



Project Management Development – Practice and Perspectives

9th International Scientific Conference on Project Management in the Baltic Countries

CONFERENCE PROCEEDINGS



Project Management Development – Practice and Perspectives

ISSN 0250-1023

ISSN 0250-1023



9 770250 102632

Research Institute of the Project Management
of the Faculty of Business, Management and Economics,
University of Latvia
Professional Association of Project Managers

9th International Scientific Conference on Project Management in the Baltic Countries “Project Management Development – Practice and Perspectives”: Riga, Latvia, April 23-24, 2020. Conference Proceedings. Riga: University of Latvia, 2020, 92 p.

© University of Latvia, 2020
© Professional Association of Project Managers, 2020



Project Management Development – Practice and Perspectives

^{9th} International Scientific Conference on Project Management in the Baltic Countries

CONFERENCE PROCEEDINGS

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

April 23-24, 2020
Riga, University of Latvia



Professional Association of Project Managers



^{9th} International Scientific Conference on Project Management in the Baltic Countries “Project Management Development – Practice and Perspectives”: Riga, Latvia, April 23-24, 2020. Conference Proceedings. Riga: University of Latvia, 2020, 92 p.

Scientific Committee – Editorial Board

Prof. (emer.) Dr. oec. Žaneta Ilmete, University of Latvia, President of Professional Association of Project Managers, Latvia, Chair

Prof. Dr. Gundars Bērziņš, University of Latvia, Latvia

Prof. Dr. Rūta Čiutienė, Kaunas University of technology, Centre for Project management, Lithuania

Prof. Dr. Tatiana Yurieva, Department of Sport and tourism Russian Presidential Academy of National Economy and Public Administration (RANEPA), Russia

Prof. Dr. Jerzy Kisielnicki, Warsaw University, Poland

Prof. Dr. Michael J. Littman, Buffalo State University of New York, USA

Prof. Dr. Arvi Kuura, University of Tartu, Estonia

Prof. Dr. José Ramon Otegi Olosa, Head of EuroMPM at the University of the Basque Country in Bilbao, Spain

Prof. DI Philipp Rosenberger, FH Campus Wien Fachbereich Technisches Management, Austria

Prof. Dr. Wolfgang Tysiak, Dortmund University of Applied Science and Arts, Germany

Prof. Dr. Carsten Wolff, Dortmund University of Applied Science and Arts, Germany

Project coordinators:

PhD.cand. MSc.proj.mgmt. Silvija Bruņa and **PhD.cand. MSc.proj.mgmt. Emīls Pūlmanis**

Design and Layout: **PhD.cand. MSc.proj.mgmt. Emīls Pūlmanis**

LEGAL NOTICE: The University of Latvia, Professional Association of Project Managers, nor any person acting on its behalf may be held responsible for the use to which information contained in this publication may be put, nor for any errors which may appear despite careful preparation and checking.

© University of Latvia, 2020

© Professional Association of Project Managers, 2020

Reproduction is authorized provided the source is acknowledged.

e-ISSN 2501-0263

ISSN 2256-0513

“Project Management Development – Practice and Perspectives” has entered into an electronic licensing relationship with **EBSCO**, the world’s most prolific aggregator of full text journals, magazines and other sources.

Business Source Corporate

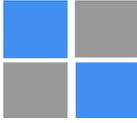
Plus

Business Source International



Media
partner:





PREFACE

Professionalization and Development of Project Management

The current global economy and growing digitalization require ever new solutions for cooperation between economy and society. In these terms, project management serves as a key discipline ensuring technically innovative and fast satisfaction of clients' demands. The classical project management methods are faced with certain changes in such circumstances. The new factors of success are agile and hybrid project management, as well as social competence and interactivity. The time of choosing between agile and traditional project management has already passed. Today, the tools to use for project management combine both agile and traditional elements.

This year brought as new challenges as during pandemic many projects and project managers faced problems what we all didn't expect to happen. However, project management has always been a field what is flexible to changes and risk mitigations as those are crucial processes in any project.

That is why this publication features experts experience with the use of agile methods, techniques, and formats in project development. They will review the agile project management practice in IT, services, construction, and other projects. The new formats additionally concentrate on the development of their standards of use and the problems arising in their practical application.

Now agile methodology has its roots in the IT world. It's recently been adopted by other industries for more tangible projects and just larger projects overall. It's particularly useful in situations where there's a lot of unknowns, where project specs can change frequently and we can see that happening a lot when you've got your team's distributed over a wide geography or, some are remote, some are having to come in.

Gender equality nowadays seems as obvious priority, however there is still discrepancies in various projects. Women in project management will be also analysed in this issue based on USA case study.

Communication, ethics, and leadership, as well as emotional intelligence are critical success factors in project management, and several reports will analyse them. Good project culture works toward success in a project, but not every culture is good for every project. Projects are implemented within the framework of multiple cultures, which must be integrated.

Leveraging technology is crucial. Advanced technologies now, such as artificial intelligence can play a very important role in helping teams organize their work. This year will be challenging for every institution and particularly for project managers. I hope there will be good lessons learned and new approaches and best practices will be discussed next year in our 10th international conference, here in Riga, Latvia!

Prof. (emer.) Dr. oec. Žaneta Ilmete



CONTENTS

1. Beliakova Y. Maria, Yurieva V. Tatiana (Russia). Public-Private partnership Projects As a Tool for The Development Of Social Infrastructure	7
2. Arvi Kuura (Estonia). 25 Years of Projectification Research	20
3. Ipek Ozguler (Turkey). How To Develop End-To-End Benefits Realization Process Through Integrating Portfolio Management With Program and Project Management.....	35
4. Littman J. Michael, Mathien D. Lorena, Littman S. Ezra (USA). Women In Project Management: Opportunities For Leadership Success	43
5. <i>Legal notice: Paper withdrawn by the request of author's as of November 9th 2020.</i> Ominde Diana Kageha, Ochieng Edward Godfrey, Omwenga Vincent (Kenya, United Arab Emirates). Refitting Stakeholder Integration Strategies: Case ICT Projects in Kenya	51
6. Turkebayeva Karina (Kazakhstan). Project Management Methodology: Theoretical Review	53
7. Tysiak Wolfgang (Germany). Monte Carlo Simulation Related to Risk Costs	69
8. Juris Uzulans (Latvia). Defining the Set of Criteria for Establishing and Evaluating a Project Risk Register	75
9. Vondruška Michal (Czech Republic). Possibilities of Crisis Management In Transport Infrastructure Projects	83



PUBLIC-PRIVATE PARTNERSHIP PROJECTS AS A TOOL FOR DEVELOPING SOCIAL INFRASTRUCTURE

Beliakova Y. Maria

PhD of Economics, Associate professor,
Head of the Department of Sport and tourism management

Yurieva V. Tatiana

Doctor of Economics, Full Professor, Department of Sport and tourism
Russian Presidential Academy of National Economy
and Public Administration (RANEPA), Moscow, Russia

Abstract

The main goal of Public-Private Partnership (PPP) projects in the creation, reconstruction and operation of social infrastructure facilities is to create conditions for the development of human capital, a healthy lifestyle, comfortable living, etc. The sectoral structure is examined and perspective directions of PPP projects in social infrastructure were revealed. The main organizational and legal forms of PPP projects in social infrastructure are researched (Concession, PPP agreements, quasi-PPP etc.). The goals, interests and benefits of the project agreement participants are analyzed.

The conclusion is made about highly risky nature of PPP projects. One of the most important issues in the process of developing and implementing a PPP project is the identification and distribution of risks and responsibilities between public and private partners, since risks can lead to changes in the project parameters and conditions for its implementation. The classification of PPP project risks in social infrastructure is carried out typical for all investment projects; typical for PPP projects; typical for projects in social infrastructure. It is shown that public and private partners use different methods of risk assessments of PPP projects in the social sphere. The choice of the right decision to participate in the project is largely determined based on the risk analysis of the PPP project.

It is recommended to use the "project finance" model of attracting financial resources more widely when implementing PPP projects in social infrastructure.

The main directions of effective state policy that stimulate the development of PPP projects in the social infrastructure are proposed.

Keywords: public-private partnership projects, infrastructure projects, social infrastructure.

JEL code: G11, O22



Introduction

New economic and social challenges impose special requirements on employees in various sectors of the economy. Priority is given to such characteristics as professional competence, the ability to create innovations, and effectively manage them in a changing environment. All this defines a qualitatively new approach to human capital as the most important factor of sustainable development. In turn, the development of human capital associated with the level of education and upbringing, labor qualifications, health, mobility is largely determined by the quality of goods and services provided by social sectors (education, health, culture, physical culture and sports, tourism, social security, etc.). At the same time, the development of the social sphere is impossible without the availability of infrastructure facilities that meets modern standards.

The provision of social public goods and services to the population is a state function and requires a large amount of investments. An increase in their number and quality characteristics requires either an increase in government spending, or the use of new mechanisms to attract private investments in the social sector. In conditions of limited public resources, the mechanism of public-private partnership (PPP) becomes an additional source of financing of social infrastructure.

Scientists actively study the principles and forms of PPP in the modern economy. The greatest contribution to the study of these issues was made by scientists such as A.A. Alpatov, A.B. Atkinson, J. Delmon, E. Farquharson, A. Hirschman, V. A. Kabashkin, V.V. Knaus, V.V. Maximov, M. Porter, O. Solvell, J. E. Stiglitz, V. G. Warnavsky, E. R. Yescombe, A. G. Zeldner and others. We should note that the degree of elaboration of PPP issues in General is quite high. The works of these researchers reflect the theoretical aspects, organizational forms, and practical technologies of PPP implementation. However, the special role of social public goods and services, and the specifics of demand formation for them, make it necessary to clarify the mechanism for implementing projects aimed at creating, reconstructing and maintaining social infrastructure facilities based on PPP principles. All this determines the relevance, purpose and objectives of this study. The main methods of its implementation are analysis and synthesis, logical modeling, economic and statistical analysis (grouping, classification, construction of dynamics series, graphic, comparative analysis).

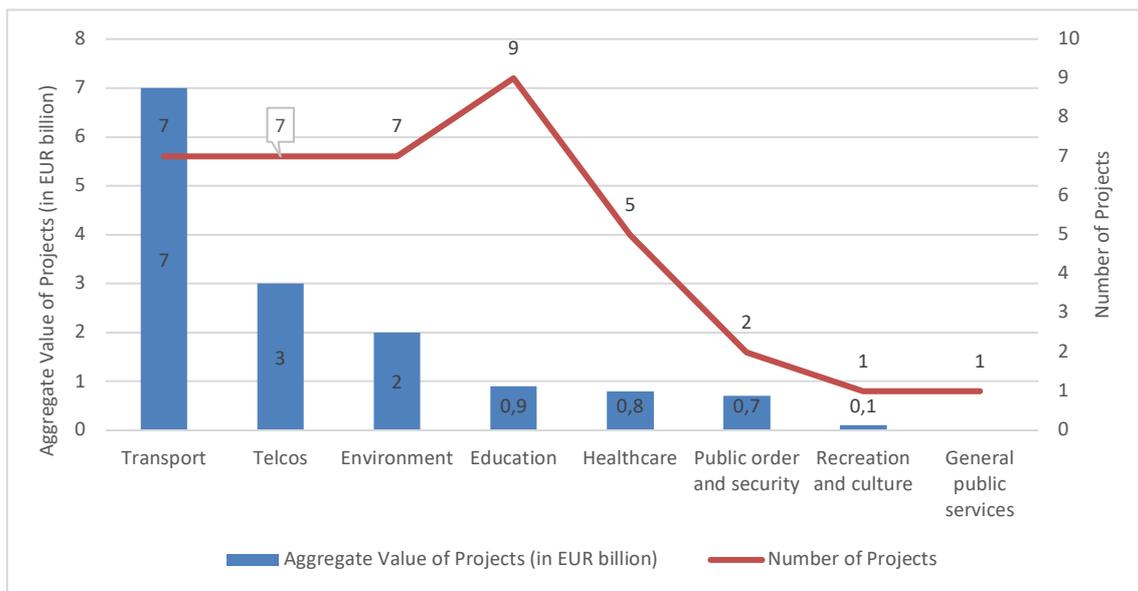
Public-Private Partnership projects: industry analysis

Projects, that are referred to as temporary enterprises formed to create unique products, services or results, are actively implemented in many areas of economic activity. Despite common management technologies, projects are significantly different. Therefore, the correct choice of project management tools makes it necessary to study the specifics of individual types of projects, which is determined by a set of certain factors (main goal, type, scale, duration, industry affiliation, complexity, ownership of project results, etc.) (Archibald, R. D. & Archibald, S., 2015; Beliakova, M.Y. & Yurieva, T.V., 2020, pp.35-37).



At present, many important socio-economic challenges are being solved through the implementation of public-private partnership projects. PPP projects are projects that are carried out by the state and private organizations on objects of state property and property of local authorities in order to increase the availability of public goods provided to the population, as well as to increase their quality. PPP projects are an effective tool for attracting additional private investments in the economy, allowing you to use the best technologies of private and public partners (Delmon, J., 2015).

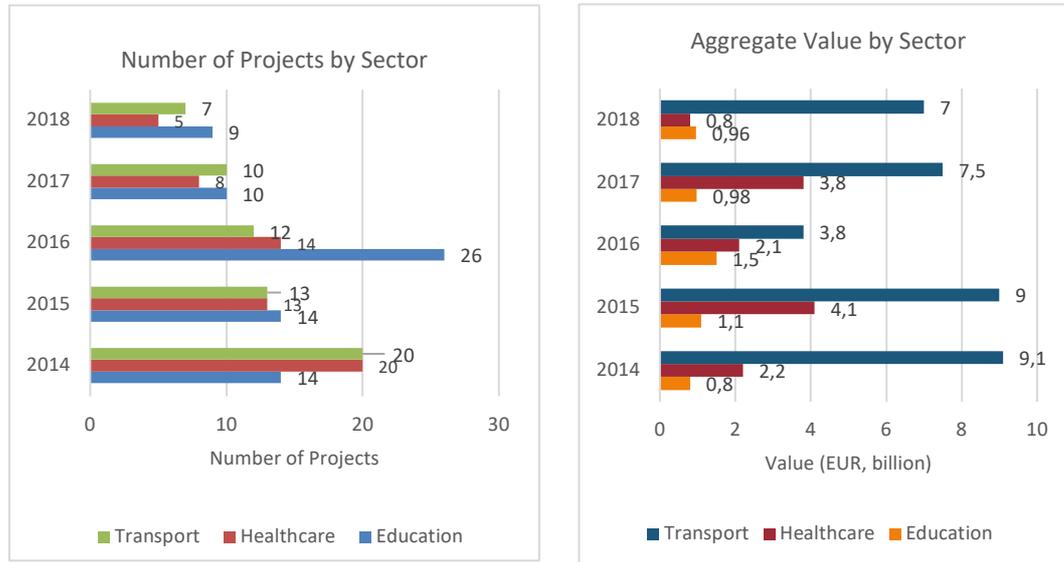
PPP projects are used to create, modernize, and maintain public infrastructure and provide vital services to the population. Many PPP projects contribute to the development of innovations, strengthening the position of national business in the global market, and forming the cultural image of the country and its individual regions. The main areas of implementation of PPP projects are: transport, telcos, environment, education, healthcare, public order and security, recreation and culture, general public services and etc. The sectoral structure of PPP projects in the European Union (EU) is shown on fig. 1.



Source: author's construction based on European PPP Expertise Centre, 2018. Market Update Review of the European PPP Market in 2018. EPEC, p. 3.

Fig. 1. Number of PPP projects and their costs in EU industries in 2018

The main goal of PPP projects in social infrastructure is the creating of conditions for the development of human capital, a healthy lifestyle, comfortable living, etc. Despite the fact that education projects account for a significant part of the total number of PPP projects in the EU, there has been a recent trend towards a decrease in both quantity and value. For example, in 2018, the number of PPP projects that reached financial closure decreased from 14 to 9 projects in the education sector compared to 2014, and from 20 to 5 projects in the health sector. The decrease in the cost of projects primarily affected health care, from 2,2 to 0,8 billion euro (fig. 2).



Source: author’s construction based on European PPP Expertise Centre, 2018. Market Update Review of the European PPP Market in 2018. EPEC, p.7

Fig. 2. Evolution of the Main PPP Sectors (2014-2018)

One of the most significant PPP projects in social infrastructure, which was signed in 2018, is the reconstruction of the campus of the Grangegorman University in Ireland. The main goal of this project is to create a single state-of-the-art campus with the Dublin Institute of Technology (DIT). The total area of the two buildings is about 52,000 square meters of academic space and is designed for 10,000 students and 600 employees. The building is planned to be put into operation by the 2020/21 academic year. In line with Ireland's strategic national priorities, the academic buildings will be provided with modern equipment, primarily for the colleges of science and healthcare, arts and tourism, and the DIT College of electrical and electronic engineering. In addition, this project corresponds to such tasks as more compact urban development; turning the Irish higher education system into one of the best in the world. The implementation mechanism of this project includes the design, construction, financing and maintenance of two educational buildings. European Investment Bank (EIB) funds the project in the amount of 110 million euros, MUFG, Sun Life Investment Management and Talanx Asset Management. The total cost of the project is estimated at approximately 253 million euros (European Investment Bank, 2018).

It is worth mentioning that significant parts of PPP infrastructure projects in the EU are implemented with the financial support of the EIB. In particular, this Bank in the period 2014-2018 participated in the financing of 16 PPP projects in the field of education and health, almost 70% of which were implemented in the UK. The EIB has allocated 1,769 million euros for this purpose (table1).

Table 1

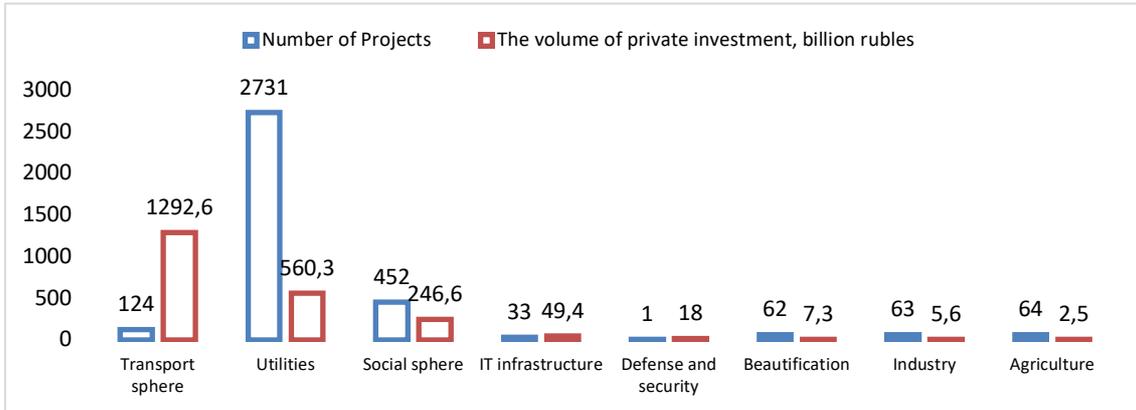


PPP projects in education and health, financed by the EIB in the years 2014-2018

Year	Country	PPP Project	Sector	Amount инвестиций EIB (EUR million)
2018	Ireland	Grangegorman Campus	Education	110
2017	Austria	Campus Berresgasse	Education	21
2017	Turkey	Bursa Integrated Health	Healthcare	150
2016	Ireland	Primary Care Bundle	Healthcare	70
2016	Turkey	Gaziantep Health	Healthcare	120
2016	United Kingdom	Priority Schools Building Programme - Yorkshire	Education	72
2015	United Kingdom	Dumfries and Galloway Hospital	Healthcare	155
		Edinburgh Hospital for Sick Children and Clinical Neurosciences	Healthcare	112
		Midland Metropolitan Hospital	Healthcare	148
		Papworth Hospital	Healthcare	65
		Priority Schools Building Programme – North East	Education	65
		Priority Schools Building Programme - Hertfordshire, Luton and Reading		88
		Priority Schools Building Programme – North West	Education	69
		Priority Schools Building Programme – Midlands	Education	88
2014	Germany	University Hospital of Schleswig-Holstein	Healthcare	400
	Greece	Attica Schools (Bundles I and II)	Education	36

Source: author's compilation based on European PPP Expertise Centre, 2019. PPPs Financed by the European Investment Bank from 1990 to 2018. January 2019.

There were 3,700 contracted PPP projects in Russia in 2018, the total volume of private investments of which amounted to 2,182 billion rubles. In 2018, 353 PPP projects passed the stage of commercial closure. The amount of private investment directed to PPP projects increased from 247.5 billion rubles to 451.7 billion rubles. Private investors prefer to invest in large PPP projects that exceed 1 billion rubles. The average duration of PPP projects is 12 years. A significant part of PPP projects is implemented in the utilities, energy and social sectors (fig.3).



Source: author's construction based on National Center for Public-Private Partnerships, 2019. Simple and Honest about Investment in Infrastructure and Public-private Partnerships in Russia. Analytical Review. Moscow: National Center for Public-Private Partnerships, p.21.

Fig. 3. Sectoral structure of PPP projects by industry in the Russian Federation in 2018

In the social sphere, the majority of PPP projects are carried out in health and education, while there are far fewer projects in tourism, culture and cultural heritage. There are few PPP projects in the sphere of physical culture and sports, as well as social services for the population,

PPP projects are conducted at all levels of management (federal/national, regional, municipal).

Federal / national PPP projects are aimed at integrated development of territories and creation of unique infrastructure complexes. In 2018, 24 PPP projects had federal/national status, with private investment estimated at 496 billion rubles. Such PPP projects have a high cost (the minimum cost is at least 5 billion rubles), and the investor's participation rate is at least 25 %. In 2015-2018, several PPP projects implemented in the social infrastructure had the status of federal / national projects (development of "Perm state medical University named after academician E. A. Wagner, "eye microsurgery Center in Yekaterinburg", etc.) (Web portal «ROSINFRA», 2020).

Regional PPP projects contribute to the creation of rapid points of economic and social growth, are highly effective and have a relatively short implementation period (Beliakova, M.Y. & Yurieva, T.V., 2020). Regional projects attract a larger range of stakeholders and organizations and therefore lead in terms of private investment. The regional structure of PPP projects allows us to make a conclusion about uneven development across Russian regions. The most advanced regions for PPP projects are: Moscow, Saint Petersburg, Moscow region, Republic of Bashkortostan, Samara region, Khanty-Mansi Autonomous Okrug-Yugra, etc. At the same time, in some regions, PPP projects still take an insignificant position (the Republic of Kalmykia, the Republic of North Ossetia-Alania, the Republic of Ingushetia, etc.) (Web portal «ROSINFRA», 2020). The characteristics of the most significant regional PPP projects in the



social infrastructure of the Russian Federation, an agreement on which was reached in 2019, are presented in the table.2.

