective of the private sector, i.e. entities implementing projects, providing advisory services or financing them.

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