Table 2

Projects in social infrastructure with the use of PPP mechanisms in the regions of the Russian Federation*

n/n	Project name	Region implementation	Industry of project's implementation	Project cost, million rubles
1.	Financing, design, construction, reconstruction and service of an educational complex with a capacity of 4550 seats	Nizhny Novgorod and the city district of Bor	Education	6136.6452
2.	The concept of the life cycle of medical equipment (project 1 - angiography)	Moscow	Health care and Spa treatment	654.966
3.	Project for creating health facilities (multidisciplinary rehabilitation center) on the territory of the International medical cluster (project 3)	Moscow	Health care and Spa treatment	3969.757
4.	Project for creating healthcare facilities (educational and research centers) on the territory of the International medical cluster (project 4)	Moscow	Health care and Spa treatment	3200
5.	Financing, design, construction and service of the full year children's recreation and recreation center "Polyarnaya Zvezda"	The Republic Of Sakha (Yakutia)	Children's recreation and Wellness	1473.651
6.	Creation of a health-resort complex, including repair and restoration works of the cultural heritage object of regional significance "Sanatorium" Kislovodsk»	Stavropol territory	Health care and Spa treatment	1800
7.	Youth sports complex	Khanty-Mansiysk	Physical culture and sports	5750
8.	Creation and operation of a sports facility-a skating Rink with artificial ice for training and recreational activities of the population	the city of Elista	Physical culture and sports	200
9.	Creation and operation of cultural objects " the State Philharmonic society of Yakutia and the Arctic epic and arts center»	The Republic Of Sakha (Yakutia)	Культура, досуг, туризм и реставрация объектов культурного наследия	9942.9206
10.	Construction of a Spa complex	Altai Republic	Physical culture and sports	770

* PPP projects with agreements signed in 2019.

Source: author's compilation based on Web portal «ROSINFRA», 2020.



The largest number PPP projects is implemented at the municipal level. Such projects are mostly small. Currently, their number exceeds 3,000 projects, and the total volume of private investment is estimated at almost 370 billion rubles. Many municipal PPP projects are related to social sectors such as social services, children's recreation and health improvement, physical culture and sports, education, leisure, tourism, etc.

Implementing mechanism of PPP projects in social infrastructure

PPP projects in social infrastructure are developed and implemented by public and private partners. Private participants can be commercial or non-commercial organizations. It should be noted that Russian legislation imposes a number of restrictions on the possibility of some organizations to participate as private partners in PPP projects. State and municipal unitary enterprises, state and municipal institutions, public law companies can't participate as private partners in PPP projects. At the same time, the private partner should have the necessary licenses; he should not have any debts on payment of taxes and fees, or signs of bankruptcy. In addition, private partner can't suspend economic activity at the time of submitting an application for participation in the competition. When implementing PPP projects in social infrastructure, it is necessary to take into account that the interests and goals of public and private partners may not coincide and have the opposite direction. Therefore, at the stage of project initiation, it is necessary to pay significant attention to identifying the interests of all stakeholders and then effectively manage them. Taking into account the functional orientation of the social sphere in modern society, the state, concluding an agreement with a private partner on the creation, reconstruction, and maintenance of a social infrastructure object, is guided not only by business interests, but also by public interests, which often require a deviation from market criteria for evaluating the project.

In general, the interaction of public and private partners in the social infrastructure sphere is profitable for all participants of the agreement, as well as to society as whole. The result of the partnership is intensive development of social infrastructure; reduction of government spending, risks, project deadlines and costs; improving the quality of work and management through innovation, competencies of private partners; increase in the number of jobs; creating a positive image of the state and business in society. State bodies are exempted from the function of monitoring investment and focus on the management of quality of service. While the private partner optimizes the process of financing the project in order to ensure the required quality of the object of the agreement. Without attracting private capital and effective managers, the state in most cases is unable to provide the necessary level of provision of social public goods and services.

Among the most significant advantages of a public partner in the implementation of PPP projects in social infrastructure are the following: participation in socially important infrastructure projects in the context of limited budget funds; creation and modernization of state and municipal property; reduction of the risks of overstating the project cost and operating its final result; the possibility of using modern engineering solutions, innovations, management methods, professional experience of employees of private structures.

The benefits of private partners include: expanding the boundaries of doing business; the ability to distribute risks between partners; investing in long-term fixed-income projects under



government guarantees (obligations); increasing revenue by providing additional paid services; reducing administrative costs, etc.

World practice shows that PPP projects carried out in social infrastructure are implemented through the following economic mechanisms:

- Build – Operate – Transfer (BOT).
- Build – Own – Operate – Transfer (BOOT).
- Build – Transfer - Operate (BTO).
- Build – Own – Operate (BOO).
- Build – Operate – Maintain –Transfer (BOMT).
- Design – Build – Own – Operate –Transfer (DBOOT).
- Design – Build – Finance – Operate (DBFO).
- Design –Build – Finance – Maintain (DBFM).

PPP projects in social infrastructure are implemented through various organizational and legal forms, which differ in the degree of responsibility of public and private partners for the design, creation, financing, operation and management of the object of the agreement. Concession (concession agreement) is the most common and developed form of PPP projects implementation in social infrastructure in many countries.

Currently, almost 60 % of PPP projects in the social infrastructure of Russia are implemented in such forms as a concession and a PPP agreement. Such projects account for 40% of the volume of private investments allocated for such purposes (table 3).

Table 3

PPP projects on the main forms of implementation and the volume of private investment in the Russian Federation

Sphere	Concession and PPP Agreement		Quasi-PPP	
	Number of projects	The volume of private investment, billion rubles	Number of projects	The volume of private investment, billion rubles
Transport sphere	69	828.4	55	464.2
Utilities and energy sector	2656	343.3	75	216.9
Social sphere	266	112.8	186	133.8
It-infrastructure	20	43.5	13	5.95
Defense and security	1	18	-	-
Industry	-	-	11	5,6
Accomplishment	20	3.7	42	3.5
Agricultural industry	2	0.2	6	2.3

Source: author’s construction based on National Center for Public-Private Partnerships, 2019. Simple and Honest about Investment in Infrastructure and Public-private Partnerships in Russia. Analytical Review. Moscow: National Center for Public-Private Partnerships. P.22-23.



Under the terms of the concession agreement, the public partner, being the full owner of the object of the agreement, transfers the private partner to perform a number of functions for a certain period. In turn, the private partner (concessionaire) is obliged to pay a fee for the use of the social infrastructure object, which is in state or municipal ownership.

Another organizational and legal form for implementing projects in the Russian economy, the PPP Agreement, is still in the process of being established. In 2018, four such projects passed commercial closure. All of them were related to the development of social infrastructure: a sports complex and a center for additional education in Volgograd (40 million rubles); a sports and recreation complex in Naberezhnye Chelny (395 million rubles); a sports cluster in Voronezh (203 million rubles).

PPP projects in social infrastructure are also implemented on the basis of so-called "quasi-PPP" (life cycle contract, lease with investment obligations, etc.). Currently, in the Russian economy, about 40% of PPP projects in social infrastructure are in the form of quasi-PPPs. This form accounts for almost 60% of the volume of private funds invested in social infrastructure (table.3). The largest part of quasi-PPP projects, especially large ones, comes from Russian regions that have developed investment legislation (Moscow, etc.).

This form of "quasi-PPP" as "life cycle contract" is increasingly being used. It is based on a special mechanism of interaction between public and private partners, called DBFM. In this case, the project is implemented on the basis of an agreement with a private partner, which includes the design, creation and operation of the agreement object for the entire period of its life cycle. In the "life cycle contract", the private partner attracts investment resources based on project financing. The public partner does not perform the function of an investor; its task is only to pay for products created during the operation of the agreement object. The payment condition is that the private partner complies with certain parameters for the operation of the agreement object. This approach increases the efficiency of economic activity and stimulates the quality of provided products.

The initiative to create a PPP project in social infrastructure can come from both a public and a private partner. The selection of projects takes place on a competitive basis, taking into account financial, economic, budgetary, social efficiency, as well as risk indicators.

Investments in social infrastructure projects are considered highly risky and less profitable compared to other sectors of the economy. This is due to the fact that the social sphere is characterized by diverse demand, difficulties in forecasting the consumer flow, as well as evaluating the social effect. As a result, private partners prefer to invest resources mainly in projects that have significant guarantees from the state.

In order to assess investment risks projects related to social infrastructure facilities are divided into two groups:

1. projects with a fixed flow of payments проекты, (the minimum yield is guaranteed by the state);
2. projects where revenue is determined by the level of consumer demand.

The first financial model provides a higher investment attractiveness of the project and allows you fully consider the risks. The second financial model is less attractive and more risky.



In this case, the private partner may require additional guarantees from the state [Agency for Strategic Initiatives. Public-Private Partnership Development Center, 2016].

Proper identification and allocation of risks in a PPP project has a significant impact on its success. At the same time, it is recommended to keep risk accounting and assessment at all stages of the project life cycle. A balanced division of predicted risks between a public and private partner has a positive effect on the overall risk assessment, since each of the participants is responsible for the part in which it is more effective [Delmon, J., 2015].

Among the main risks of PPP projects in social infrastructure, the following can be identified: design and preliminary stage; object creation; object operation; income generation; and other risks. These risks can be classified as typical for all investment projects (management, economic, construction); typical for PPP projects (political, legal); typical for projects in the social infrastructure.

Public and private partners of the PPP project use different methods of risk assessment. A private party to the agreement evaluates different types of risks primarily in terms of value. The public partner evaluates the project's risks based on its social significance and usefulness. The resulting project risk assessment is a determining factor when making a decision to participate in the project, and allows you to distribute effectively responsibility for risk management [Tsvetkova, L., Yurieva, T., Orlianiuk-Malitskaia, L., Plakhova, T., 2019]. However, the full distribution of risks between public and private partners cannot always be achieved and responsibility for some of the risks falls on the two partners. Choosing the right solution depends largely on the depth of the project's risk analysis.

A special place in the implementation of PPP projects in the social infrastructure is given to their provision with financial resources. The limited resources of the state and private companies, the need to implement complex projects featuring by high risks, created prerequisites for the formation and development of such an effective model of attracting financial resources as "project finance". The mechanism of this model assumes that financial assets are attracted exclusively for the implementation of a specific project, while the obligations for them must be repaid from the future income of the project, and only its assets are pledged. The main provisions of the project Finance concept are described in detail in the works of such scientists as B. C. Esty, E. Farquharson, S. Gatti, E. R. Yescombe и др. [Esty, B. C., Chavich, C., & Aldo, S., 2014; Gatti, S., 2013; Yescombe, E. R., 2014; Yescombe, E. R. & Farquharson, E., 2018]. Despite the significant advantages of the project Finance model, it is not always appropriate to use it in social sectors where there is a high uncertainty of profit generation [Yurieva, T.V., & Voropaeva, L.N., 2019].

In order to improve the efficiency of PPP projects in social infrastructure, the state should implement a set of regulatory actions: constant monitoring and supervision of the execution of the project agreement obligations; reviewing the terms of the agreement, if necessary; accepting proposals from private participants aimed at improving the implementation of the agreement terms; reviewing consumer claims for the final result of the project; conducting a state audit, etc. Among the measures of economic stimulation of PPP projects, tax benefits should be allocated to private partners. These can be benefits for paying property tax, income tax, or transport tax. Non-tax measures include preferential or gratuitous connection to utility



networks; subsidized interest rates on loans; providing technical and organizational assistance in the implementation of projects, etc.

Conclusion

The quantity and quality of social goods and services have a significant impact on the development of human capital, which is an essential prerequisite for sustainable growth. The provision of private social benefits and services is carried out by business, taking into account effective demand. The provision of public social goods is a function of the state. The challenges of the modern economy require increased spending on their production and, above all, on the creation, reconstruction and operation of social infrastructure facilities. In conditions of limited resources of the state, inefficiency of increasing the tax burden, it is appropriate to attract additional private investment in the social sector through the implementation of projects based on the principles of public-private partnership. PPP projects are one of the most effective tools for implementing investment policy, which helps to consolidate the resource, financial and managing potential of the state and private business. PPP projects in social infrastructure are beneficial to project participants and society as a whole.

World practice shows that PPP projects are actively used in such sectors as health and education. Promising areas of PPP projects are the infrastructure of such industries as tourism, culture and cultural heritage, physical culture and sports. PPP projects in social infrastructure are implemented through various organizational and legal forms. The most common and developed form of PPP projects in social infrastructure is a concession.

Investments in social infrastructure projects are considered highly risky. The main risks of PPP projects in social infrastructure are divided into three groups: typical for all investment projects; typical for PPP projects; and typical for social infrastructure projects. The resulting risk assessment is a determining factor in making a decision to participate in the project, and allows you to distribute effectively the responsibility for risk management.

Limited resources, the need to implement complex social infrastructure projects with high risks, stimulate a more active use of such model of attracting financial resources as "project finance".

The development of social infrastructure through PPP projects requires an effective public policy that includes a set of administrative and economic measures, as well as the availability of professional competencies in the field of project management for all project participants.



References

- Agency for Strategic Initiatives. Public-Private Partnership Development Center, 2016. *Best Practices for the Implementation of Public-private Partnership Projects in the Social Sphere*. Moscow: Agency for Strategic Initiatives. Public-Private Partnership Development Center. 64 p.
- Archibald, R. D. & Archibald, S., 2015. *Leading and Managing Innovation: What Every Executive Team Must Know about Project, Program, and Portfolio Management*. 2 - ed. New York: Auerbach Publications. 104 p.
- Beliakova, M.Y. & Yurieva, T.V., 2020. *Project Management Technologies*. Moscow: International Publishing Center "City of the XXI Century". 152 p.
- Delmon, J., 2015. *Creating a Framework for Public-Private Partnership Programs: A Practical Guide for Decision-makers*. World Bank, Washington, DC. © World Bank. 58 p.
- Esty, B. C., Chavich, C., & Aldo, S., 2014. An Overview of Project Finance and Infrastructure Finance—2014 Update. *Harvard Business School Background*, 214-083, June (Revised July 2014.)
- European Investment Bank, 2018. *Ireland: EIB loan supports major PPP investment in DIT Grangegorman Campus*. [Online] Available at: <https://www.eib.org/en/press/all/2018-081-eib-loan-supports-major-ppp-investment-in-dit-grangegorman-campus> [Accessed 01 February 2020].
- European PPP Expertise Centre, 2018. *Market Update Review of the European PPP Market in 2018*. EPEC. 14 p.
- European PPP Expertise Centre, 2019. *PPPs Financed by the European Investment Bank from 1990 to 2018*. January 2019. 30 p.
- Gatti, S., 2013. *Project Finance in Theory and Practice: Designing, Structuring, and Financing Private and Public Projects*. 2 - ed. Waltham: Academic Press. 496 p.
- Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, 2017. Sixth Edition and Agile Practice Guide. Project Management Institute. 756 p.
- National Center for Public-Private Partnerships, 2019. *Simple and Honest about Investment in Infrastructure and Public-private Partnerships in Russia*. Analytical Review. Moscow: National Center for Public-Private Partnerships. 37 p.
- Tsvetkova, L., Yurieva, T., Orłaniuk-Malitskaia, L. & Plakhova, T., 2019. Financial Intermediary and Insurance Companies: Assessing Financial Stability // *Montenegrin Journal of Economics*, 15(3), pp. 189-204.
- Web portal «ROSINFRA», 2020. Infrastructure project support platform. [Online] Available at: <https://www.rosinfra.ru/project> [Accessed 01 February 2020].
- Yescombe, E. R. & Farquharson, E., 2018. *Public-Private Partnerships for Infrastructure. Principles of Policy and Finance*. 2nd edition. Butterworth-Heinemann. 548 p.
- Yescombe, E. R., 2014. *Principles of Project Finance*. 2nd edition. San Diego, United States: Academic Press Inc. 560 p.
- Yurieva, T.V., & Voropaeva, L.N. Project Finance: Principles and Efficiency // *Project Management Development - Practice and Perspectives*. Conference proceedings. Riga, 25-26 May, 2019. Riga: University of Latvia, pp.104-113.



25 YEARS OF PROJECTIFICATION RESEARCH

Arvi Kuura, University of Tartu, Pärnu College

Abstract

This paper marks the 25 years of projectification research. This research stream originated in 1995 from Midler's seminal work in a special issue of Scandinavian Journal of Management. During this time, projectification has been ongoing (and seemingly accelerating) process, it has deserved increasing interest, and the research field has significantly evolved. This paper scrutinizes the developments in projectification research, focusing on emerged and emerging trends and streams. Using a loosely structured combination of historical and content analysis, it intends to fix their initial source(s) and/or roots, the latest developments and the current 'end state'. Also, it pays attention to so far less covered aspects, both positive and negative implications of projectification, as well as possible over-projectification.

This study revealed a striking increase of interest, appearing in the numbers of publications in 2016-2018 and extra in the past year. More importantly, coverage of (sub)topics, issues, sectors, levels, etc. has enlarged. Research on projectification has achieved academic rigour and richness, it is reflecting different more general trends, it has been influenced by developments in related (sub)fields and in turn, influences them. Yet, such relations are not equally developed – there are several linkages with (social) entrepreneurship and HRM but no studies on links to financial management, including project finance, and the financial sector. Most appeared relations are expectable, but some – such as relatedness to organizational romance and organizational improvisation – may be surprising. Substantial is the appearance of 'deprojectification' and the fact that research on projectification has been greatly treading in Midler's 'footprints'.

Key words: *projectification, deprojectification, project-based work, research.*

JEL codes: M0, M5, L20.

Introduction

In 1995 Scandinavian Journal of Management dedicated an issue to Project Management and Temporary Organizations. This special issued included several outstanding articles. The most cited is Lundin and Söderholm (1995) where they outlined a theory of temporary organization. In another seminal work, Midler (1995) introduced a novel notion projectification, denoting ongoing (and seemingly accelerating) phenomenon that deserves increasing interest in academic research.

This year (2020) the project management research community can celebrate. During the past quarter of century, this research field has significantly evolved, thus it is not possible to reflect all relevant matters in one paper. To stay in the limits of a conference paper and considering the presence of similar (including quite recent) studies, this work does not tend to provide another all-encompassing overview on projectification. This paper scrutinizes the developments in projectification research, focusing on emerged (and still emerging) trends and streams. Using a loosely structured methodology, combining historical and content analysis, this work intends to assess the initial source(s) and/or roots of a particular trend or stream, and concentrating on the latest developments, to ascertain its most current 'end state'. Another intention is to pay attention on so far less covered trends, streams, fields and sectors, etc., including both positive and negative implications of projectification, as well as on possible over-projectification (c.f. Lundin, 2016).



The Nature and History of Projectification

Projectification is already quite a popular topic in the ‘project’ literature. Thus, there is no need to deepen into its nature and history, albeit some flashback and clarification are probably useful. Projectification as a phenomenon is recognized during decades – a trend that the societies become increasingly projecticised, organised in terms of time-limited sequences of (inter)action, was noticed already in the mid-1960s (c.f. Packendorff, 2002). Projectification as a concept and term was introduced much later, in the middle of the 1990s by Midler (1995) in a seminal article, examining Renault’s way towards project orientation. The construct of project orientation was taken from Gareis (1989) work which proposed a novel management approach ‘Management by Projects’, considering also relationships between the projects and the company (organisation) and between projects – i.e. the network of projects. There are different terms – project orientation, projectification and projectization – that have similar but not coincident meanings. According to Müller (2009), the (level of) projectization indicates the extent to which a business is based on projects and the project way of working pervades. Thus, projectification and projectization should be rather distinguished, even though this is not (yet) commonly accepted. Projectization means the degree of organising activities through projects, what is a precondition for projectification; projectification has a much wider meaning, embracing projectization.

A significant adjustment in the understanding of projectification was made by Maylor et al. (2006), eliciting that the novelty was not in the trend of organising work through projects, but in concurred organisational changes. Their another significant contribution was developing a related notion programmification, meaning the implementation of programmes and portfolios (of projects) as management mechanisms in organisations (ibid.), bringing in the multi-project perspective. As projectification is a wider term and comprises projectization, it can be used when there is no need to differentiate. Such an approach seems to be quite common and will be followed also in this paper. Moreover, it should be noted that wordings like project intensification or project proliferation, projectivization, as well as project or projectified society (economy, business), etc., are often used for describing and disserting the same phenomenon (c.f. Gemünden, 2013).

Albeit projectification is not a novel topic, increasing interest can be observed during the past decade. Jacobsson and Jalocha (2018) examined 86 projectification-oriented publications, including journal articles, books or book chapters, conference papers, etc., and perceived several characteristic patterns. First, after a rather silent period at the end of the first decade of this century (2007-2009), immense growth in numbers of publications is noticed during the following periods (2010-2012, 2013-2015 and 2016-2018). As the stock was taken in January 2018, they assumed that “... *the number of publications in the last interval (2016-2018) is very likely to grow by at least an additional 10-15 publications until the end of 2018, if it follows the present trajectory.*” (ibid.: 8). The author of this paper is glad to mention that their assumption was right: similar (yet probably not the same) screening process resulted in 89 relevant publications, and 12 of these were published in 2018. So, the growth within the last period (2016-2018) is even bigger than depicted (see Jacobsson & Jalocha, 2018, Figure 2). Taking stock about two years later, the author of this paper retrieved 21 relevant contributions that appeared in 2019. This affirms that interest in this topic is steadily growing.

Increased numbers of projectification-related publications, particularly in recent years, indicates growing interest. A notable event was a special section “*Projectification and the impact on societies*” in the *International Journal of Managing Projects in Business* (12(3), 2019). Its editorial (Schoper & Ingason 2019) points to a related special section in an earlier (12(2)) issue of the same journal, headed “*World views on projects and society*”. Two special sections in sequential issues of a respected journal “... *underlines the importance, and also the*



urgence of a deeper understanding of the phenomenon of projectification to all members of the society” (ibid.: 517). Moreover, another special section (on relations of entrepreneurship and project management) in the previous issue (12(1), 2019) of the same journal included some projectification-related papers. An evidential example is a work by Auschra et al. (2019) about projectification of entrepreneurial (start-up) ecosystems, shaping the new venture creation towards ‘project-like practices’, such as milestone planning, short-term budgeting, etc. Kuura and Lundin (2019) widened the horizon to business process management and revealed several accrual parallels and linkages. Thus, 2019 can be labelled as ‘year of projectification’ even basing on a single journal. This topic got attention also in other journals – for example, a work of Henning and Wald (2019) in *International Journal of Project Management* on macroeconomic implications of project work in firms. Appearing of projectification-related work in another project-oriented journal should be less surprising than in ‘non-project’ journals. A good example for the last is a work by Fred (2019) on projectification of local government, published in *Local Government Studies* journal.

Trends and Streams in Projectification Research

Increasing numbers of publications on projectification may sign qualitative developments, such as covered subtopics, novel research streams, etc. The first to mention is a typology of levels of projectification by Jalocha (2019): micro (individuals), meso (organisations), macro (industries and sectors), mega (countries, supranational organisations) and meta (transformations of global social structures). This study deals with developments on the meso-, macro- and mega-levels and concentrates on the public sector. Coined by Midler (1995) on the organizational (meso¹) level, the notion of projectification has significantly evolved. Jalocha (2019) claims that projectification causes changes in structures, processes and methods of work in public organizations. Even though the examined case of Poland may be a bit specific², intensive projectification in the public sector is observed also in a quite diametrical country like Sweden (Fred, 2019; 2015). Both afore-cited (Jalocha, 2019 and Fred, 2019; 2015) pay attention to the influence of the European Union (EU) that occurs mainly through huge numbers of projects funded by the EU. It is not immodest to say that massive project-based funding from the EU has caused specific projectification. Fred (2018) claims that such projectification started almost as early as the EU.

Considering this is possible to say that projectification on societal (macro- and mega-level, mainly in the public sector), embraces a specific sub-stream that emerged already about two decades ago. In a seminal work, Dornisch (2002) depicted the role of ‘*post-socialist projects*’ in a Polish region and consequent projectification of restructuring efforts during a comprehensive transition. This supported possessing distinctive ‘*transitional capacity*’ that was useful in dealing with a myriad of practical restructuring problems the regional firms and institutions were facing. As this study involved firms, it included also the meso-level. Notable contributions to this sub-stream were made Kovach and Kucherova (2006). Examining the situation in Hungary and the Czech Republic they claimed that extensive flows of EU, national and other project-based funds caused ‘bottom-up projectification’ in (regional) development and the emergence of a new phenomenon or social group, labelled ‘*project class*’. They reasoned this using another novel notion of ‘*project economy*’ where people with expert knowledge

¹ General disciplines like economics tend to limit with traditional micro and macro levels, the need to discern another meso level between micro and macro is not commonly recognized. This is worth to note because Jalocha (2019) places the firms (organisations) on the meso-level, whereas the firms are micro-level subjects for most economists.

² Poland is the biggest among the 10 new Member States that joined EU in 2004 and was not well developed, thus it has been the largest beneficiary of EU funds in Europe. As the access to EU funds is mostly project-based, the situation caused big misfit between the projectified EU structures and the Polish public sector – and forced its projectification.



(including redistributive and market mechanisms related to development projects) and managerial skills become highly competitive. Kovach and Kucherova (2009) pointed out its originators: changes in administrative structures and EU and national developmental policies, and the emergence of cultural and cognitive elements in spatial development. Moreover, they hypothesized that the projects as a management form obtain key role in European integration. But yet, Kovach and Kucherova (ibid.) manifested also potentially negative – situations where projects do not support development but become a profitable business for the ‘project class’. Both just cited works (Kovach & Kucherova, 2006; 2009) embrace also the micro-level, as they deal with individuals.

It is difficult to label the just revealed sub-stream: let it be ‘*euro-projectification*’ for now. As seen, it has both positive and negative implications, and a specific feature – it appeared in the cases of post-socialist or transition societies. So, this phenomenon may look like an ‘infantile complaint’ that is normal to be suffered from at a certain age, giving immunity for the future, but this is not quite so. For one, Andersson (2009) uncovers an ‘innovation paradox’ – an expectation that the actors in regions are innovative comes true very seldom, most projects lack innovation. This is accompanied by professionalization and gendering (women as project leaders, especially in small projects) of project work. This is in line with the ideas of Kovach & Kucherova (2006) about the emergence of ‘project class’. Similarly, Andersson (2009) noted that the added value of most projects is very small – sometimes just workplaces for involved people until there is funding, but minimal long-term effects, or ‘sustainability’ in Euro-terms. Availability of project-based (EU and national) funding causes situations where “*Projects “that have already been done” are started over and over again, under slightly new names*” (ibid., 196). As this work treats Finland, it denotes that similar problems exist also in developed countries, not only in post-socialist East and Central Europe, meaning that this is not an ‘infantile complaint’.

The ‘innovation paradox’ has similarities with the ‘renewal paradox’ – expectations that project work will be renewed when a new project starts come true very seldom, most projects are treated as repetitive, and at worst, also mistakes are repeated (Ekstedt et al., 1999). The cited work does not name projectification but used labels like ‘*projectised*’ and ‘*project-intensive economy*’ have a similar meaning. Later Lundin (2007) related the renewal paradox to a tendency to ‘stick to established procedures’ that tends to kill creativity and innovativeness in projects.

Regardless of proliferation, ‘*euro-projectification*’ still represents a sub-stream in societal projectification, which relates to projects in public administration. Just a decade ago Andersson (2009) noted that project management propagated in public administration, but it had deserved surprisingly little attention, whereat most existent research was about development aid. The aid topic has intersections with so-called ‘*euro-projectification*’, greatly related to redistribution in the EU. Lundin (2011) saw a trend in projectification the emergence of new application areas, such as the EU – in a modern view it is not a question of government, but of governing – activities within the union. Hence, Lundin (ibid.) deduced that projectification will become an issue also for political scientists. This surmise became true, an example is a contribution by Godenhjelm et al. (2015) about projectification in the public sector, including policy making, in the context of the European Union. They pointed out different (internal and external, push and pull) factors influencing projectification and stressed a need for comparative research of public sector projectification on supranational and national levels. At that, they warned that alluring EU-wide standardisation and formalisation can be counterproductive – the unique nature of projects should remain because the particularities and priorities in different member states will continually vary.



Godenhjelm et al. (2015) commemorated their work as "... *the first steps towards a theory applicable to projectification in a public context*" (ibid.: 344) and called for the following research, posing some questions – such as possible developments at the local level and suitability of projects if long term goals and permanent, hierarchical structures rule. Several authors, including afore-cited Jalocha (2019) and Fred (2019 and 2018) have followed this call. Novel notions, such as ‘projectified politics’ (Sjöblom et al., 2013), ‘politicized projects’ (Krohwinkel-Karlsson, 2013), have been introduced and developed in this stream. Furthermore, there are numerous examples of recent developments. For instance, Fred and Hall (2017) investigated the political-administrative rationale of projectification in a Swedish municipality and detected that it introduces a new mind-set with potential long-term effects, rather than profound organizational change. Jalocha (2018) introduced a notion ‘projectariat’ – employees “*who by performing work within the framework of projects, experience precarious work conditions*” (ibid.: 71). Public servants may be in danger of becoming the projectariat, yet projectification does not harm their professional identity, in their opinion, they remain public servants. Greer et al. (2019) observed the emergence of a precarious projectariat in Slovenian but not French social services. They explained this exceptionality with differences in transactional structures between the countries.

As society comprises several levels (macro, meso, and micro) and sectors (public, private and voluntary), societal projectification should also concern different levels and sectors that must be covered in studies. One such example is Schoper et al. (2018) who targeted on the systematic and complete measurement of projectification across economies, embracing all sectors and all levels. This study measured and compared the level of projectification in three developed Western economies (Germany, Norway and Iceland) and revealed significant differences across sectors.

The last study is important also because of applied quantitative approach in projectification research but this aspect will be covered later.

In an earlier work on ‘euro-projectification’ Jalocha (2012) scrutinized its effects on public labour market organisations. Bogacz-Wojtanowska and Jalocha (2016) examined projectification in a specific and emerging sector – social economy, where the main actors are social entrepreneurs, organized in different forms (formal, informal and semiformal NGOs or non-profit companies, etc.). These works concerned mostly the societal level but involved also the organizational level. Jalocha and Cwikla (2017) used a research question “*How the EU cultural programmes affect the national cultural policies, cultural organizations, and artists?*”, which involves three levels – national, organizational, and personal. The last should be involved because the artists “*wanted to be free and had seen institutions as places of distractions in which art can not be made and showed without pressures*”, although in some cases (such as applying for funding natural persons may be not eligible) organizations are needed (ibid.). Further, Jalocha, Goral and Bogacz-Wojtanowska (2019) examined projectification in the Roman Catholic Church, operationalising research problem on the organisational (meso) level, what (as the authors recognize) is typical. Yet, as it is a global organization, a single level might be too confining. As the authors mention, “... *the Catholic Church becomes, presumably unintentionally, an agent of projectification processes*” and supporting cross-project learning is “... *spreading project realisation knowledge and skills, contributes to dissemination of project thinking in various cities and regions of the world*” (ibid.: 317). Considering the mightiness of the Roman Catholic Church, its projectification presumably affects a mass of organizations and individuals all over the World, thus involving all possible levels of projectification.

Preceding inquiry evinced another trend in projectification research that could be labelled sectoral. Among afore-cited are examples that examined culture (Jalocha & Cwikla, 2017), social economy (or social entrepreneurship – Bogacz-Wojtanowska & Jalocha, 2016), as well as



church and event management (Jalocha, Goral & Bogacz-Wojtanowska, 2019). This list can be continued by the public (national, regional and local) administration, as it also represents a sector. And the ‘classic’ work of Midler (1995) on the automotive industry, continued introducing novel aspects like multi-project lineage management (Midler, 2013) and internationalization in innovation processes (Midler, 2019). Studying a complex phenomenon like culture may answer an auspicious question like “*Why cultural projects don’t provide refreshing ideas for project management although they could?*” (Cwikla & Jalocha, 2015). Recognizing that the arts have always been a source of refreshing ideas, the authors see the possibility to “... *establish the art of project management in a more creative way*” (ibid.: 644). Projectification is ongoing also in media industries “... *where creativity and freethinking is a must.*” (Lundin & Norbäck, 2016: 370), indicating that there is a natural place for improvisation (Clegg & Burdon, 2019).

Projectification in some sectors has deserved very little attention – one example is sport or sports management, treated only by Puusepp and Kuura (2014). But there are popular sectors, such as academic activities, including core science or research, related to topics like innovation (Baur, Besio & Norkus, 2018) and academic careers (Müller & Kaltenbrunner, 2019), and management of educational organisations, including on non-university level (Landri, 2009). Some of the works (especially Landri, 2009) just mention relatedness to projectification, whereas in some works (for one, Fowler, Lindahl & Sköld, 2015) projectification is the focal topic.

A widely used division along with sectoral is spatial (or regional) and this is used also in researching projectification. As in general, this stream tends to use more quantitative comparison, whereas in other streams of projectification research qualitative approach dominates. Yet, not all studies of projectification involving spatial aspects are comparative, nor quantitative – numerous contributions inquire a single spatial unit, using an entirely or predominantly qualitative approach. Inherently, if the work is not purely conceptual, addressing projectification in the public sector (on the societal level) leads to treating spatial unit(s). The units of analysis may vary from (small) municipalities (c.f. Fred, 2015) to regions and/or countries (c.f. Andersson, 2009), even up to the European Union (c.f. Jalocha, 2019). These are just some examples, probably here is no need to repeat all referred before contributions.

Notably, a similar pattern appears – neither sectors nor spatial units are equally covered. The prior overview of the approaches to euro-projectification evinced that this phenomenon has been scrutinized on the samples of post-socialist countries – Poland (c.f. Jalocha, 2012), the Czech Republic and Hungary (c.f. Kovach & Kucherova, 2006; 2009). Looking further, this list can be continued with Estonia, where several aspects of projectification have been treated by Kuura (2011), Puusepp and Kuura (2014), Aunapuu-Lents (2013), and Rungi (2012). It can be noted that some of the just mentioned works appeared also in the sectoral overview. However, as also noted before, similar trends appear and have also been enquired on the samples of developed (Nordic) countries – in Sweden (c.f. Fred, 2015; Fred & Hall, 2017), and in Finland (c.f. Andersson, 2009). This reveals a pattern: covered spatial units follow the locations of the authors. The same pattern appears in the quantitative and comparative research to be examined next.

Quantitative comparison of the extent of projectification across spatial units and sectors is a novel research stream. An early attempt to estimate the extent of projectification – the total share of project activities in the world economy – was made by Turner et al. (2010). Accounting the share of new capital formation (i.e. infrastructure projects) and the share of development projects in the business (SME) sector they claimed that about one-third of the world economy is done via projects, and implied that in developing economies this share is bigger, up to a half. Kuura (2011) used the same approach and estimated that the share of projects in Estonian



economy was 52%, whereas in developed ('old') EU countries the average was about 35%. Later, Turner et al. (2013) claimed this parameter in India is 39% and in China it is 43%.

Within recent years, the quantitative stream in projectification research gets popularity. A notable example is (already mentioned in the context of covering different sectors and levels) Schoper et al. (2018), carrying out systematic and complete measurement of projectification in Germany, Norway and Iceland. Despite significant differences in the levels of projectification across sectors, the overall results of these countries turned out comparable. The methodical basis, used for the development of measurement instrument, was taken from Wald et al. (2015). Survey of 500 German private and public organizations denoted the share of project work in 2013 nearly 35%. This result matches the estimation of Turner et al. (2010), hence it is possible to say that their measurement instrument proved trustworthy.

The quantitative dimension that Schoper et al. (2018) used is simple – the share of project work relative to total work, giving a ratio indicating the share of project work in an organization. Generalized to macro-level (sectors, economies, etc.) it makes possible to calculate the share of projects in general macro-indicators, such as gross value added (GVA). The methodology seems simple, but the difficulty lies in data collection – ensuring adequate representativeness of samples needs extensive surveys (especially in big countries like Germany), which is expensive. The cited authors (ibid.) recognized their limitations – problematic sample sizes, data preciseness (most companies do not record project-related data), etc. Also, there are more ontological issues – such as the definition of a project – a nonroutine task with a specified target, minimum four weeks and three participants – might be not suitable for smaller and agile projects. Hereby it is worth to note that Ingason et al. (2019) measured projectification in Iceland, using and comparing two methods. Iceland participated in the GVA-study and projectification was measured by Schoper et al. (2018). The new approach of Ingason et al. (2019) added a benchmark study – a general survey of a very large sample of managers. The last is less time and resource-consuming and therefore can be repeated after shorter time intervals (three years was recommended). These two types of studies can complement and verify each other.

Projectification Research in Context

Projectification is not a 'stand-alone' phenomenon – it is influenced and influences other fields in practice, thus similar mutual influences can be anticipated in research. This section will examine these relations or (in other words) contextualize projectification research and possibly reveal additional research streams.

Projectification influences work and labour relations, so consequently analogous influence should appear in academic literature. For one, Huzzard (2003) noted that the need for flexibility, achieved via project-based organising, causes more temporal nature of work, thereby influencing the employment contracts and the quality of working life. Arvidsson and Ekstedt (2006) saw the proliferation of projects as a major impact on the new division of labour, and besides the macro-level influences, also bring out the influence of rising project-based work on the organizational and personal levels. Project-based work can be more engaging and inspiring than routine but concurring specified deadlines and performance demands may create stress and require leadership where is less place for 'soft' aspects. Bredin and Söderlund (2006) examined how the proliferation of different project-based structures influences the management of human resource (HRM) in organizations. They found that better understanding of the changes and challenges of HRM in projectified firms is possible through four perspectives: competence, trust, change, and individual. Arvidsson (2009) addressed a 'classic' issue in projectified organizations – tensions in virtue of co-existence and co-dependence of contrary line and projects organizations. Project-oriented and project-based (where revenues are generated respectively by permanent and temporary structures and processes) displayed both differences



and similarities. (Notably, unfolded sources of tension match the main properties (Lundin & Söderholm, 1995) of temporary organizations). The tensions are ‘poison’ but there is appropriate ‘medicine’, as “... *the success rate of complex, knowledge-intensive TOs can be increased if the antecedents of relationship quality and transparency are fully understood.*” (Hanisch & Wald, 2014: 209).

This ‘projectification-HRM’ stream appears proliferous, as affirmed by recent significant contributions. For one, Ballesteros-Sanchez et al. (2019) addressed the main challenges for project managers in the current projectified societies – being (becoming) a project manager and required competences. Ekstedt (2019) problematized how the expansion of the project and temporary work challenges traditional work-life and pertinent institutions, and in addition to notorious aspects, pointed to novel trends, such as digitalization and servitization. Notably, just HRM-related aspects seem intriguing for the representatives of critical management studies in projectification research. Allying the critical perspective Cicmil et al. (2016) explored how project workers and projectified organisations become vulnerable. Among others, they rely on an earlier work of Lindgren and Packendorff (2006) about masculinization and feminization in project-based work. Gendering belongs to this stream, as well as to critical studies. Moreover, Palm and Lindahl (2015) pointed to a novel phenomenon labelled ‘*deprojectification*’, meaning decreasing the distinction between line and project work that may lead to more sustainable project work.

There are more subareas in management related to projectification. Bergman et al. (2013) probed projectification in four perspectives: product (offering), process, structure, and people. People (and to some extent also structure) appeared already in the HRM-stream, while process and product are novel. Yet, further examination renders just one exclusion – operations and supply chain management (Maylor et al., 2018). It appears that projectification has nothing in common with functional areas in organizations – such as financial management. Still, despite sketchy coverage of functional areas in business, in recent years projectification has been related to some current strategic areas. The first to mention is sustainable development, where projects can deliver sustainable goods and/or services, and/or projects can be delivered in a sustainable way, notably in ‘megaprojects’, which is an outcome of projectification of societies (Sabini et al., 2019). In turn, growing importance of sustainability issues under projectification calls for ‘Responsible Project Management Education’ (Silvius & Schipper, 2019). Cerne and Jansson (2019) impress the role of global projectification and projects as global coordination, emphasizing necessary multi-sectoral partnerships, creativity and innovation, achievable through projects. Moreover, they see sustainable development as a market opportunity, which engages the entrepreneurial approach, including entrepreneurial projects. It means that sustainability represents another linkage between entrepreneurship and projects (c.f. Auschra et al., 2019; Kuura & Lundin, 2019).

Demonstrated linkages between projectification and other phenomena in organizations and societies seem expected, at least not surprising. However, screening the literature reveals some linkages that may be surprising. For instance, Clegg et al. (2015) note that projectification (that is related to digitalization and spatial and temporal concentration) leads to less self-regulated, to less ‘civilized’ behaviour. Also, projectification makes governmentality more problematic: if two or more different regulation regimes are represented in a collaboration project, the people do not know, whose norms to follow. The cited implications are almost ‘mainstreaming’, not surprising, but as the cited work deals with organizational romance (sexual relations at the workplace), it casts a shadow to projectification. Also, projectification is related to organizational improvisation, supporting resilience in project management (Klein et al., 2015; Kuura & Sandoval, 2019).



Organizational romance and improvisation (respectively sexual relations and improvisation in organizations) are just mentioned in the literature, they do not (yet) represent a (sub)stream in projectification, but both can be related³ to a (sub)stream that could be labelled governmentality. Governmentality represents “... *the way governors present themselves to those they govern, sets the tone for the interaction between governing and governed individuals ... the human side of an otherwise more structure-oriented governance*” (Müller et al. 2016: 958). Governmentality does not replace but complements governance, settling how the use project management methodology, enforced in an organization by governors (subjects) via governance (process). They contributed to integrating governance and governmentality with projectification in an organization. Burke and Morley (2016) inserted network relations that are increasingly used in the governance of projects. Simard et al. (2018) added organizational design and developed a conceptual framework that challenges the traditional division of formal and informal aspects at the interface of temporary and permanent organizing. Munck af Rosenschöld (2019) shifted from (mainstreaming) firms to environmental governance and public administration and scrutinizing literature on the processes of transforming project outputs into institutional change, proposed three models of projectified governance – mechanistic, organic, and adaptive.

The governance school of project management (see Turner et al., 2010; 2013) deals greatly with interactions between permanent and temporary (project) organizations. Due to increasing attention to time and temporality in general organization theory (c.f. Burke & Morley, 2016) projectification means coexistence of projects and non-projects (repetitive, recurrent operations) or, as put by Nesheim (2019), their balance. Discerning⁴ project-based organizations (PBOs) and project-supported organizations (PSOs), Nesheim (ibid.) analysed the coexistence of projects and non-projects in the core of an organization (a Norwegian state directorate) under both PBO and PSO logic. The study revealed that balance of projects and routine (in terms of outputs, work units and logics) can be institutional stability, rather than a transitory state, yet tensions originating from described state appeared as well. Identification of PBOs and PSOs, taken⁵ from Lundin et al. (2015), has proved useful in explaining the differences in coordination of core (operating) and support processes business processes across the discerned types of project organizations (c.f. Kuura & Lundin, 2019), that is the organizational environment of projectification.

Speaking about coexistence of projects and non-projects (repetitive, recurrent operations), presumes differentiation between projects and non-projects, but van der Hoorn and Whitty (2016) proposed an original view – is an activity a project or not, depends on its ‘projectyness’, which means greater or lesser capability to undertake an activity. Thus, a project is an experience, caused by a lack of capability to undertake the activity. As the capabilities of different people are very different, a clear distinction between non-project (operational) and project work will disappear.

Concluding Discussion

The analysis of (mostly) recent literature on projectification revealed several significant and interesting developments. The first to mention is a tremendous increase of interest,

³ Sources that bring in organizational romance and organizational improvisation do not have explicit links to each other but notably, the authors of cited paper on organizational romance have several works on organizational improvisation.

⁴ In PBOs, the core (creating products and/or services) business processes and revenue stream are organized as projects, in PSOs the main business processes are routine and recurrent and project-based processes support the core operations.

⁵ Lundin et al. (2015) discerned also the third type – project networks (PNWs) that may be both inter-organizational and interpersonal, and include PBOs and PSOs, as well as individual actors and other temporary organizations.



expressed in the numbers of publications during the recent (2016-2018) and extra in the past year. This trend could be reasoned by the growing importance of the phenomenon in practice, chiefly in business but also in the whole society, encompassing all levels – from supra-national bodies to people, including both professional and private spheres. These developments are well depicted in a comprehensive book by Lundin et al. (2015). However, Jensen, Thuesen and Geraldi (2016) go even a bit further, accentuation projectification of everything, including our home and free-time activities, resulting in projects as ‘a human condition’.

Simple quantitative measures like the numbers of publications might be not good indicators, qualitative developments are usually more important. Thus, the second to point out is the enlarged coverage of (sub)topics, issues, sectors, levels, etc. Not so long ago Packendorff and Lindgren (2014) proposed narrow and broad conceptualisations of projectification, where the last extends the area from its initial concern – the primacy of projects in organisational structures – to cultural and discursive processes in societies. Looking at the latest developments, broad conceptualisation may seem already slightly narrow. In a recent trial to conceptualise projectification Maylor and Turkulainen (2019) proposed ‘advanced organisational projectification’ that should fit the current paradigm, characterised chiefly by increasing complexity, especially in major or mega-projects.

Turner et al. (2013) claimed that project management is (i.e. was in 2013) already a serious academic discipline, drawing on other management disciplines and making contributions to them. Projectification research is not (yet) a sub-discipline but its state today is comparable to the main discipline about a decade ago. So, the third point could be achieved academic rigour and richness, as well as reflecting different trends and interchange (‘export’ and ‘import’) with other fields. The first to note is entrepreneurship (c.f. Germain & Aubry, 2019), including social, also HRM, labour economics, and several other (sub)fields, and sectoral studies. Continuing the list needs to decide, where to draw the line – as it revealed, the fields and sectors are not equally covered (for one, in sport management just a conference paper). Probably sport does not interest researchers in project management, and projects do not interest those who are in sport management. The same might be valid for other fields and sectors. An important but not yet covered field is financial management, including project finance, as well as the financial sector. Yet, ‘export’ and ‘import’ may lead to ‘conceptual colonization and epistemological emptying’, as Rehn (2019) warns.

Scrutinising existent research on projectification revealed relatedness with several current developments, such as digitalization and servitization. These relations are logical and expectable, especially digitalization, influencing almost everything and everybody. However, some surprising things came out – such as relatedness to organizational romance and organizational improvisation. The last can be related to the message of Cwikla and Jalocho (2015) about more creativity in ‘the art of project management’. This leads to another research stream that will not fit into this paper, however, learning from fine arts seems to be an emerging trend in business development and education (c.f. Sorsa et al., 2018).

Something substantial is the appearance of the notion ‘deprojectification’ (Palm & Lindahl, 2015; Jensen et al., 2016). Call to deliberate deprojectification of organisations is in line with conclusions of Lundin and Norbäck (2016: 380): “... *applying management by projects on a grand scale may be a useful, even necessary ...*” but “... *everything won’t realise its best results in a project-based approach. Projectification has limits.*”. After all, introduced by van der Hoorn and Whitty (2016) notion ‘projectyness’ may prove helpful, or make all the related matters even more tricky, especially in quantitative research. As the pioneers of quantitative approach Schoper et al. (2018) recognised, their definition of a project might not suit for all, especially smaller and agile projects. Applying the concept of ‘projectyness’ makes any definition of a project highly subjective, because people may have a very different



experience. For example, an experienced ‘projectarian’ may have good capabilities to undertake an activity what will be extraordinary for a novice project worker. On the other hand, following this concept may reduce the separation between project and non-project workers, as Palm and Lindahl (2015) suggested.

Finally, it is worth noting that the research on projectification has been greatly treading in ‘Midler’s footprints’ (Aubry & Lenfle, 2012). Hereby it is essential to note that the founder of this research stream is still active (c.f. Midler, 2019). Within the past quarter of century, research in this stream has significantly evolved and recognized in the project management field. For example, Schoper et al. (2016) see projectification as a basis for all 15 future trends in project management until 2025. Moreover, as Walker and Lloyd-Walker (2016: 732) argued, “*We may also need to be facing a re-think of PM from a political impact of projectification perspective*”, also because this will influence the careers (and thus the lives) of people (Lloyd-Walker et al., 2016). In turn, this will establish new requirements for knowledge, skills, attributes and experience that the project people will need in 2030 and beyond (Walker & Lloyd-Walker, 2019). In brief, all this signifies that successive developments in projectification, as well as its positive and negative consequences, need further investigation.

References

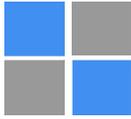
- Andersson, K., 2009. Orchestrating Regional Development Through Projects: The 'Innovation Paradox' in Rural Finland. *Journal of Environmental Policy & Planning*, 11(3), pp. 187-201.
- Arvidsson, N., 2009. Exploring tensions in projectified matrix organisations. *Scandinavian Journal of Management*, 25(1), pp. 97-107.
- Arvidsson, N., & Ekstedt, E., 2006. The growth of project organisation and its effects on working conditions. In: J. Olofsson, M. Zavisic (eds.) *Routes to a More Open Labour Market, The National Institute for Working Life Yearbook*, Stockholm, pp. 88-102.
- Aubry, M., & Lenfle, S., 2012. Projectification: Midler's footprint in the project management field. *International Journal of Managing Projects in Business*, 5(4), pp. 680-694.
- Aunapuu-Lents, V., 2013. Rural Policy in Estonia: The Leader Approach and the Concentration of Power. *Halduskultuur – Administrative Culture* 14 (1), pp. 125-144.
- Auschra, C., Braun, T., Schmidt, T., & Sydow, J., 2019. Patterns of project-based organizing in new venture creation: Projectification of an entrepreneurial ecosystem. *International Journal of Managing Projects in Business*, 12(1), pp. 48-70.
- Ballesteros-Sanchez, L., Ortiz-Marcos, I., & Rodriguez-Rivero, R., 2019. The project managers' challenges in a projectification environment. *International Journal of Managing Projects in Business*, 12(3), pp. 522-544.
- Baur, N., Besio, C., & Norkus, M., 2018. Projectification of Science as an Organizational Innovation. In: *Innovation Society Today*, Wiesbaden, Springer, pp. 341-370.
- Bergman, I., Gunnarson, S., & Räisänen, C., 2013. Decoupling and standardization in the projectification of a company. *International Journal of Managing Projects in Business*, 6(1), pp. 106-128.
- Bogacz-Wojtanowska, E., & Jalocha, B., 2016. The bright side of social economy sector's projectification: a study of successful social enterprises. *Project Management Research and Practice*, 3.
- Bredin, K., & Söderlund, J., 2006. Perspectives on human resource management: an explorative study of the consequences of projectification in four firms. *International Journal of Human Resources Development and Management*, 6(1), pp. 92-113.
- Burke, C.M., & Morley, M.J., 2016. On temporary organizations: A review, synthesis and research agenda. *Human relations*, 69(6), pp. 1235-1258.
- Cerne, A., & Jansson, J., 2019. Projectification of sustainable development: implications from a critical review. *International Journal of Managing Projects in Business*, 12(2), pp. 356-376.
- Cicmil, S., Lindgren, M., & Packendorff, J., 2016. The project (management) discourse and its consequences: on vulnerability and unsustainability in project-based work. *New Technology, Work and Employment*, 31(1), pp. 58-76.



- Clegg, S.R., & Burdon, S., 2019. Exploring creativity and innovation in broadcasting. *Human Relations*, (in press).
- Clegg, S.R., Cunha, M.P., Rego, A., & Story, J., 2015. Powers of romance: the liminal challenges of managing organizational intimacy. *Journal of Management Inquiry*, 24(2), pp. 131-148.
- Cwikla M., & Jalocho B., 2015. Unspread wings. Why cultural projects don't provide refreshing ideas for project management although they could? *International Journal of Managing Projects in Business*, 8(4), pp. 626-648.
- Dornisch, D., 2002. The evolution of post-socialist projects: trajectory shift and transitional capacity in a Polish region. *Regional Studies*, 36(3), pp. 307-321.
- Ekstedt, E., 2019. Project work, a challenge to traditional work life institutions. *International Journal of Managing Projects in Business*, 12(2), pp. 267-281.
- Ekstedt, E., Lundin, R.A., Söderholm, A., & Wirdenius, H., 1999. *Neo-industrial Organising – Renewal by Action and Knowledge Formation in a Project-intensive Economy*. New York, NY, Routledge.
- Fowler, N., Lindahl, M., & Sköld, D., 2015. The Projectification of University Research: A study of resistance and accommodation of project management tools & techniques. *International Journal of Managing Projects in Business*, 8(1), pp. 9-32.
- Fred, M., 2015. Projectification in Swedish municipalities. A case of porous organizations. *Scandinavian Journal of Public Administration*, 19(2), pp. 49-68.
- Fred, M., 2018. *Projectification: The Trojan horse of local government*. Doctoral Dissertation, Faculty of Social Science, Lund University, Sweden.
- Fred, M., 2019. Local government projectification in practice – a multiple institutional logic perspective. *Local Government Studies*, pp. 1-20. DOI: 10.1080/03003930.2019.1606799.
- Fred, M., & Hall, P., 2017. A projectified public administration. How projects in Swedish local governments become instruments for political and managerial concerns. *Statsvetenskaplig tidskrift*, 119(1), pp. 185-205.
- Gareis, R., 1989. Management by project: the management approach for the future. *International Journal of Project Management*, 7(4), pp. 243-249.
- Gemünden, H.G., 2013. Projectification of society. *Project Management Journal*, 44(3), pp. 2-4.
- Germain, O., & Aubry, M., 2019. Exploring processual and critical avenues at the crossroad of entrepreneurship and project management. *International Journal of Managing Projects in Business*, 12(1).
- Godenhjelm, S., Lundin, R.A., & Sjöblom, S., 2015. Projectification in the public sector—the case of the European Union. *International Journal of Managing Projects in Business*, 8(2), pp. 324-348.
- Greer, I., Samaluk, B., & Umney, C., 2019. Toward a precarious projectariat? Project dynamics in Slovenian and French social services. *Organization Studies*, 40(12), pp. 1873-1895.
- Hanisch, B., & Wald, A., 2014. Effects of complexity on the success of temporary organizations: Relationship quality and transparency as substitutes for formal coordination mechanisms. *Scandinavian Journal of Management*, 30(2), pp. 197-213.
- Henning, C.H., & Wald, A., 2019. Toward a wiser projectification: Macroeconomic effects of firm-level project work. *International Journal of Project Management*, 37(6), pp.807-819.
- Huzzard, T., 2003. The convergence of the quality of working life and competitiveness – a current Swedish literature review. In: E. Ekstedt (Ed.), *Work Life in Transition*, Stockholm: National Institute for Working Life.
- Ingason, H.T., Fridgeirsson, T.V., & Jonasson, H.I., 2019. Projectification in Iceland measured – a comparison of two methods. *International Journal of Managing Projects in Business*, 23(3), pp. 602-616.
- Jacobsson, M., & Jalocho, B., 2018. A literature review on projectification: trends, emerging ideas and avenues for future research. In *the 14th International Research Network on Organizing by Projects (IRNOP) conference, Melbourne, Australia, December 10-12, 2018*.
- Jalocho, B., 2012. Projectification of the European Union and its implications for public labour market organisations in Poland. *Journal of Project, Program & Portfolio Management*, 3(2), pp. 1-16.
- Jalocho, B., 2018. Are projects changing public servants into projectarians? Projectification's influence on employees in the Polish public sector. *International Journal of Contemporary Management*, 17(2), pp. 63-83.



- Jalocha, B., 2019. The European Union's multi-level impact on member state projectification in light of neoinstitutional theory. *International Journal of Managing Projects in Business*, 12(3), pp. 578-601.
- Jalocha, B., & Cwikla, M., 2017. Addicted to projects: cultural policies in times of projectification. In: *Proceedings of 21st International Research Society on Public Management Conference, Budapest 19-21 April 2017*.
- Jalocha, B., Goral, A., & Bogacz-Wojtanowska, E. (2019). Projectification of a global organization – case study of the Roman Catholic Church. *International Journal of Managing Projects in Business*, 12(2), pp. 298-324.
- Jensen, A., Thuesen, C., & Geraldi, J., 2016. The projectification of everything: Projects as a human condition. *Project Management Journal*, 47(3), pp.21-34.
- Klein, L., Biesenthal, C., & Dehlin, E. 2015. Improvisation in project management: A praxeology. *International Journal of Project Management*, 33(2), pp. 267-277.
- Kovach, I., & Kucherova, E., 2006. The Project Class in Central Europe: The Czech and Hungarian Cases. *Sociologia Ruralis*, 46(1), pp. 3-21.
- Kovach, I., & Kucherova, E., 2009. The Social Context of Project Proliferation — The Rise of a Project Class. *Journal of Environmental Policy & Planning*, 11(3), pp. 203-221.
- Krohwinkel-Karlsson, A., 2013, Politicized projects. *Scandinavian Journal of Public Administration*, 17(2), pp. 13-36.
- Kuura, A. 2011. Policies for projectification: support, avoid or let it be? *Estonian Discussions on Economic Policy*, 19(1), pp. 117–136.
- Kuura, A., & Lundin, R.A., 2019. Process perspectives on entrepreneurship and projects. *International Journal of Managing Projects in Business*, 12(1), pp. 25-47.
- Kuura, A., & Sandoval, I., 2019. Improvisation in Project Management: Lessons from Jazz. *Project Management Development – Practice and Perspectives*, 8, pp. 15-28.
- Landri, P., 2009. A temporary eclipse of bureaucracy. The circulation of school autonomy in Italy. *Italian Journal of Sociology of Education*, 1(3), pp. 76-93.
- Lindgren, M., & Packendorff, J., 2006. What's new in new forms of organizing? On the construction of gender in project-based work. *Journal of Management Studies*, 43(4), pp. 841-866.
- Lloyd-Walker, B., French, E., & Crawford, L., 2016. Rethinking researching project management. *International Journal of Managing Projects in Business*, 9(4), pp. 903-930.
- Lundin, R.A., 2008. The Beauty and the Beast – On the Creativity/Project Management Encounter. *International Journal of Managing Projects in Business*, 1(2), pp. 206-215.
- Lundin, R.A., 2011. Guest Editorial by the winner of the IPMA Research Achievement Award 2010 “On trends and the future of project management research and profession”. *International Journal of Project Management*, 29(3), pp. 241–243.
- Lundin, R.A., 2016. Project society: paths and challenges. *Project Management Journal*, 47(4), pp. 7-15.
- Lundin, R.A., Arvidsson, N., Brady, T., Ekstedt, E., Midler, C., & Sydow, J. 2015. *Managing and Working in Project Society Institutional Challenges of Temporary Organizations*. Cambridge: Cambridge University Press.
- Lundin, R.A. & Norbäck, M., 2016. Projectification in the media industries. In *Managing Media Firms and Industries* (pp. 367-382). Cham: Springer.
- Lundin, R.A., & Söderholm, A., 1995, A theory of the temporary organisation. *Scandinavian Journal of Management*, 11(4), pp. 437-455.
- Maylor, H., Brady, T., Cooke-Davies, T., & Hodgson, D., 2006. From projectification to programmification. *International Journal of Project Management*, 24(8), pp. 663-674.
- Maylor, H., Meredith, J.R., Söderlund, J., & Browning, T., 2018. Old theories, new contexts: extending operations management theories to projects. *International Journal of Operations & Production Management*, 38(6), pp. 1274-1288.
- Maylor, H., & Turkulainen, V., 2019. The concept of organisational projectification: past, present and beyond?. *International Journal of Managing Projects in Business*, 12(3), pp. 565-577.
- Midler, C., 1995. Projectification of the Firm: the Renault Case. *Scandinavian Journal of Management*, 11(4), pp. 363-375.



- Midler, C., 2013. Implementing a low-end disruption strategy through multiproject lineage management: The Logan case. *Project Management Journal*, 44(5), pp. 24-35.
- Midler, C., 2019. Projectification The forgotten variable in the internationalization of firms' innovation processes?. *International Journal of Managing Projects in Business*, 12(3), pp. 545-564.
- Munck af Rosenschöld, J., 2019. Inducing institutional change through projects? Three models of projectified governance. *Journal of Environmental Policy & Planning*, 21(4), pp. 333-344.
- Müller, R., 2009. *Project Governance*. London: Routledge.
- Müller, R., & Kaltenbrunner, W., 2019. Re-disciplining Academic Careers? Interdisciplinary Practice and Career Development in a Swedish Environmental Sciences Research Center. *Minerva*, 57(4), pp. 479-499.
- Müller, R., Zhai, L., Wang, A., & Shao, J., 2016. A framework for governance of projects: Governmentality, governance structure and projectification. *International Journal of Project Management*, 34(6), pp. 957-969.
- Nesheim, T., 2019. A fine balance? Unwrapping the coexistence of projects and non-projects in the core of the organization. *International Journal of Managing Projects in Business* (in press).
- Packendorff, J., 2002. The temporary society and its enemies: Projects from an individual perspective. In: K. Sahlin-Andersson & A. Söderholm (eds.) *Beyond Project Management: New Perspectives on the Temporary-Permanent Dilemma*. Malmö: Liber, pp. 39-58.
- Packendorff, J., & Lindgren, M., 2014. Projectification and its consequences: narrow and broad Conceptualisations. *South African Journal of Economic and Management Sciences*, 17(1), pp. 7-21.
- Palm, K., & Lindahl, M., 2015. A project as a workplace: Observations from project managers in four R&D and project-intensive companies. *International Journal of Project Management*, 33(4), pp. 828-838.
- Puusepp, L., & Kuura, A., 2014. Projectification of Sport Management. *Project Management Development – Practice and Perspectives*, 3, pp. 175-182.
- Rehn, A., 2019. The vanishing point? – notes on conceptual colonization and epistemological emptying. *International Journal of Managing Projects in Business*, 12(1), pp. 95-103.
- Rungi, M., 2013. Influential capabilities and their development in a project business: results of an Estonian survey. *Research in Economics and Business: Central and Eastern Europe*, 4(2).
- Sabini, L., Muzio, D., & Alderman, N., 2019. 25 years of 'sustainable projects'. What we know and what the literature says. *International Journal of Project Management*, 37(6), pp. 820-838.
- Schoper, Y., Gemünden, H.G., & Nguyen, N.N., 2016. Fifteen future trends for Project Management in 2025. In: *Future trends in project, programme and portfolio management 2016. Proceedings of the International IPMA Expert Seminar in Zurich*, pp. 23-43.
- Schoper, Y.G., & Ingason, H.T., 2019. Projectification and the impact on societies. *International Journal of Managing Projects in Business*, 12(3), pp. 517-521.
- Schoper, Y.G., Wald, A., Ingason, H.T. & Fridgeirsson, T.V., 2018. Projectification in Western economies: A comparative study of Germany, Norway and Iceland. *International Journal of Project Management*, 36(1), pp. 71-82.
- Silvius, G., & Schipper, R., 2019. Exploring Responsible Project Management Education. *Education Sciences*, 9(1), pp. 1-13.
- Simard, M., Aubry, M., & Laberge, D., 2018. The utopia of order versus chaos: A conceptual framework for governance, organizational design and governmentality in projects. *International Journal of Project Management*, 36(3), pp.460-473.
- Sjöblom, S., Löfgren, K., & Godenhjelm, S., 2013. Projectified politics – Temporary Organisations in a Public Context. *Scandinavian Journal of Public Administration*, 17(2), pp. 3-12.
- Sorsa, V., Merkkiniemi, H., Endrissat, N., & Islam, G., 2018. Little less conversation, little more action: Musical intervention as aesthetic material communication. *Journal of Business Research*, 85, pp. 365-374.
- Turner, J.R., Anbari, F., & Bredillet, C., 2013. Perspectives on research in project management: the nine schools. *Global Business Perspectives*, 1(1), pp. 3-28.
- Turner, R.J., Huemann, M., Anbari, F.T., & Bredillet, C.N., 2010. *Perspectives on projects*. Abingdon, Oxon: Routledge.



- van der Hoorn, B., & Whitty, S.J., 2016. Projectyness: a spectrum of greater or lesser capability. *International Journal of Project Management*, 34(6), pp. 970-982.
- Wald, A., Wagner, R., Schneider, C., & Schoper, Y., 2015. Towards a measurement of “projectification”: A study on the share of project-work in the German economy. *Advanced project management: Flexibility and innovative capacity*, 4, Nürnberg, GPM, pp. 18-36.
- Walker, D., & Lloyd-Walker, B., 2016. Rethinking project management. *International Journal of Managing Projects in Business*, 9(4), pp. 716-743.
- Walker, D., & Lloyd-Walker, B., 2019. The future of the management of projects in the 2030s. *International Journal of Managing Projects in Business*, 12(2), pp. 242-266.



HOW TO DEVELOP END-TO-END BENEFITS REALIZATION PROCESS THROUGH INTEGRATING PORTFOLIO MANAGEMENT WITH PROGRAM AND PROJECT MANAGEMENT

Ipek Ozguler, PMWJ

Abstract

In the business dictionary, there are three definitions of the word “benefit”. The first definition is “advantage, privilege, right or financial reimbursement”, the second is “desirable and measurable outcome or result from an action, investment, project, resource, or technology”, the last is “desirable attribute of a good or service, which a customer perceives he or she will get from purchasing. Whereas vendors sell features, buyers seek the benefit”.

According to the Project Management Institute (PMI), “Projects are a key way to create value and benefits in organization”. (PMBOK Guide, 2017, p.10) Furthermore, the PMI stated that “successful business value realization begins with comprehensive strategic planning and management” and continued “In order to bridge the gap between organizational strategy and successful business value realization, the use of portfolio, program, and project management techniques is essential.” in the “A Guide to the Project Management Body of Knowledge”. (PMBOK Guide, 2013, p.16)

The primary aim of this paper is to develop end-to-end benefits realization process through integrating portfolio management with program and project management. In order to achieve this, the author conducted a deep research about benefit management based on PMI’s perspective and will explain them on the background section. Then, the relationship between portfolio management, program management and project management will be developed and a new end-to-end benefits realization process will be proposed.

Key words: *Benefits Realization, Benefits Realization in Portfolio Management, Benefits Realization in Program Management, Benefits Realization in Project Management, End-to-End Benefits Realization*

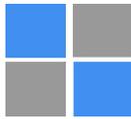
JEL code: Z00

Introduction

In the last few decades, the awareness of benefits realization has increased. Ginger Levin argued that “although much has been written on benefits realization since the 1980s, primarily regarding return on investment in the information systems field, it began to be discussed in the project management field in the 1990s in program management”. (Ginger Levin, 2015)

PMI stated in the Pulse of the Profession report that “the traditional measures of scope, time, and cost are no longer sufficient” and a project must deliver the expected benefits. (Pulse of the Profession 2017) Benefits realization management (BRM) is a way to achieve this through aligning projects, programs and portfolios to the organizational strategy. (The Boston Consulting Group, 2016)

The purpose of this paper is to develop and visualize end-to-end benefits realization process based on the PMI’s view. In order to achieve this, the author will explain the key word “benefit” on the background section. Then, the benefit management will be discussed in detail from the project, program and portfolio management perspective. Finally, a new process will be



proposed through visualization the relationship between portfolio, program and project management.

Background

1. Benefit

As stated on the abstract section, the word “benefit” has three definitions in the business dictionary. The first definition is “advantage, privilege, right or financial reimbursement”, the second is “desirable and measurable outcome or result from an action, investment, project, resource, or technology”, and the last is “desirable attribute of a good or service, which a customer perceives he or she will get from purchasing. Whereas vendors sell features, buyers seek the benefit”.

PMI defined benefit as “the gains and assets realized by the organization and other stakeholders as the result of outcomes delivered by the program”. (The Standard for Program Management, 2017, p.164) “Programs are conducted primarily to deliver benefits to the sponsor organizations or constituents of the sponsoring organization” (The Standard for Program Management, 2017, p.3), and “for a benefit to have value, it needs to be realized to a sufficient degree and in a timely manner”. (The Standard for Program Management, 2017, p.52)

Benefits are varied such as: expanded market presence, improved financial performance, operational efficiencies, enhancing current capabilities, facilitating change, creating or maintaining assets, offering new products and services, or developing new opportunities to generate or preserve value.

2. Benefit Management Project Management Perspective

In the PMI’s view, projects create value and benefits in organizations, and the net quantifiable benefit derived from a business endeavor is named “business value”. “The benefit may be tangible, intangible, or both.” (PMBOK Guide, 2017, p.7) A project manager uses two important business documents during managing a project. Project business case and project benefits management plan.

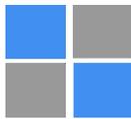
The project business case is used “to establish the validity of the benefits”. (PMBOK Guide, 2017, p.29) The evaluation statement in the business case explains “the plan for measuring the benefits the project will deliver. This should include any ongoing operational aspects of the recommended option beyond initial implementation”. (PMBOK Guide, 2017, p.32)

The project benefits management plan defines “the processes for creating, maximizing, and sustaining the benefits provided by a project” and includes the following key information: target benefits such as net present value calculations, strategic alignment, timeframe for realizing benefits, benefits owner, metrics, assumptions, and risks. It is developed prior to the project being initiated, and maintained iteratively throughout the lifecycle of the project. “The project manager works with the sponsor to ensure that the project charter, project management plan, and the benefits management plan remain in alignment throughout the life cycle of the project”. (PMBOK Guide, 2017, p.33) This plan is one input of the following project management processes: Develop project charter, identify stakeholders, determine budget, plan procurement management, close project or phase.

The benefits management plan is a way to develop more understanding about the expected benefits during developing project charter.

Then it is used as an input to the stakeholder identification process. PMI stated that “it may identify the individuals and groups that will benefit from the delivery of the outcomes of the project and are thus considered as stakeholders.” (PMBOK, 2017, 509)

In the planning stage of procurement management process, the plan “describes when specific project benefits are expected to be available, which will drive procurement dates and contract languages”. (PMBOK, 2017, p.469)



Finally, during the closing project or phase, the project manager measures whether the benefits of the project were achieved as planned through using the plan. The output of this process is a final report, which consists of a summary of project performance. “If the benefits are not met at the close of the project, indicate the degree to which they are achieved and estimate for future benefits realization”. (PMBOK, 2017, p.128)

According to the PMI, one of the project objectives is to complete the project benefits management plan. Another objective is to meet the agreed –upon financial measures, such as benefit cost ratio (BCR) documented in the business case.

3. Benefit Management from the Program Management Perspective

Based on the definition in the organizational project management context, a program is consisted of “a group of related projects, subsidiary programs, and program activities managed in a coordinated manner to obtain benefits not available from managing them individually” and program management enhances the optimally delivery of program benefits to the sponsor organizations or constituents of the sponsoring organization. (PMBOK Guide, 2017, p.29) PMI puts forward that benefits realization is achieved incrementally throughout the program or at the end or after the end of the program and sustained. Mahon and Driessnack argued that “program management harmonizes its project and sub-program components, and manages their interdependencies in order to realize specified benefits”. (Mahon & Driessnack, 2017)

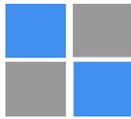
In the Standard for Program Management, there are five performance domains: Program Strategic Alignment, Program Benefits Management, Program Stakeholder Engagement, Program Governance, Program Life Cycle Management.

Program Strategic Alignment is the first performance domain. In this performance domain, program outputs and outcomes which aim is to provide benefits aligned with the organization’s goals and objectives are identified. Three types of documents are existed: Program business case, program charter and a program roadmap.

The program business case is used to assess the program’s investment against the intended benefits. The program charter authorizes the program and expresses the organization’s vision, mission and high-level benefits expected to be produced. “A program roadmap is a graphical representation of the incremental benefits and provides a visual of when the return on investment may help fund the future program benefits and outcomes”. (The Standard for Program Management, 2017, p.45) It is useful when communicating the overarching plan and benefits to stakeholders and assessing a program’s progress toward achieving its expected benefits.

The next performance domain Program Benefits Management Performance. The phases in this domain are the following: Benefits Identification, Benefits Analysis and Planning, Benefits Delivery, Benefits Transition, Benefits Sustainment.

In the “Benefits Identification” phase, the benefits are identified and qualified through creating benefits register, “developed based on the program business case, the organization’s strategic plan, and other relevant program objectives.” (The Standard for Program Management, 2017, p.47) In the “Benefits Analysis and Planning” phase, benefits management plan is established, benefits metrics and framework are developed. Based on the PMI, this plan should be defined “how the resulting benefits and capabilities will be transitioned into an operational state to achieve benefits, and to the individuals, groups, or organizations responsible for sustaining the benefits”. (The Standard for Program Management, 2017, p.50) Furthermore, it is stated that “program costs may continue after program closeout as operational costs to sustain the benefits in the program funding.” (The Standard for Program Management, 2017, p.48) In the “Benefits Delivery” phase, the program manager ensures to deliver the expected benefits through monitoring the organizational environment, program objectives, and benefits realization evaluating opportunities and threats affecting benefits, producing a defined set of reports or metrics and sharing them with the related program stakeholders. During this phase, strategic alignment and value delivery are analysed and assessed. “For internally focused programs, the benefits realization processes measure how the new benefits affect the flow of operations of the organization”. (The Standard for Program Management, 2017, p.52) Another phase is “Benefits



Transition”, which aim is “to ensure that program benefits are transitioned to operational areas and can be sustained once they are transferred” through defining the scope of transition, identifying the stakeholders, measuring the program benefits, developing sustainment plans, and executing the transition. (The Standard for Program Management, 2017, p.53) The last phase is “Benefits Sustainment”. It is defined as “ongoing maintenance activities performed beyond the end of the program by receiving organizations to assure continued generation of the improvements and outcomes delivered by the program”. (The Standard for Program Management, 2017, p.164) The sustainment ways of benefits are operations, maintenance, new components, or other efforts. Before program closure, a benefits sustainment plan, in which the risks, processes, measures, metrics, and tools are identified, should be created.

The third performance domain is Program Stakeholder Engagement. Five phases in this performance domain are listed as follows: Program Stakeholder Identification, Program Stakeholder Analysis, Program Stakeholder Engagement Planning, Program Stakeholder Engagement, Program Stakeholder Communications. In this performance domain, the stakeholder interests should be balanced, the potential impact on program benefits realization should be considered, and desired benefits should be agreed.

The next performance domain is Program Governance. The definition of this domain is “the framework, functions, and processes by which a program is monitored, managed, and supported in order to meet organizational strategic and operational goals.” (The Standard for Program Management, 2017, p.165) It is used to enable the effective realization of program benefits. (Standard for Program Management, 2017, p.59).

Program Life Cycle Management is the last performance domain. The definition of this domain is “to manage all program activities related to program definition, program delivery, and program closure”. (Standard for Program Management, 2017, p.166) The program life cycles consists of three phases: Program Definition Phase, Program Delivery Phase, Program Closure Phase.

Program management is performed by the program manager whose focus is to deliver organizational benefits aligned with the organization’ strategic plan as:

- maintaining responsibility for the leadership, conduct, and performance of a program;
- building program team;
- monitoring the output and outcomes of a program’s component activities;
- ensuring that program components are adapted as required;
- managing or coordinating the management of complex issues through using the communication skills, stakeholder engagement skills, change management skills, leadership skills, analytical skills, integration skills.

A program sponsor’s responsibilities are to ensure delivery of the intended benefits, secure the available positive benefits, steward the handling of negative benefits.

“To provide capable governance resources to oversee and monitor program uncertainty and complexity related to achieving benefits delivery”, “provide oversight and monitoring so program benefits are planned, measured, and achieved”, “review expected benefits and benefits delivery” are a program steering committee’s responsibilities.

4. Benefit Management from the Portfolio Management Perspective

In the organizational project management context, “success is measured in terms of the aggregate investment performance and benefit realization of the portfolio”. (PMBOK, 2017, p.13) The focus of portfolio management is value, “the entire quantifiable and qualifiable benefits, worth and usefulness of the organization”, and it can be defined “in terms of its short-



medium-, or long-term realization. Value is created through the effective management of ongoing operations”. (The Standard for Portfolio Management, 2017, p.7)

The portfolio manager should take into account financial and non-financial benefits and risks during portfolio strategic management and alignment, organizational change impacts on the expected benefits, provide oversight and feedback on the delivery of benefits, secure the available benefits leading to value realization. The operational manager’s responsibility is to realize the outcomes and benefits from the successfully implemented portfolio components. The portfolio has life cycle, “the ongoing processes and functions that occur to a set of portfolios, programs, projects, and operations within a continuous time frame”. (The Standard for Portfolio Management, 2017, p.117) The stages of the life cycle are Initiating, Planning, Executing, and Optimization. During planning stage, portfolio strategic planning is realized regularly, and the portfolio business model is reviewed in order to ensure that it is aligned with customer values/benefits. The next stage is execution stage in which benefits realization potential based on component delivery is monitored. In the optimization stage, “the portfolio manager facilitates discussions with stakeholders to ensure that the organization realizes the intended benefits for the remaining components”, and continued “benefit realization from components that have been transitioned into the operational work of the organization may also provide credible evidence for optimization”. (The Standard for Portfolio Management, 2017, p.25)

In the portfolio management, there are six performance domains: Portfolio Strategic Management, Portfolio Governance, Portfolio Capacity and Capability Management, Portfolio Stakeholder Engagement, Portfolio Value Management, Portfolio Risk Management.

In the Portfolio Strategic Management, benefits are considered during the following sections: Portfolio Strategic Objectives, Portfolio Charter, Defining Key Portfolio Components, Portfolio Optimization.

In this performance domain, a portfolio strategic plan is developed and aligned to the organizational strategy and objectives. PMI argued “that the summation of the initiatives’ outcomes under a specific strategic goal lead to %100 realization of that strategic goal’s benefits.” (The Standard for Portfolio Management, 2017, p.30) The expected benefits are listed in the portfolio strategic plan. A portfolio performance management plan is “a subsidiary plan or component of the portfolio management plan that describes performance measures, reporting (on scope, cost, schedule, and resources), resource optimization, and benefits realization”. (The Standard for Portfolio Management, 2017, p.117)

A portfolio chapter is created based on the portfolio strategic plan, portfolio process assets and enterprise environmental factors in order to give authorization to the portfolio manager. “A portfolio is built using a set of subsidiary portfolios, programs, projects, and operational activities managed in a coordinated way”. (The Standard for Portfolio Management, 2017, p.36) A key component in the portfolio is to realize the desired benefits. During optimizing the portfolio, the benefits, risks, and resources are balanced and optimized.

The second performance domain is Portfolio Governance Domain, “a set of practices, functions, and processes within a framework based on a set of principles that are fundamental norms, rules, or values that guide portfolio management activities in order to optimize investments and meet organizational strategic and operational goals.” (The Standard for Portfolio Management, 2017, p.117)

The other performance domain is “Portfolio Capacity and Capability Management”. It is “a comprehensive framework based on a set of guiding consisting a set of tools and practices to identify, allocate, and optimize resources for maximizing resource utilization and minimizing resource conflicts in portfolio execution”. (The Standard for Portfolio Management, 2017, p.117) During managing capacity and capability, the portfolio manager should consider benefit realization. There are four elements in capacity management. Capacity Planning, Supply and Demand Management, Demand Optimization, Reporting and Analytics. The targeted portfolio benefits are achieved through using these elements during managing capacity. In the Capacity Planning, benefits of portfolio components and their priority are considered while allocating resource. In the Supply and Demand Optimization, the mitigation strategies are developed, and

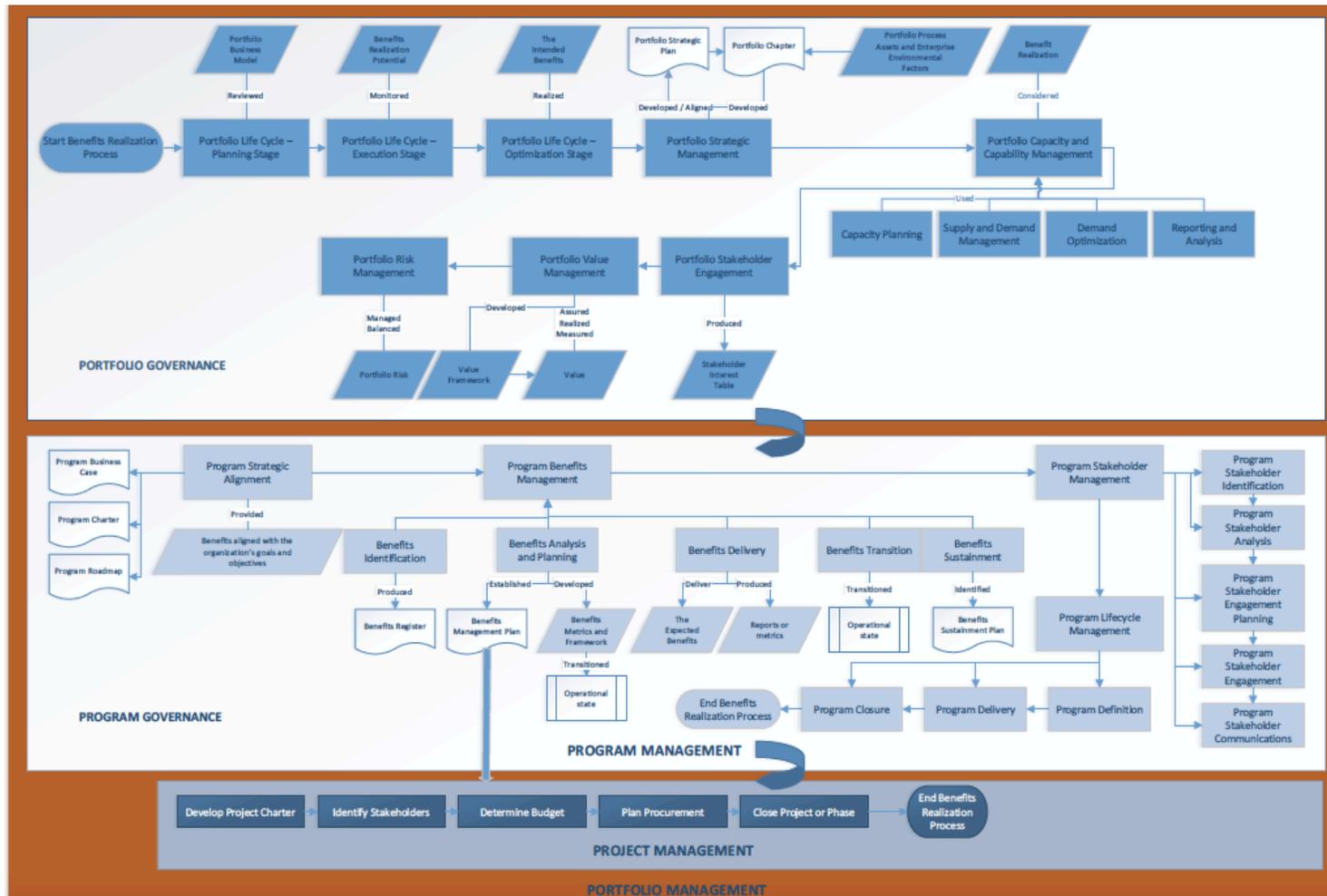
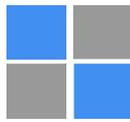


metrics are measured for optimization. In the Capability Development, new capabilities are developed and existing capabilities are sustained, and their benefits realization are measured.

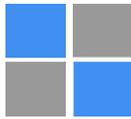
The fourth performance domain is Portfolio Stakeholder Engagement. In this performance domain, the stakeholder interest table is defined. The roles of Portfolio Governance, one of stakeholder group, are to oversee the portfolio, set priorities, manage the spending, report progress, and manage timely delivery of benefits. The interest of portfolio sponsor is benefits and outcomes that meet the organization's goals. (The Standard for Portfolio Management, 2017, p.66)

Portfolio value management is another performance domain. Assuring, realizing, and measuring value are key concepts in this performance domain. "Value assurance is concerned with ensuring that the deliverables enable the intended beneficial changes". (The Standard for Portfolio Management, 2017, p.81) In order to realize value, portfolio managers "need to ensure that the components receiving outputs from other components in the portfolio exploit those outputs effectively and deliver the targeted benefits so that the portfolio's expected value continues to align with the requirement". (The Standard for Portfolio Management, 2017, p.82) For measuring the value of portfolio, value measurement framework is developed.

Portfolio risk management is the last performance domain. The portfolio manager should manage portfolio risk and balance risk through taking a proactive approach. It is stated that "the sum of benefits among the component elements of the portfolio or the delivery of specific capabilities via projects or ongoing operations does not fully define the delivered value of the portfolio". (The Standard for Portfolio Management, 2017, p.92).



End-to-End Benefits Realization Process through Integrating Portfolio Management, Program Management and Portfolio Management



Conclusions

To understand the importance of benefits realization, establish a process integrating portfolio management, program management and project management, moves the organization forward to realize its vision. This research is the first step in achieving this goal. The proposed process provides end-to-end benefits tracking, developed based on the PMI standards. In the future, the research could be expanded through integrating the other standards.

References

- Levin, G. (2015). Benefits – a necessity to deliver business value and a culture change but how do we achieve them? Paper presented at PMI® Global Congress 2015—North America, Orlando, FL. Newtown Square, PA: Project Management Institute.
- Mahon, C. R. & Driessnack, J. D. (2017). Winning in the 21st Century: Command by Negation within a Portfolio, Program, Project Structure, a Point Paper to the Section 809 Panel. *PMI White Papers*. Project Management Institute. (2013). *A guide to the project management body of knowledge (PMBOK Guide)*. Newtown Square, Pa: Project Management Institute.
- Project Management Institute. (2017). *A guide to the project management body of knowledge (PMBOK Guide)*. Newtown Square, Pa: Project Management Institute.
- Project Management Institute. (2017). *The Standard for Program Management Fourth Edition*. Newtown Square, Pa: Project Management Institute.
- Project Management Institute. (2017). *The Standard for Portfolio Management Fourth Edition*. Newtown Square, Pa: Project Management Institute. Pulse of the Profession 2017 (2017).
- The Boston Consulting Group (2016). Connecting Business Strategy and Project Management.



WOMEN IN PROJECT MANAGEMENT: OPPORTUNITIES FOR LEADERSHIP SUCCESS

Michael J. Littman, Ph.D.

SUNY Buffalo State, Fellow: Brandeis University, USA

Lorena D. Mathien, Ph.D.

SUNY Buffalo State, USA

Ezra S. Littman, M.S.

SUNY Buffalo, USA

Abstract

There is an increasing gap worldwide between employers' need for skilled individuals in project management and the availability of professionals to fill these roles. This indicates significant current and future opportunities in the field of project management.

It is vitally important and ethically sound to close the current opportunity gap for women in project management by providing women a chance to utilize their leadership skills for successful project execution and completion. Since studies have shown women are as competent, or more competent, leaders who are typically underrepresented in project management, it would be vital to consider increasing the hiring of female project managers for the sake of gender equity, ethical leadership, and project success. This is a strategy to reduce the opportunity gap for women and the continuing need to fill professional positions in project management.

There are several recommendations made to utilize the leadership skill sets of women that can meet the projected need for female project managers. Of the various skills required by project managers, three categories of skills include: 1) main leadership skills, including communication and ethical behavior, 2) relationship skills, including collaboration/teamwork, inspiration/motivation, and development of others, and 3) task skills, including delivering results, analysis, and problem solving.

Key words: *project management, women in project management, leadership skills*

JEL code: L21, L29, M14

Introduction

Results from the Project Management Institute (PMI) study “Job Growth and Talent Gap 2017 to 2027” (PMI, 2017) indicate that there is widening gap worldwide between the industry need for skilled project managers and the availability of professionals to fill those roles. This points to significant current and future opportunities in the field. There are several catalysts for this gap, including:

- 1) A dramatic increase in the number of jobs requiring project oriented skills,
- 2) Attrition rates, including professionals retiring from the workforce, and
- 3) A significant uptick in demand for project management talent, especially in rapidly developing economies such as China and India (PMI, 2017).

Also of importance is the gender inequality in hiring for positions in various fields, including project management leadership, which has been historically male dominated. According to one study, reported by Berger (2016) there is a large gender disparity across all major sectors within the leadership of the project management field. Based on the top five



project management industries, construction is 93.5% male and 6.5% female, telecommunications is 73.4% male and 26.6% female, consulting services is 71% male and 29% female, while information technology is 68.7% male and 31.3% female. There is more parity in financial services where it is 52.1% male and 47.9% female (Berger, 2016).

Based on their skills, background, and experience, women are in a strong position to succeed as project managers when provided the opportunity to lead larger projects in more venues, as mentioned above, as well as in the growing field of health care. It is important and necessary to reduce this opportunity gap for women in project management.

Purpose of the Study

The purpose of this study was to analyze leadership skills important to project management success and review the most valuable set of skills that can be exhibited by women leading to personal and career growth on a path for success in project management. This will help reduce the gap in opportunities for women and reduce the gap in employment shortfalls in project management.

Growth in Project Management Jobs

In today's global economy, jobs have become more project-oriented, as the variety of skills used in project management have expanded in a range of industries. These industries include areas such as health care, information technology, and professional services. While manufacturing and construction are still the leading sectors for openings in project management skill areas, an analysis shows that the health care sector in the United States has a 17% growth in project-oriented jobs (PMI, 2017).

More specifically, the Anderson Economic Group (AEG) and PMI analyzed project-oriented employment opportunities and found that in the United States, between 2017 and 2027, there will be an increase of 2.1 million jobs or 213,974 new jobs per year (PMI, 2017). It was noted that project managers contribute to a nation's productivity and there is a possibility of a \$22.5 billion GDP risk reduction in the US economy if project positions are not filled.

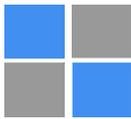
The PMI analysis of talent gap supports the issue that future demand for project managers is growing faster than demand for workers in other occupations. This necessitates a review of the opportunities, strategies, and pathways project managers may follow to be best prepared for successful employment in the field, as well as using appropriate strategies to hire more qualified women. The skills needed for project success can be met by the increasing use of the talents and skills of more females in project management leadership.

Varga and Cziszarik-Kocsir (2017) noted the 2015 work of the Association for Project Management that indicated, on average, there are four times as many male project managers as females, although these percentages may differ in certain countries and in employment sectors. Nevertheless, the number of women in project management roles is an area of concern that must be recognized and addressed.

Leadership

Dubrin (2019) defined leadership as the ability to inspire support and confidence among the people who are needed to achieve organizational goals. Leadership was clarified by Daft (2018) as an influence relationship among leaders and followers who intend real changes and outcomes that reflect their shared purpose. Both ideas have value in this discussion.

According to Littman and Littman (2017), leadership involves the 4 I's; intentions (goals of the project), influence (on other people, organization, society) impact (outcome of the project), and integrity (honest dealings in the project). These are the ideals that successful



leaders should model. This leadership direction is highly valuable for the success of any organization. Working together, appropriately guided by an encouraging leader, an organization's goals should be reached. This will lead to the success of the project.

Leadership is a set of skills and experiences, goal orientation, influences, and impacts that are not gender specific. Strong leadership today can be provided by both men and women. Research has shown that there are certain differences between the leadership styles and skills of men and women. Zenger and Folkman (2019) reported that women scored higher than men in most leadership skills. This supports the notion that women are just as competent and, in some cases, more competent, than men. This is a sign that there are opportunities for women in leadership positions.

Leadership Skills for Women

Currently, there are more men than women in leadership roles in most organizations. Today, as more women have attained higher levels of education, enhanced their experiences, and gained skills related to leadership, there needs to be greater opportunities available for women leaders in all areas of the business and the professional world.

In a number of studies, female leaders self-reported and were perceived by their subordinates as being strong leaders. When direct reports reviewed the male and female managers, subordinates largely found female leaders to be the more competent party. According to Burger (2018), "Women were seen as more effective when they held senior-level management position ... The notion that cognitive load leads to the increase use of stereotypes holds true; however, rather than relying on stereotype of man's greater leadership effectiveness, organizational members may rely upon a different, newer stereotype: that women are more effective leaders."

Paustain-Underdahi, Walker, and Woehr (2014), in a meta-analysis across 95 studies, found that when all leadership contacts are considered, men and women do not differ in perceived leadership effectiveness. When other ratings only are examined, women are rated as significantly more effective than men. In contrast, when self-ratings only are examined, men rate themselves as significantly more effective as leaders than women rate themselves.

Since studies have shown women are as competent, or more competent, leaders who are typically underrepresented in project management, it would be important to consider increasing the hiring of female project managers for the sake of gender equity, ethical leadership, and project success. This is a strategy to reduce the opportunity gap for women and the continuing need to fill professional positions in project management.

Women Leadership Skills for Success in Project Management

In a growth area such as project management, it is critical to use available talents of the people in the project management field. According to Jones (2018), women are a powerful force in project management. A limiting factor is that women may miss potential opportunities for leadership. Women often do not get the same opportunities as men, and, therefore do not assume the same number of leadership roles in project management. When this opportunity is lost, it harms that individual, as well as possibly impacting the timely completion and success of projects.

Although Varga and Cziszarik-Kocsir (2017) found no fundamental differences between the



project management successes based on gender, they noted the value of a leader's personal integrity, expertise, and people-centered approach. This is the starting point for focusing on the most important leadership skills women can exhibit to be successful project managers. Clarification will be based the following categories of project management skills: 1) main leadership skills, 2) relationship (people) skills, and 3) tasks (expertise) skills. All of these skills are considered critical for successful project management, and all are skills that women may focus on to improve their presence in the project management arena.

Main Skills Needed: *Communication Skills, Displays Strong Ethical Behavior*

- 1) *Communication* is the essential skill needed for project success. Strong written, verbal, and listening communication skills are the foundation of any relationship guiding the direction of a project. The ability of a leader to provide clarity in direction to her team through the use of technology, individual directions, and group discussions can be the difference between project success and project failure. A project can reduce its chance for success, such as being overbudget, late, or missing goals, based on communication problems.

Sharing important information to all stakeholders in a timely and clear manner is a critical success factor for any project. Open communication channels between leaders and team members allow for shared visions and ideas necessary for project success. Sharing information in a face-to-face channel is typically best, especially for sensitive communication. Two-way communication is timelier for all parties involved and more valued. This communication positively impacts not only project team members, but also clients and stakeholders.

Women should develop their skills in this area and become role models of communication excellence. This is done by an ongoing practice of being open, honest, and clear.

- 2) *Displaying strong ethical behavior*, being honest, is a second essential skill necessary for project success. Without ethics and honesty there is no support from stakeholders.

According to PMI (2017), "Responsibility, respect, fairness, and honesty are the values that drive ethical behavior for the project management profession as reflected in the PMI Code of Ethics and Professional Conduct. Project managers face decisions and ethical dilemmas every day. While project managers often know what to do, how to do it can become a challenge, and when stakeholder interests conflict, ethics enters the picture. Ethics is the discipline of how to do it best."

Ethics can be a valuable tool in the decision-making process, providing structure and guidance in project methods. Godbold, cited in Turner (2016), stated that ethics in projects and business might be an opportunity to differentiate oneself from the competition and to exploit competitive advantage. The idea of competitive advantage is valuable in the leadership opportunities for women and in the business environment faced by organizations today.

Ethical leadership is vital to any organization, all people, and project success. Some of the key areas that ethical leadership supports include: 1) attraction and retention of high quality employees (human resources); 2) attraction and retention of high quality projects (financial resources); and 3) goodwill from the community, competitors, and the government.

Littman and Littman (2017) concluded that ethical leadership is a critical form of leadership action. These actions lead to higher levels of productivity, stronger service quality, better quality decision-making, a more trusting environment, better



communication, and increased flexibility from stakeholders. The leader's actions and the methods in which they are communicated are the stepping-stones on the path to project success. Without these actions, any project is more likely to have problems and issues on the route to completion.

Relationship Skills Needed: *Collaborating/Teamwork, Inspiring and Motivating, Developing Others*

- 1) *Collaboration/Teamwork* is highly valued as a skill today. People who drive organizations and their contributions toward goal attainment are noteworthy and valuable. Cooperation towards setting, discussing, and attainment of goals allows people to work together towards project success. People work better when they share the vision of a project. Team members whose ideas are valued have a sense of belonging. This turns into enhanced contributions, commitment, and ownership of actions, in turn leading to success.

Female leaders should always work closely with project teams for two-way communication towards success. This will allow for supportive decisions that will engage team members who feel they are contributing to meeting established project goals, and it will instill commitment to the successful outcome of the project.

- 2) *Inspiration/motivation* are the reason people do certain things. Motivation is an internal and external personal guiding force that pilots one's actions. It is the key reason a person acts and exhibits a level of contributions in specific ways. Allowing team members to focus on and use the most meaningful aspect of their skill set will enhance their personal motivation and contributions, thus leading to project success.

Female leaders should learn about their individual project team members, their motivation, and their goals. This personal linkage will lead to better relationships and enhanced success. It is always important to show team members appreciation for their contributions, via words of encouragement or tangible rewards.

- 3) *Developing others* is a key leadership goal for female project managers. Being supportive of others in their personal and career growth, and development of skills, is vital and necessary for current and future project success. Team members must have opportunities made available to them to enhance their skills, including coaching and mentoring team members to support their growth and development, providing training or increased responsibilities on a project, and providing opportunities for advancement. Using a structured career plan, evaluation plan, and review process, female leaders can enhance accomplishments of individuals and the organization through the growth shown by others.

Task Skills Needed: *Driving Results, Analyzing Issues, Solving Problems*

- 1) *Driving results*, including establishing project goals, project targets, and project outcomes, is the responsibility of a project leader. This task is developed while adding the structural issues and benchmarks, as well as the personal and team motivation, to complete the project. The project leader takes responsibility for the ongoing process and the final project results. Meeting the goals and having the trust developed in consultation with shareholders drives successful results. All stakeholders must have knowledge of the mission and support the vision for completion.

Issues that may impact results include cost and financial issues, legal and regulatory issues, human resource issues, time factors, and environmental threats that could impact the outcome of the project. Results are best met using the main skills of communication and ethical leadership actions to address and solve concerns. Results drive the plan, the



deadlines, and the final outcomes. Women leaders can drive results by using their knowledge of the assignment and how they assign people to complete the project on time and on budget.

- 2) *Analyzing issues* allows a project leader to examine, in detail, the concern and problems that arise during the process of the project that may have an impact on the planned outcome. As mentioned previously, these issues can arise from multiple areas. The first step is to gather sufficient and appropriate data to clarify the issues of concern. This is best done by gathering data from records and involving stakeholders with relevant background knowledge. Using their feedback, while valuing different perspectives, is a useful tool in connecting all people to assist in clarifying the issues, with the goal of solving the problem. Female leaders can enhance their success by accurately and systematically using the expertise of relevant stakeholders to review the issues of concern.
- 3) *Solving problems* is accomplished by developing a plan of action after selecting the problem, analyzing alternative solutions, and selecting the best choice for a positive resolution. A project manager will encounter both small and large problems, routine and nonroutine complications, financial and human resource troubles, as well as problems that could impact completing projects on time, on budget, and in scope. Successful leaders will have the thinking skills and practice to confront problems and resolve those problems in a timely fashion. Female project leaders should develop a clear plan for problem solving that utilizes multiple strategies to review the challenges they encounter.

Conclusions

Women are important influencers and can have a positive impact on project management leadership. Since studies have shown women are as competent or more competent as leaders who are typically underrepresented in project management, it would be important to consider increasing the employment of female project managers for the sake of gender equity, ethical leadership, and project success. This is a strategy to reduce the opportunity gap for women and the continuing need to fill professional positions in project management.

Women should use their strengths in the following areas, strengths based on a two overriding main skills, followed by three relationship (people) skills, and three tasks (expertise) skills, that will assist in the leadership success of women project managers. The main skills needed to be exhibited by women leaders include communication skills and the ability to display strong ethical behavior. The major relationship skills required include collaboration/teamwork, inspiration/motivation, and the development of others. The major task skills needed include the driving of results, issue analysis, and problem solving.

References

- Association for Project Management, (2015). "Women in project management." APM Association for Project Management.
- Berger, R., (Dec 12, 2016). "Leadership studies that prove women make great project managers." Project Management.
- Daft, R.L. (2018) *The Leadership Experience*, 7th Ed. Cengage Learning. Boston MA
- Dubrin, A.J. (2019) *Leadership*, 9th Edition, Cengage Learning. Boston MA
- Littman, M.J. and E.S. Littman, (2017). Six ethical leadership strategies for project management success; presented at the Sixth Scientific Conference on Project Management in the Baltic States,



- University of Latvia, April 2017; republished in the PM World Journal, Vol. V111, Issue X, November, 2019.
- Jones, T. (2018) “Women’s work: women are a powerful force in project management but they don’t often get the same opportunities-or pay-as men.” PM Network, 32(5) 28-37.
- Paustain-Underdahi, S.C., L.S. Walker, and D.J. Woehr (2014). “Gender and perception of leadership effectiveness: a meta-analysis of contextual moderators.” Journal of Applied Psychology. Vol 99, No: 6, 1129 – 1145.
- Project Management Institute (2017). Project Management Job Growth and Talent Gap 2017-2027.
- Turner, J.R. Editor (2016). Grower Handbook of Project Management , 4th Ed. Routledge. London and New York.
- Varga, J and A. Cziszarik-Kocsir, (April 27-28, 2017). “Women in project management.” Sixth International Scientific Conference on Project Management in the Baltic Countries. University of Latvia.
- Zenger, J. H. and J. Folkman, (June 25,2019). “Research: women score higher than men in most leadership skills.” Harvard Business Review.



REFITTING STAKEHOLDER INTEGRATION STRATEGIES: CASE ICT PROJECTS IN KENYA.

Ominde Diana Kageha

*Strathmore University
Strathmore Business School, Kenya*

Ochieng Edward Godfrey

*Faculty of Business and Law
The British University in Dubai (BUiD) Dubai, United Arab Emirates*

Omwenga Vincent

*Strathmore University
Faculty of Information and Technology, Kenya*

*Legal notice: Paper withdrawn by the request of author's as of
November 9th 2020*



PROJECT MANAGEMENT METHODOLOGY: THEORETICAL REVIEW

Turkebayeva Karina
Satbayev University

Abstract

In today's changing at accelerating rate economic and business environment, there is a growing popularity, interest and need for an effective way of organizing work such as projects. The application of projects as a working form and their management concepts were transferred to different industries: government, construction, energy, IT, consulting, financial services, education, manufacturing. The current state of project management can be characterized by significant increase in the number of projects implemented in these fields. When we consider the concept of project management methodology, we face with a whole system of components. Many scholars and practitioners strive to construct the right definition and components of project management methodology in order to apply it in a best way. The term project management methodology dates back to 1960 and continues to develop by inventions of relatively new approaches such as agile and hybrid. This research aims to provide a theoretical literature review on the concept of project management methodology by considering diverse research works, theories, models, ideas, opinions, and methods to get deeper comprehension of its basic principles (fundamentals), what advantages and disadvantages of project management approaches are presented in previous studies and what are additional findings in project management methodology theories. This paper provides an examination of different views, knowledge and research results to explain the importance of project management methodology as a part of project success that is the final target of methodology. It will be the basis for further research within PhD dissertation as a part of research strategy. This review deepens the knowledge within the project management context and is intended to make a theoretical contribution to scientific literature base.

Key words: project management, methodology, approach, project success.

JEL code: O22

Introduction

Project management methodology is one of the frequently researched topics in project management. But, project management methodology is based on a distinct project management approach, that defines set of principles and guidelines for managing project.

In order to better understand the nature of these two concepts, it should be first investigated what is the meaning of the notion of project management methodology as well as project management approach, as they are commonly used as mutually replacing. At the same time, the interconnections of two terms should be highlighted. In addition, differences between agile and traditional project management approaches and advantages/disadvantages of each approach should be detailed.

Project success is the essential goal of any methodology, be it within the context of agile or traditional approaches. The number of factors influencing project success continues to supplement, but the results of projects continue to disappoint (Cooke-Davies, 2002). Project management methodology is meant to enhance project effectiveness and increase chances of success (Vaskimo 2011). However, the extent that the objective of achieving project successful results by project management methodology is reached is unknown as project still fails to reach their goals (Lehtonen and Martinsuo, 2006; Wells, 2013).



The paper aims to contribute to scientific knowledge of project management methodology concept as the part of project success and provide an overview on the given topic by considering diverse views, works, models, opinions, results. The article consists of the following parts: first part sheds light on project management methodology and project management approach, then comparison of two main project management approaches are presented. Later, project success is revealed through such factors as project management methodology, management support, human resources, legislation/ regulation, and at the end conclusion is provided.

Project management methodology

The term project management methodology was first defined by early 1960 (Adrian and Anca, 2014). The concept has been supplemented and changed over time. Project management methodology is a strictly combination of logically related policies, practices, processes, tools, techniques and templates that determine how best to plan, execute, monitor and deliver a project (Whitaker, 2014).

Project Management Institute defines project management methodology as a system of practices, techniques, procedures, and rules used by those who work in a discipline (Project Management Institute, 2017). The existing definitions have similar meanings and are presented in Table 1.

Table 1

Project management methodology definitions

Year	Definition	Author
1989	Set of tools, methods and practices used in software development.	Humphrey
1996	A structured way to manage projects consisting of rules and directions and is based on specific way of thinking.	Brinkkemper
1997	Set of techniques and tools used for solving specific problem.	Introna and Whitley
1999	Framework to improve inter-organizational communication; and avoid duplication of effort by having documentation, common resources and training.	Clarke
2000	Structured approach for delivering a project, and consists of set of processes and activities, with each process or activity having clearly defined schedule and resources.	Turner
2001	Knowledge set about tasks, techniques, deliveries, roles and tools.	Gane
2002	Structured project management method.	Office of Government Commerce
2003	Any principle project management team relies on in order to successfully deliver project result.	Cockburn
2003	Set of guidelines and principles that can be tailored and applied to specific situation, where guidelines could be as simple as task list, or it could be specific approach to project with defined tools and techniques.	Charvat
2004	Theoretical framework that describes each task in	Kerzner



	depth, so that a project manager or team will know what to do in order to implement activities of project according to the budget, schedule, specifications and other requirements.	
2009	Set of guidelines that support project manager and team through controlled, managed and visible set of activities in order to achieve project results.	Office of Government Commerce
2013	Model that describes all of the project management activities and documentation.	Ericsson
2014	Set of methods, techniques, procedures, rules, templates, and best practices used on a project.	Spundak
2019	Governance tool that defines the roles, responsibilities, process, milestones, and control points in the project. Management tool that provides guidance in the planning and implementation of the project.	Muller et al.

Source: author's construction based on literature review

Based on the wide range of definitions, we propose the following description of project management methodology: Project management methodology is the doctrine on organization of activity that includes:

- rules, principles, values, common terminology
- roles, responsibilities
- guidelines, standards, documentation
- processes, procedures
- methods, tools, techniques, templates
- tasks, activities
- milestones, deliveries
- best practices.

It is important to note the purposes and benefits of project management methodology. Introduction of the new team members to the process, easier replacement of the team members, clear responsibilities, customer impression, visible progress and status reporting and education are several methodology purposes (Cockburn, 2006). Kerzner (2001) argues that characteristics of a good methodology are recommended level of details, usage of templates, standardized planning, time management and cost controlling techniques, standardized reporting, flexibility for usage on all projects, flexibility for quick development, that it is understandable to user, accepted and usable within organization, it uses standardized project life cycle phases, and that is based on guidelines and good business ethics. Wells (2012) states that project management methodology benefits to projects and organizations, such as control and monitoring, standardization and unified language, guidance and support. However, the findings suggest a misalignment between the intended benefit of project management methodologies at the strategic level and the reported benefits by project managers at the project level (Wells, 2012).

It is worth mentioning here that forty years ago, the first formal project management methodologies were set up by government agencies to control budget, plans and quality (Packendorff, 1995). Three types of project management methodologies are revealed in the literature: standardized, customized and combined project management methodologies. However, the main question of debate among the researchers and practitioners is whether standardization with little project environmental context; customization with context; or mixed with some context can result in project success.



Project management approaches

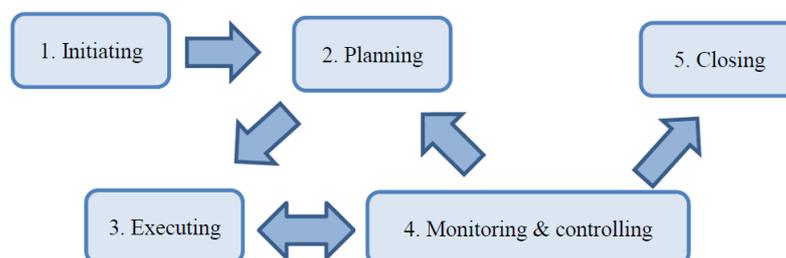
The term project management approach is most frequently applied as a set of principles and guidelines that define how specific project is managed (Iivari, Hirschheim & Klein, 2000; Introna & Whitley, 1997). Two main project management approaches that is traditional (predictive, waterfall) and agile (adaptive) are discussed in the research works. Furthermore, the absence of consensus on which one is better and preferable lead to the emergence of relatively new hybrid project management approach that combined both approaches.

Traditional project management approach

Traditional or classical project management approach was designed for projects that are implemented by the fixed planned manner. The main reason for this orientation is that project principles were set up in the 1950's which can be characterized by stable economic conditions and of course, by absence of dynamic changing environment caused by rapidly advancing technologies as in today's world. The essential target of traditional project management approach is following the established plan within the project triangle that is time, cost and scope. The main idea behind that classical, rational approach is that projects are quite simple and predictable with clear borders and limits, which gives the possibility to construct the plan in detail and pursue it without big changes (Spundak, 2014; Andersen, 2006; Wysocki, 2007, Shenhar, A. J. & Dvir, D., 2007).

Moreover, almost all bodies of knowledge of project management institutions are based on traditional project management approach. According to Spundak (2014), the reason for this domination could be explained by the fact that first variants of bodies of knowledge were introduced in the 1980s when no alternative approaches existed except for traditional approach. The subsequent editions of bodies of knowledge reflect the changes in the part of actual practices but do not always meet the expectations of practitioners.

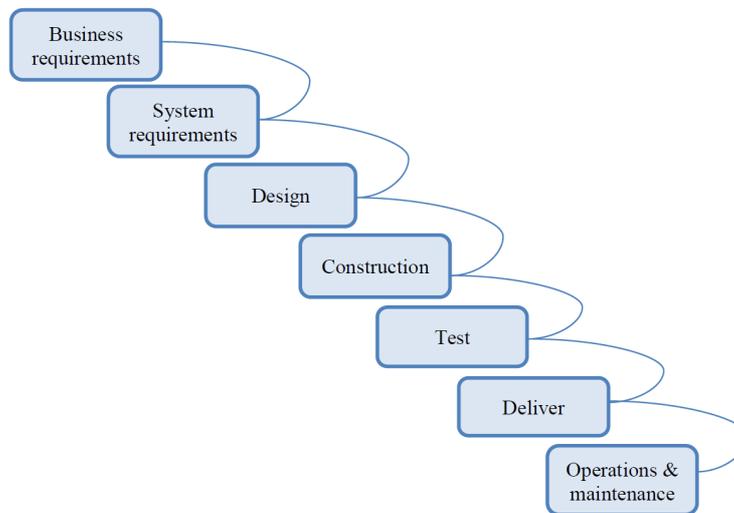
The traditional approach is based on five sequential steps, as presented in the PMI (2017) PMBOK and depicted in Figure 1. The PMBOK guide divides the project management process into five process groups: initiating, planning, executing, monitoring and controlling, closing. These groups are broken down into 49 project management processes that are allocated in comply with the following ten knowledge areas: integration, scope, schedule, cost, quality, resource, communication, risk, procurement and stakeholder management.



Source: PMI (2017)

Fig. 1: The five process groups of the PMBOK project management process.

In software engineering and development, this approach is often named as the waterfall model, which is illustrated in Figure 2, and consists of several tasks in linear sequence.



Source: (Hass, 2007)

Fig. 2: The project life cycle model

Traditional project management approach is oriented on projects where clear defined points and goals can be developed at the beginning of the life cycle. Fernandes et al. (2018) mentioned that in a predictive approach the time, cost and scope of project are determined in the early phases of the life cycle and any changes to project are strictly managed. Sheffield & Lemétayer (2010) shared similar ideas and pointed that in this type of projects, the requirements are clearly specified and little change is assumed. This approach is “change-resistant and focus on compliance to plan as a measure of success” (Wysocki, 2009). In addition, traditional approach requires considerable effort in the process and documentation, especially in case of change requests.

Furthermore, the predictive (waterfall) approach can be tailored to any project environment as basic principles, processes, procedures and methods can be applied to every project uniformly. It should “ensure robustness and applicability to a wide range of projects, from simple and small to most complex and large ones” (Spundak, 2014). At the same time, the number of authors adhering to the opinion that “one size does not fit all” is consequently growing. Thus, in project management the “one size does not fit all” principle is unanimously recognized (Charvat, 2003; Wysocky, 2009; Sheffield & Lemétayer, 2010). One of the crucial task is to select the right and appropriate approach and methodology for a specific project in order to be compatible with cost, quality, time and scope (Charvat, 2003). On the contrary, the mistake in choice of more suitable approach and methodology can lead to the increased rates of project risks (Elkington & Smallman, 2002).

Since traditional project management approach could not always response to changing nature of projects, the necessity for new ways to meet the challenges of today’s economic and business environment arose. According to many researchers, the projects have changed and became more complicated with growing number of stakeholders, tasks and complex interrelations that traditional project management approach is not able to deal with (Cicmil & Hodgson, 2006; Golini & Landoni, 2014; Shehnaar & Dvir, 2007; Van de Waladt, 2011). At the same time, the main weaknesses of traditional project management approach that were determined by scholars as well as by practitioners created the ground for alternative project management approach. Williams (2005) stresses that the essential reasons of inapplicability of



the traditional approach to wide range of contemporary projects are “structural complexity, uncertainty in goal definition and project time constraints”. To support this point of view, several authors note high fallibility of projects and their management as one of the key disadvantage of traditional project management approach (Cicmil & Hodgson, 2006; Gauthier & Ika, 2012; Ika & Hodgson, 2014; Shehnaar & Dvir, 2007).

Agile project management approach

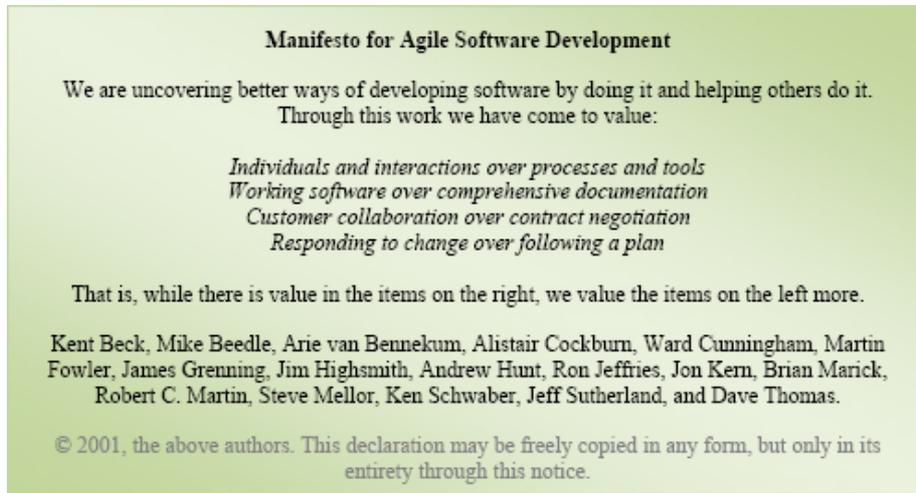
The term “agile” is defined as “able to move quickly and easily, and think quickly and in an intelligent way” (Oxford learner’s dictionary). Basic characteristic of agility is the ability to react on time on changes created by turbulent environment. Interestingly that the concept of “agility” emerged in the field of manufacturing in 1991 and was developed by team of researchers at Iacocca Institute of Lehigh University (USA). They defined agility as “manufacturing system with capabilities (hard and soft technologies, human resources, educated management, information) to meet the rapidly changing needs of the marketplace (speed, flexibility, customers, competitors, suppliers, infrastructure, responsiveness)” (Yusuf, Sarhadi & Gunasekaran, 1999).

The concept of agile project management dates back to 1980s compared to traditional project management, which basic principles were developed in the 1950s and emerged from defense and construction industries. Contrary to the agile manufacturing and agile software development, few works dedicated to agile project management in other industries. Until 2009, agile project management approach was prevailing in IT projects. Therefore, most of studies were concentrated on software development projects. In the last decade, the little number of projects accepted and applied agile practices (Stare, 2013).

Confronto et al. (2014) offer the definition of agile project management as follows: “an approach is based on a set of principles, whose goal is to render the process of project management simpler, more flexible and iterative in order to achieve better performance (cost, time and quality), with less management effort and higher levels of innovation and added value for customer”.

Furthermore, the agile approach is oriented on projects with big amount of uncertainty, unpredictability, adaptability, constant changes and updates, faster execution and deep client involvement. Similarly, Yusuf et al. (1999) point out the following foundations of agility: speed, flexibility, innovation, proactivity, quality and profitability. Agility is based on the number of business principles such as continuous innovation, product adaptation, reduction in delivery times, adjustment of people and processes, and reliable outcome (Highsmith, 2004).

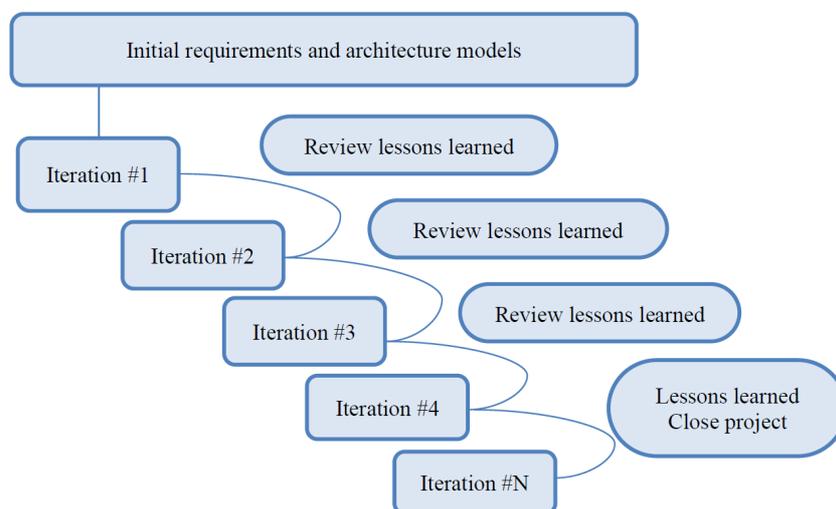
The agile community, which shared the same views and beliefs, was founded in 2001 and set up four core values, as depicted in Figure 3. Based on the Agile Manifesto, four essential values like *individuals*, *software*, *customer and change* should be highlighted, which means that despite the recognized importance of items on the right, agile project management approach is more focused on the items on the left. Even though, Manifesto was developed for agile software projects, all the core values can be introduced and applied to different projects that use agile project management (Aguanno, 2004).



Source: (Agile Alliance, 2001)

Fig. 3: Agile Manifesto

Agile project management is iterative and incremental process, which implies that stakeholders and project team members cooperate closely to understand the domain in question, identify requirements, and prioritize functionalities (Hass, 2007). The agile approach embraces lots of rapid iterative planning and development cycles, as illustrated in Figure 4, enabling checking and assessment of interim results and making corrections by users, clients and stakeholders in case of change in their preferences. This approach opens the opportunity for fast modifications of the product when previously uncertain goals and requirements are revealed.



Source: (Hass, 2007)

Fig. 4: The agile project lifecycle model

As the traditional project management approach that includes four phases of project life cycle, the agile approach also has several phases of project. Some authors developed the phases of agile project management approach in order to enable the users to compare two different approaches. Thus, Highsmith (2004) divides the project life cycle on the following phases:



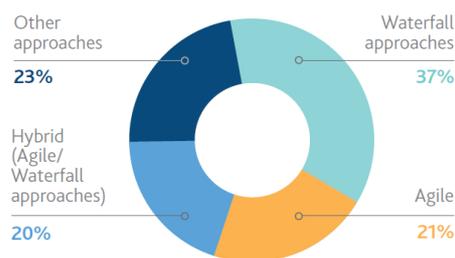
Envision (define vision, project scope and project organization), Speculate (develop model defined by the product characteristics and time constraints, and iteration plan for vision implementation), Explore (deliver tested parts in short time and continuously search for a way to reduce project risk and uncertainty), Adapt (check deliverables, current situation, and team behavior to adapt if necessary), and Close (close project, create lessons learned, and celebrate). Similarly, De Carlo (2004) establishes Flexible Project Model that contains five iterative phases: Visionate, Speculate, Innovate, and Reevaluate, and closing phase Disseminate. In addition, each short iteration consists of all phases and final project scope is constructed by every iteration. Furthermore, project scope could be changed up to 30 % during each iteration (Benediktson & Dalcher, 2005).

According to Chin (2004) in the contemporary environment, which is characterized by changing at accelerating rate conditions, the agile approach offers exclusive solutions and project results. Chow & Cao (2008) states that critical success factors for the agile approach embrace appropriate application of agile methods, highly qualified project team, and right delivery strategy, while appropriate management process, organizational environment, and customer involvement are factors that might contribute to project success.

Traditional vs. agile project management approach

There is no consensus on which project management approach is better, appropriate and more effective. Each approach has its advantages and disadvantages. According to survey results from 3234 project management practitioners, conducted by Project Management Institute, most organizations still use waterfall (traditional) approach – 37%, the rest percentage, wherein for each approach (other approaches, agile and hybrid) falls on around 20 % of application in 2017 (PMI, 2017). The survey results are presented in Figure 5.

Q: In your estimation, what percentage of the projects completed within your organization in the past 12 months has used the following types of approaches?



Note: Numbers may not sum to 100% due to rounding

Source: (PMI 2017 Pulse of the Profession In-Depth Reports: Organizational Agility Increases Project Success Rates)

Fig. 5. The percentage of using different types of project approaches in 2017

Depending on project characteristics and features, one should apply the appropriate project management approach. Additionally, organization's type of industry, strategy, goals, policy, rules, procedures and business processes play an important role in defining the suitable project approach. Since traditional (waterfall) project management approach is a time-proved



approach, and there is also empirical evidence on successful results of application of traditional project management methods and practices, this approach is more widespread in lots of industries.

Regarding benefits and drawbacks of both approaches, the kind of organization and project and their characteristics are essential elements in choosing what project management approach to employ. As already mentioned, the traditional approach is more acceptable for projects with well-defined goals, tasks, objectives, where the plan can be developed at the outset of the project, there is low level of changes during the project, and therefore low level of uncertainty. This kind of projects (e.g., construction, engineering, defense) implies that the changes in requirements will be low, and there is no need for active involvement of customers and interactions between project teams and clients (Shehna & Dvir, 2007). Likewise, some authors note that traditional approach is more adequate for large projects, in which project team members have not so much experience and it is expected that project team turnover will be high (Aguanno, 2004; Coram & Bohner, 2005).

On the other hand, agile project management approach is more suitable for projects (e.g., manufacturing, IT, research projects, software development, new innovative product development, process modification projects) that have volatility of requirements, high level of uncertainty, unpredictable activities and changes, technological and organizational complexity and ambiguity (unknown cause and effect interdependencies). Moreover, since non-linear, iterative and incremental process of agile approach includes constant updates and additions, the human factor is considering as the most significant aspect in the collaboration process. Therefore, several authors in their recommendations state that highly skilled workforce, communication, collocations of project team members are critical success factors (Spundak, 2014; Highsmith, 2004).

Table 2

Difference between traditional and agile approach

Characteristic	Traditional approach	Agile approach
Requirements	clear initial requirements; low change rate	creative, innovative; requirements unclear
Users	not involved	close and frequent collaboration
Documentation	formal documentation required	tacit knowledge
Project size	bigger projects	smaller projects
Organizational support	use existing processes; bigger organizations	prepared to embrace agile approach
Team members	not accentuated; fluctuation expected; distributed team	collocated team; smaller team
System criticality	system failure consequences serious	less critical systems
Project plan	linear	complex; iterative

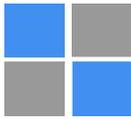
Source: Spundak (2014)

Taking into account the existing statements of several researchers, we present the main advantages and disadvantages of each approach (traditional and agile) in Table 3 and 4 respectively.

Table 3

Traditional approach

Advantages	Disadvantages
Stable working system	Top-down approach
Well-structured process	Leadership style is command, control and



	hierarchical
Optimization of processes and procedures	Very structured
Time-proved methods, tools and techniques	Huge amount of documentation and records
Importance of initial requirements	Bureaucracy and formalization
	Change-resistant

Source: author's construction derived from the literature

Table 4

Agile approach

Advantages	Disadvantages
Low hierarchy	Insufficient amount of empirical evidence on successful application of agile methods and practices
Speed, flexibility	Risks that can impact on product/service quality
Fast-learning by applying tacit knowledge	
Intense customer involvement	
Informal communication	
Joint decision-making	

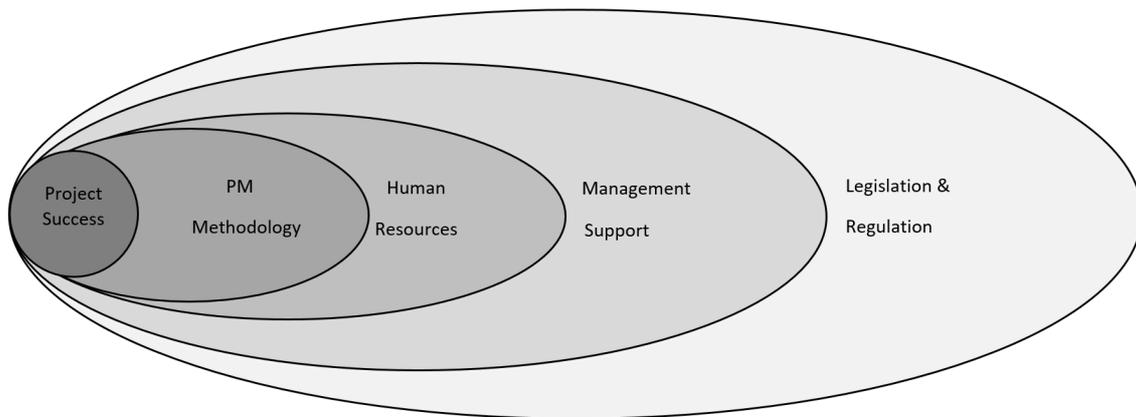
Source: author's construction derived from the literature

Project success

Project success as well as project management methodology is one of the researched topics in project management literature. Numerous works have been dedicated to this topic. Furthermore, according to Highsmith (2009) the concept of success of the project can be difficult to define and measure. Traditional approach usually measures success in terms of scope, schedule and cost, while agile measures success in terms of response to change and value delivered to the customer (Sheffield & Lemétayer, 2010).

Project success criteria and critical success factors differ from project to project and depend on type of the project, its characteristics and the level of complexity. Thus, there is no uniform list of factors that influence on project success. However, some scholars tried to determine the common factors and criteria and constructed the model of critical success factors and project success. As an example, Alexandrova & Ivanova (2012) developed the conceptual model, where they identified the main components of critical success factors (project manager, top management support, motivated team, effective communication), success criteria (goals achieved in due terms and within planned budget, satisfaction, sustainable positive effects) and project success (achievement of results). The following definitions of success factors and criteria are stated by Muller & Judgev (2012): “1) Project success factors, which are the elements of a project, which when influenced, increase the likelihood of success; these are the independent variables that make success more likely. 2) Project success criteria, which are the measures used to judge on the success or failure of a project; these are the dependent variables that measure success”.

Due to further considerations of project success factors, the model of significant factors was elaborated. Based on relevant studies, the important elements of project success are depicted in Figure 6.



Source: author's construction derived from the literature

Fig. 6. Aspects of project success.

Project management methodology as an element of project success

The main target of any approach and methodology is successful project results. Vaskimo (2011) notes that project management methodology is one of the project success factors that improve project performance and can enhance chances of success. So, according to study by Joslin & Muller (2015), using a deductive approach and cross-sectional questionnaire with 254 responses, identified that the application of project management methodology accounts for 22,3 % of the variation in project success. These results correspond to the findings of Shehnar, Dvir et al. (2002a), White and Fortune (2002), Shehnar, Tishler et al. (2002b) and indicate that using project management methodology and appropriate tools and techniques are success factors.

Cockburn (2007) points out that “methodologically successful projects” have the following characteristics:

- 1) The project was delivered and the product gets used.
- 2) The leadership staid the same and did not get fired because of their results on the project.
- 3) The project team would work the same way again.

Many organizations introduce their own project management methodology in order to take into account the peculiarities of their industry, company's structure and internal processes. One of the necessary condition for successful methodology application is alignment with the other company processes (Kerzner, 2001; Charvat, 2003). It is also very important to consider the weaknesses of methodology to make the right choice and decision.

Human resources

The literature has identified human resources management as an important factor towards project success (Zwikael & Unger-Aviram, 2010; Tampoe & Thurloway, 1993; Barcak & Wilemon, 1992; Thamhain, 2004a) and an essential aspect of project management bodies of knowledge (PMI, 2017). Furthermore, it makes the contribution to the success of the company (Huselid, 1995) and generates competitive advantage for the company (Amit & Belcourt, 1999).

Some scholars devoted their works to the issues of leadership and management support, other academics studied the impact of such factors as personnel (recruitment, selection and training), project manager and team competence and communication on project success. Pinto and Prescott (1988) revealed that the “Personnel factor” was the insignificant factor for project success. At the same time, the study of influence of team development practices on project success showed that there is a positive impact only in long projects (Zwikael, 2010). In addition,



the development of competences in the part of hard skills and soft skills, including the concept of emotional intelligence, becomes actual and very popular in project management to achieve project success as well as organization's success.

Despite the fact that there is a contradiction between different studies on the effect of human factor on project success, the strategic role of human resource management is undeniable.

Management support

Many researchers recognized the importance to include management support to the list of success factors. Furthermore, management support is considered by scholars and practitioners as one of the critical success factors affecting project outcome. The analysis of 63 research works by Fortune and White (2006) showed that clear goals, senior executive support and appropriate resources are the most significant critical success factors. The results of study by Belout and Gauvreau (2004) identified that for three different structures (functional, matrix and project-based) "the management support and trouble-shooting variables were significantly correlated with success".

Hyväry (2006) studied project success and failure factors. The factors are the following: clear objectives, clear job descriptions, effective leadership, ability to coordinate, commitment to the end-user, flexibility with resources, support from upper management, structuring by project, technological developments, and economic environment. The research work revealed that consulting the client, communication, acceptance from the client, project schedule, mission, execution, monitoring and control, staff management, trouble-shooting, and upper management support are critical success factors.

All of the above can lead to the conclusion that management support significantly facilitates any work be it project or even routine tasks.

Legislation and regulation

Legislation and regulation should be considered as the project success factor mostly in developing countries, where there is imperfection and inconsistency with current global requirements of legal and control system. The experience of developed countries shows the necessity and importance of legislation and regulation system in the part of cost and performance control to implement the successful projects. As an example, "legislation relating to controlling and measuring performance began as early as 1993 in USA, with the Government Performance and Results Act" (Kwak, Y.-H. & Anbari F.T., 2012). Additionally, according to the Planning, Budgeting, Acquisition, and Management of Capital Assets guide (OMB, Executive Office of the President, 2008b) "If any of the cost, schedule, or performance variances are a negative 10 percent or more you must provide a complete analysis of the reasons for the variances, the corrective actions that will be taken and the most likely estimate at completion (EAC)". Thus, the responsibility for detailed reporting on the variances from three major measures of project implementation (cost, schedule, scope) and preventive actions can help to increase the chances for success of project.

Conclusion

Project management is a special field that covers so many topics arousing interest and debates. This article provided a comprehensive overview on project management methodology and approach concepts, which have different meanings, but there exist some common perception. In addition, project success that is the final aim of project management methodology



was presented through such factors as methodology, human resources, management support and legislation and regulation.

The decision on selection and application of suitable approach and methodology is not an easy task since both traditional and agile approaches have their pros and cons. Taking into account the organization's type and project characteristics, the decision maker can combine two approaches for one project and within one methodology. Therefore, the main question is how to develop the methodology that will be based on both approaches that can increase the likelihood of success.

Since many works were dedicated to the research of traditional approach, there is the need for studying agile approach application in areas apart from only IT industry and consider the results of these projects (success or failure).

References

- Adrian, U. & Anca, U., 2014. *Methodologies Used In Project Management*. Annals of Spiru Haret University, Economic Series, 5, 47-53.
- Agile Alliance., 2001. *Manifesto for Agile Alliance Software Development*. Retrieved from www.agilemanifesto.org
- Aguanno, K., 2004. *Managing agile projects*. Lakefield, Canada: Multi-Media Publications Inc.
- Alexandrova, M., & Ivanova, L., 2012. *Critical success factors of project management: empirical evidence from projects supported by EU programmes*. Paper presented at the 9th International ASECU Conference on "Systematic Economics Crisis: Current Issues and Perspectives", Skopje, Macedonia.
- Amit, R., Belcourt, M., 1999. *Human resource management processes: a value-creating source of competitive advantage*. Eur Manag J, 17 (2), 174-81.
- Andersen, E. S., 2006. *Perspectives on projects*. Proceedings of the PMI Research Conference 2006, Canada.
- Barczak, G., Wilemon, D., 1992. *Successful new product team leaders*. Industrial Marketing Management, 21 (1), 61–68.
- Belout A. & Gauvreau C., 2004. *Factors influencing project success: the impact of human resource management*. International Journal of Project Management, 22 (2004), 1–11.
- Benediktsson, O. & Dalcher, D., 2005. *Estimating size in incremental software development projects*. IEE Proceedings – Software, 152(6), 253–259.
- Brinkkemper, S., 1996. *Method engineering: engineering of information systems development methods and tools*. Information and Software Technology, 38(4), 275-280.
- Charvat, J., 2003. *Project Management Methodologies: Selecting, Implementing, and Supporting Methodologies and Processes for Projects*. Hoboken, NJ: John Wiley & Sons, Inc.
- Chin, G., 2004. *Agile project management: how to succeed in the face of changing project requirements*. New York: AMACOM.
- Chow, T. & Cao, D., 2008. *A survey study of critical success factors in agile software projects*. The Journal of Systems and Software, 81(6), 961–971.
- Cicmil, S., & Hodgson, D., 2006. *New possibilities for project management theory – A critical engagement*. Project Management Journal, 37(3), 111–122.
- Clarke, A., 1999. *A practical use of key success factors to improve the effectiveness of project management*. International Journal of Project Management, 17, 139-145.
- Cockburn, A., 2003. *People and Methodologies in Software Development*. Doctoral Dissertation. University of Oslo, Oslo, Norway.
- Cockburn, A., 2006. *Agile Software Development: The Cooperative Game*. Second Edition. Boston, MA: Addison Wesley Professional, Pearson Education, Inc.
- Conforto, E. C., Salum, F., Amaral, D. C., da Silva, S. L., & Magnanini de Almeida, L. F., 2014. *Can agile project management be adopted by industries other than software development?* Project Management Journal, 45(3), 21-34. doi:10.1002/pmj.21410.



- Cooke-Davies, T. J. , 2002. *The “real” success factors on projects*. International Journal of Project Management, 20 (3), 185–190.
- Coram, M. & Bohner, S., 2005. *The impact of agile methods on software project management*. Proceedings of the 12th IEEE International Conference and Workshops on the Engineering of Computer–Based Systems, USA.
- De Carlo, D., 2004. *Extreme Project Management*. San Francisco: Jossey–Bass.
- Elkington, P., & Smallman, C., 2002. *Managing project risks: A case study from the utilities sector*. International Journal of Project Management. 20(1), 49–57.
- Ericsson., 2013. *PROPS Manual for Project Managers*. Ericsson, Stockholm, Sweden.
- Fernandes, G., Pinto, E. B., Machado, R. J., Araújo, M., and Pontes, A., 2015. *A Program and Project Management Approach for Collaborative University-Industry R&D Funded Contracts*. Procedia Computer Science, 64, 1065–1074.
- Fortune, J., & White, D., 2006. *Framing of project critical success factors by a systems model*. International Journal of Project Management, 24, 53–65.
- Gane, C., 2001. *Process Management: Integrating Project Management and Development*. In Tinirello, P.C. (Ed.) *New Directions in Project Management*, 67-82. Boca Raton, FL: Auerbach Publications.
- Gauthier, J.-B., & Ika, L. A., 2012. *Foundations of project management research: An explicit and six-facet ontological framework*. Project Management Journal, 43(5), 5–23.
- Golini, R., & Landoni, P., 2014. *International development projects by non-governmental organizations: An evaluation of the need for specific project management and appraisal tools*. Impact Assessment and Project Appraisal, 32(2), 121–135.
- Hass, K. B., 2007. *The blending of traditional and agile project management*. PM world today, 9(5), 1-8.
- Highsmith, J., 2004. *Agile project management*. Boston, MA: Addison–Wesley.
- Highsmith, J., 2009. *Agile project management: Creating innovative products*. Upper Saddle River, NJ: Addison-Wesley.
- Huselid, M.A., 1995. *The impact of human resource management practices on turnover, productivity, and corporate financial performance*. Acad Manag J, 38 (3), 635-72.
- Humphrey, W.S., 1989. *Managing the Software Process*. Boston, MA: Addison-Wesley.
- Hyväri, I., 2006. *Success of projects in different organizational conditions*. Project Management Journal, 37(4), 31–41.
- Iivari, J., Hirschheim, R., & Klein, H.K., 2000. *A dynamic framework for classifying information systems development methodologies and approaches*. Journal of Management Information Systems, 17(3), 179–218.
- Ika, L. A., & Hodgson, D., 2014. *Learning from international development projects: Blending critical project studies and critical development studies*. International Journal of Project Management, 32(7), 1182–1196.
- Introna, L. D. & Whitley, E. A., 1997. *Against method–ism: Exploring the limits of method*. Information Technology & People, 10(1), 31–45.
- Joslin R. & Muller R., 2015. *Relationships between a project management methodology and project success in different project governance contexts*. International Journal of Project Management, 33 (2015) 1377–1392.
- Kerzner, H., 2001. *Strategic Planning for Project Management using Project Management Maturity Model*. New York, NY: John Wiley & Sons.
- Kerzner, H., 2004. *Advanced project management: Best practices on implementation*. John Wiley & Sons.
- Kwak, Y.-H. & Anbari, F. T., 2012. *History, practices, and future of earned value management in government: perspectives from NASA*. Project Management Journal, 43(1), 77–90.
- Lehtonen, P., Martinsuo, M., 2006. *Three ways to fail in project management: the role of project management methodology*. Proj. Perspect. XXVIII (1), 6–11.
- Müller, R., & Jugdev, K., 2012. *Critical success factors in projects: Pinto, Slevin, and Prescott the elucidation of project success*. International Journal of Managing Projects in Business, 5(4), 757-775.



- Muller, R., Drouin, N., & Sankaran, S., 2019. *Modeling Organizational Project Management*. Project Management Journal, 50, 499–513. doi: <https://doi.org/10.1177/8756972819847876>.
- Office of Government Commerce., 2002. *Tailoring PRINCE2*. Norwich, UK: The Stationery Office.
- Office of Government Commerce., 2009. *Managing Successful Projects with PRINCE 2*. Norwich, UK: The Stationary Office.
- <https://www.oxfordlearnersdictionaries.com/definition/english/agile>
- Office of Management and Budget, Executive Office of the President., 2008b. *Circular A-11, Part 7: Planning, budgeting, acquisition and management of capital assets*. Retrieved from http://www.whitehouse.gov/omb/circulars/a11/current_year/s300.pdf
- Packendorff, J., 1995. *Inquiring into the temporary organization: new directions for project management research*. Scand. J. Manag., 11 (4), 319–333.
- Pinto, J. K., & Prescott, J. E., 1988. *Variations in critical success factors over the stages in the project life cycle*. Journal of management, 14(1), 5-18.
- Project Management Institute (PMI)., 2017. *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*, 6th edition, Pennsylvania: PMI.
- Project Management Institute (PMI), 2017. *PMI 2017 Pulse of the Profession In-Depth Reports: Organizational Agility Increases Project Success Rates*.
- Sheffield, J. & Lemétayer, J., 2010. *Critical success factors in project management methodology fit*. Paper presented at PMI® Global Congress 2010—Asia Pacific, Melbourne, Victoria, Australia. Newtown Square, PA: Project Management Institute.
- Shenhar, A., Dvir, D., Lechler, T., Ploi, M., 2002a. *One size does not fit all— true for projects, true for frameworks*. Proceedings of PMI Research Conference, Seattle, Washington, USA, 99–106.
- Shenhar, A., Tishler, A., Dvir, D., Lipovetsky, S., Lechler, T., 2002b. *Refining the search for project success factors: a multivariate, typological approach*. R&D Manag. 32 (2), 111–126.
- Shenhar, A. J. & Dvir, D., 2007. *Reinventing project management: The diamond approach to successful growth and innovation*. Boston, MA: Harvard Business Press.
- Spundak, M., 2014. *Mixed agile/traditional project management methodology—reality or illusion?* Procedia-Social and Behavioral Sciences, 119, 939–948.
- Stare, A., 2013. *Agile project management – A future approach to the management of projects*. Dynamic Relationships Management Journal, 2(1), 43-53.
- Tampoe, M., Thurloway, L., 1993. *Project management: the use and abuse of techniques and teams (reflections from a motivation and environment study)*. International Journal of Project Management, 11 (4), 245–250.
- Thamhain, H.J., 2004a. *Team leadership effectiveness in technology-based project environments*. Project Management Journal 35 (4), 35–46.
- Turner, J. R. & Keegan, A., 2000. *The management of operations in the project-based organization*. Journal of Change Management, 1, 131-148.
- Van der Walddt, G., 2011. *Adaptive project management: A tool for more realistic municipal planning*. Administratio Publica, 19(2), 2–20.
- Vaskimo, J., 2011. *Project management methodologies: an invitation for research*. IPMA World Congress 2011 on October 12, 2011 in Brisbane, Queensland. International Project Management Association, Amsterdam, the Netherlands.
- Wells, H., 2012. *How effective are project management methodologies (PMMs)?: An explorative evaluation of their benefits in practice*. Paper presented at PMI® Research and Education Conference, Limerick, Munster, Ireland. Newtown Square, PA: Project Management Institute.
- Wells, H., 2013. *An exploratory examination into the implications of type agnostic selection and application of project management methodologies (PMMs) for managing and delivering IT/IS projects*. Proceedings IRNOP 2013 Conference, June 17–19, 2013, Oslo, Norway, 1–27.
- Whitaker, S., 2014. *The Benefits of Tailoring: Making a Project Management Methodology Fit*. PMI.
- White, D., Fortune, J., 2002. *Current practice in project management—an empirical study*. International Journal of Project Management, 20 (1), 1–11.



Project Management Development – Practice and Perspectives
9th International Scientific Conference on Project Management in the Baltic Countries
April 23-24, 2020, Riga, University of Latvia
ISSN 2501-0263

Wysocki, R. K., 2007. *Effective project management*. Fourth Edition. Indianapolis, IN: John Wiley & Sons, Inc.

Wysocki, R. K., 2009. *Effective project management: Traditional, Agile, Extreme*. Hoboken, NJ: Wiley.

Yusuf, Y. Y., Sarhadi, M., & Gunasekaran, A., 1999. *Agile manufacturing: The drivers, concepts and attributes*. International Journal of Production Economics, 62(1), 33-43.

Zwikael, O., Unger-Aviram., 2010. *HRM in project groups: The effect of project duration on team development effectiveness*. International Journal of Project Management, 28 (2010), 413–421.



MONTE CARLO SIMULATION RELATED TO RISK COSTS

Prof. Dr. Tysiak Wolfgang

University of Applied Sciences, Dortmund, Germany

Abstract

If there are uncertainties in a project, let it be in quality, durations, or costs, you have to estimate probability distributions. By this, the entire planning process becomes more complex, but on the other hand, offers even more insights into the risk structure of the project. Whereas most often Monte Carlo simulation in risk management in projects is mainly related to risks in the durations of the individual tasks and therefore finally, of course, related to the duration of the entire project (c.f. Tysiak, (2014a)), this contribution is focused on risks in the costs of the tasks. By way of an example possible applications, the flexibility, and the productivity of such an approach are shown. Additionally, it becomes obvious that this Monte Carlo approach only needs little efforts, because it can easily be implemented by means of Excel.

Key words: *project management, risk management, Monte Carlo simulation, Excel*

JEL codes: G32, C53, O22

Introduction and Background

Everybody, who is familiar with project management, knows that risk management is an integral component in this subject that usually contains the following cyclic phases (c.f. PMI (2017), Kerzner (2017), Schelle et al. (2006)): (1) risk management planning, (2) risk identification, (3) qualitative risk analysis, (4) quantitative risk analysis, (5) risk response planning, (6) risk monitoring and control. Especially in the steps (3) and (4), the knowledge of some analytical/statistical methods might be useful, because you have to deal with uncertainties and insecurities and therefore with densities and distributions. These uncertainties usually have to be used in two aspects, because a risk is commonly characterized by the probability of occurrence and - if it occurs - by a distribution of the possible impacts. These impacts can be measured in various dimensions, such as time (duration), costs, quality, etc.

In Tysiak (2014a) we introduced the example shown in fig. 1. As it is standard in PERT (c.f. Taylor (2010)), we assumed beta distributions for the durations of the individual tasks (the abbreviations OD, MD, and PD stand for the parameters optimistic duration, most probable duration, and pessimistic duration of the individual distribution). In Tysiak (2014b) and later in Tysiak (2017) we performed Monte Carlo simulations to generate the resulting final distribution of the entire project. We could also identify the critical field (given in fig. 2), generated the distributions of the individual buffers, performed sensitivity analyses, studied the changes in all these densities throughout the lifetime of the project, examined correlations - and we performed a lot of similar other things. But in all these analyses the focus has been mainly on risks in time. This might be because of the historical development in the deterministic approach in project management: One of the dominant tools in the beginning was the critical path analysis, then followed by PERT (program evaluation and review technique), the first attempt to introduce uncertainties – all these techniques were time related.

In this current contribution, we want to shift the focus from risks exclusively in time and introduce additional risks in costs. The word “additionally” is used here, to make sure that this



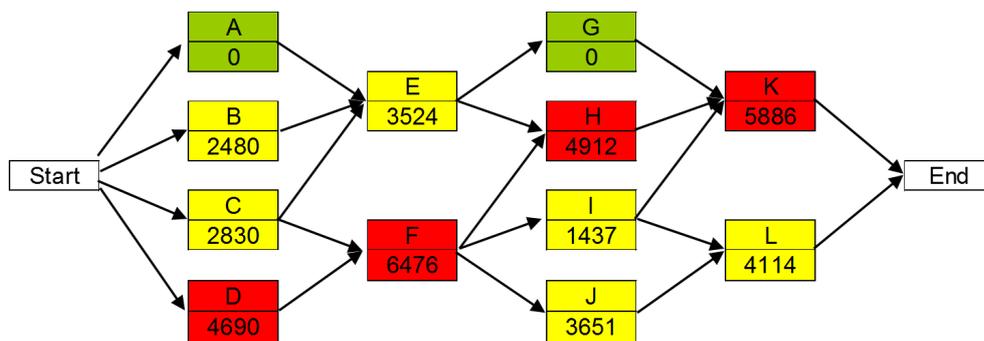
should not be seen as an alternative way of integrating risks into a project, but more as a complementary approach.

Each project usually contains several risk dimensions at the same time and above that, they are strongly dependent/correlated to each other: If a risk occurs, it might lead to additional work that will prolong the duration of this task as well as increase its expenditure. Sometimes there will be a clear cause and effect relationships, whereas sometimes there are only experiences that can be measured by correlations. However, in the end, we will see, that these two dimensions have a couple of fruitful mutual coherences.

Activity	Predecessors	OD	MD	PD
A	-	2	3	4
B	-	3	6	9
C	-	2	5	10
D	-	4	6	9
E	A, B, C	3	7	10
F	C, D	2	7	9
G	E	2	3	4
H	E, F	3	6	8
I	F	3	5	9
J	F	2	7	10
K	G, H, I	2	6	8
L	I, J	3	5	8

source: Tysiak (2014a)

Fig. 1. The main example



source: Tysiak (2014a)

Fig. 2. The critical field (number of times that a node is critical)

Risks in Costs

Let us assume that the project team analysed the costs of the individual tasks of our given project and they agreed on the data given in fig. 3. Therefore, together with the data from fig. 1, the table in fig. 3 can be seen as part of the risk register.



In this table, the terms “triangle” and “beta” denote the triangular and the beta distributions with the three parameters optimistic duration, most probable duration, and pessimistic duration, whereas the term “normal” refers to the normal distribution with the two parameters mean and standard deviation.

task	risk-free costs	probability to occur	distribution of impact	additional condition/remark
A	1000		A1: normal(0,300)	there is a correlation of +0.3 between A1 and D1
B	2000	0.1	B1: normal(300,50)	
C	800	0.2	C1: triangle(100,200,500)	
D	1500		D1: normal(0,100)	there is a correlation of +0.3 between A1 and D1
E	700	0.1	E1: beta(1500,1800,2300)	
		0.2	E2: triangle(300,500,1000)	
		0.3	E3: normal(500, 50)	if C1 occurred, the parameters in E3 change to (200,20)
F	800			
G	1200			
H	1500	0.05/0.2	H1: triangle(600,800,1400)	if the impact of E1 is higher than 2000, then the probability of occurrence is 0.05, otherwise 0.2
I	1000		I1: normal(0,100)	there is a correlation of -0.3 between I1 and L1
J	1500	0.2	J1: normal(-500,100)	this is a chance!!
K	2000	depends on time	K1: normal(1000,300)	risk occurs if the start of task K is later than 20
L	1000		L1: normal(0, 150)	there is a correlation of -0.3 between I1 and L1

source: author's own construction

Fig. 3. The cost situation

Let us try to categorize the information presented in fig. 3 in different groups:

1. Risk-free tasks

There are tasks that are assumed to be totally risk-free (like F and G). The only evaluations we get in the corresponding lines of the table are the risk-free (fixed) costs in the second column. This might be the case if tasks are totally outsourced and therefore all the possible risks that may occur in relation to these tasks are transferred to a third party via contracts.

2. Tasks with remaining fuzzy uncertainties

Some other tasks (like A, D, I, and L) have supplementary to the risk-free costs some uncertainties in the task costs. These uncertainties mean that there are still some fuzzy variations possible because we only have estimates. Additionally, there might be estimated correlations between these uncertainties.

3. Risks that may appear with an assumed probability of occurrence

As we already mentioned, risks in general have the two dimensions that they may occur or may not occur with some (estimated) probability and on the other hand that they will have an uncertain impact, if they occur (like B, C, E1, and E2). Even in this case, correlations between the densities of the impacts are possible.

4. Conditional risks

Quite often we are able to find conditions that may influence the probability that a risk occurs or affect the distribution of the impacts (like E3, H, and K). These risk drivers may have external origin or may be internal events that might occur during the execution of the project. Particularly we find here a lot of relationships to the time performance of the project (like in K).

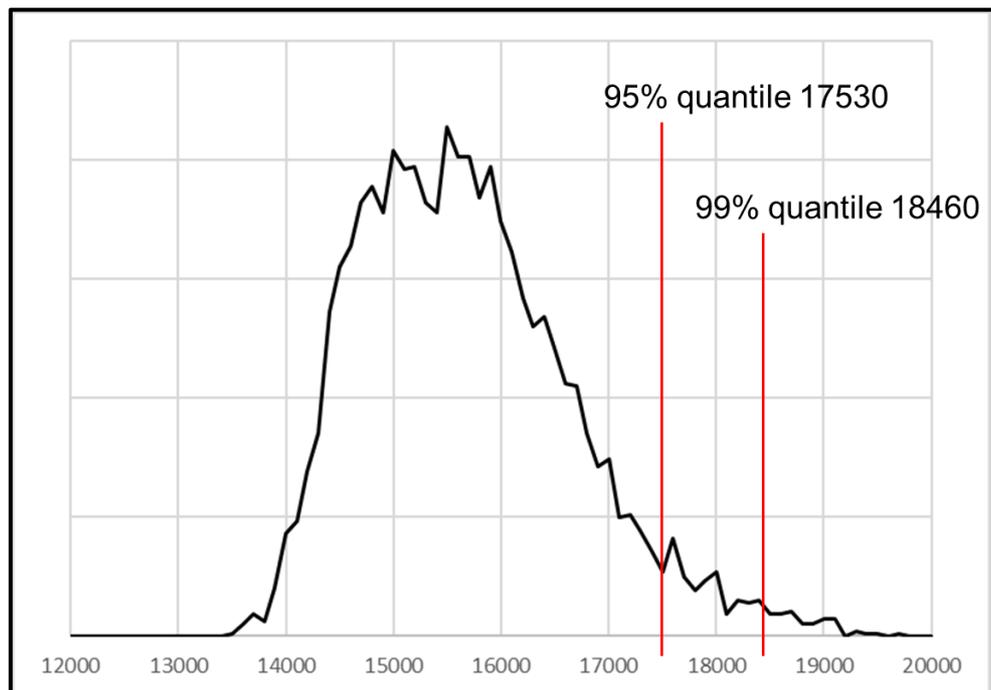


5. Chances

Everybody should keep in mind that in risk management according to the different definitions of “risk” (c.f. PMI (2017)), we might also have risks with a positive impact (like J). In our daily life, we tend to call these kind of risks “chances”, but in risk management, we subsume them under risks.

To get an impression, to what the assumptions collected in fig. 3 lead to, we performed a Monte Carlo simulation (c.f. Garlick (2007), Rubinstein/Kroese (2016)). As a simulation tool, we used Excel, because it offers a lot of advantages. In Excel, it is not only easy to model all the conditions given in fig. 3, but it is also very simple to generate random numbers that follow a predefined distribution, let it be normal, beta, or triangular etc. (c.f. Tysiak/Sereseanu (2010), Tysiak (2018)). The entire simulation can be generated by only using cell formulas, there is no need for any visual basic programming.

The resulting density of the total costs of the project is given in fig. 4. The mean is $\mu = 15,690$ with a standard deviation of $\sigma = 995$. But in risk management other parameters are more important, e.g. the quantiles. The 95% quantile is the value that is exceeded with a probability of only 5%, and respectively the 99% quantile is the value that divides the lower 99% percent range from the upper 1% area. In our example, we get a value of 17,530 for the 95% quantile, which means that with a probability of 95% the total costs will be less than this value. The 99% quantile is 18,460.



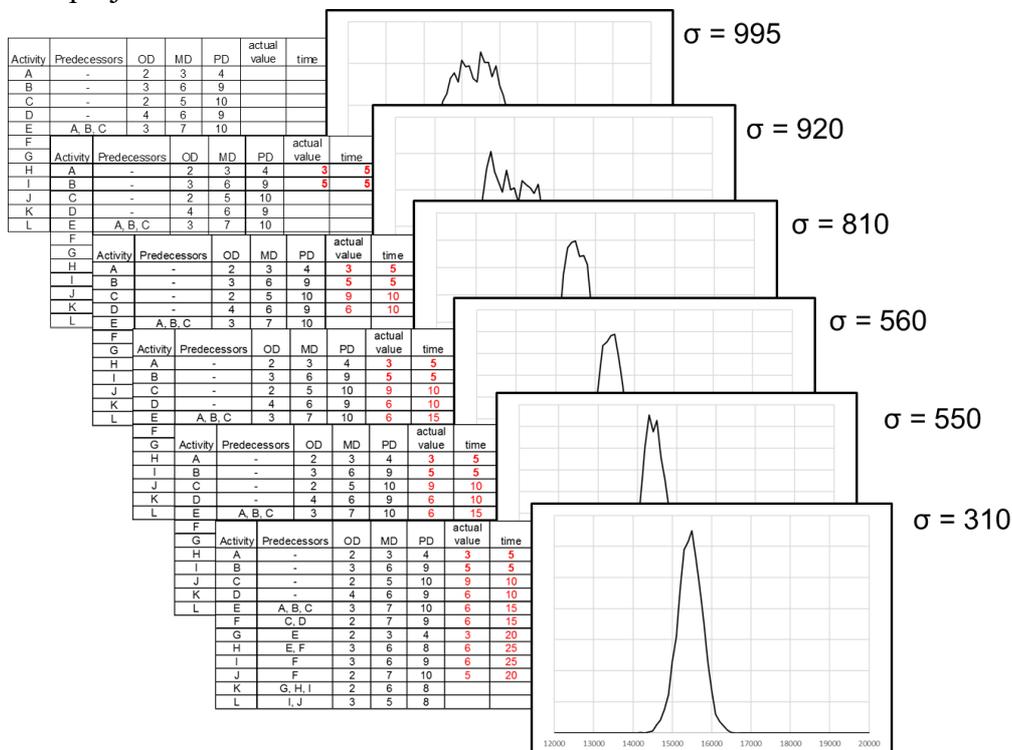
source: author's own construction

Fig. 4. The distribution of costs of the entire project

Development of Costs During the Lifetime of the Project



Fig. 4 shows the distribution of the total costs as a simulation with the initial assumptions/estimates given in fig. 3. But all the individual risks are associated with tasks. Therefore, we can also interpret the costs as time related. If a project team has already created such a Monte Carlo simulation model right at the beginning of the project, it can be used throughout the whole lifetime of the project as a controlling tool. The only thing that has to be done, is to update the values, especially, of course, the realizations of risks that have occurred or that are no longer existent. A possible development over time is shown in fig. 5. We assumed that every 5 periods the model is updated and the remaining lifetime of the project is simulated. As it can be seen, the standard deviation decreases from almost 995 in the beginning to 310 short before the end of the project.





Risks might appear in different levels (fuzzy, conditional or unconditional, split into the probability of occurrence and the uncertainty of the impact, etc.). The application of Excel offers the flexibility to implement most of the realistic conditions that you can imagine in projects, let it be internal relationships between the risks within the project or let it be dependent on external risk drivers.

References

- Garlick, Andy (2007): *Estimating Risk - A Management Approach*, Aldershot, Gowen, 2007
- Kerzner, Harold (2017): *Project Management*, John Wiley & Sons, Hoboken, New Jersey, 2017
- PMI (2017): *A guide to the project management body of knowledge*, (PMBOK®Guide – Sixth Edition), PMI – Project Management Institute, Newton Square, Pennsylvania, 2017
- Rubinstein, Reuven/Kroese, Dirk (2016): *Simulation and the Monte Carlo Method*, John Wiley & Sons, Hoboken, New Jersey, 2016
- Schelle, Heinz/Ottmann, Roland/Pfeiffer, Astrid (2006): *Project Manager*, GPM German Association for Project Management, Nürnberg, 2006
- Taylor (2010): *Introduction to Management Science*, Pearson Prentice Hall, Upper Saddle River, New Jersey, 2010
- Tysiak, Wolfgang/Sereseanu, Alexandru (2010): *Project Risk Management Using Monte Carlo Simulation and Excel*, International Journal of Computing, Vol. 9 (4), 2010
- Tysiak, Wolfgang (2014a): *A Deeper Insight in Some Effects in Project Risk Management*, International Journal of Computing, Vol. 13 (4), 2014
- Tysiak, Wolfgang (2014b): *The Dynamics in Monitoring and Control of Risk Management in Projects*, Project Management and Development – Practice and Perspectives – Proceedings of the Third International Scientific Conference on Project Management in the Baltic Countries, Riga, University of Latvia, 2014
- Tysiak, Wolfgang (2015): *Risk Management in Projects: Variation of Parameters in the Critical Field*, Proceedings of the 8th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications (IDAACS'2015), IEEE Service Center, Piscataway, 2015
- Tysiak, Wolfgang (2018): *Teaching Risk Management in Projects Using Monte Carlo Simulation and Excel*, Proceedings of the 1st International Conference on Research and Education in Project Management, Bilbao, 2018
-



Defining the Set of Criteria for Establishing and Evaluating a Project Risk Register

Uzulans Juris

University of Latvia, Riga, Latvia

Abstract

The project risk register is an important part of project management and one of risk management documents. Among the project risk registers used in practice, there are ones of various size and content. Procedures for the establishment of registers and criteria for the evaluation of registers in project management theory does not have well-established or logically correct criteria for establishing or evaluation risk registers. The most commonly used criteria represent maturity, practical application and compliance with a group of criteria chosen by owners. However, the author cannot conclude that these criteria are sufficient.

The author has used the results of his previous studies to create a set of the criteria and to analyse the definitions of 'risk' and similar concepts and the process of project risk management. The results of both studies and the results of studies on specific projects have served as the basis for defining a set of criteria for establishing and evaluating the project risk register.

A set of criteria can then ensure a better quality of risk registers and their evaluation in the management process.

Key words: *project, risk, risk register, set of criteria.*

JEL code: M00, M10, M190

Introduction

The aim of the study is to develop criteria for establishing and evaluating the project risk register. In the previous studies on the criteria for risk register evaluation the author concluded that the criteria chosen as a result of the studies were not sufficient to assess project risk registers. In order to establish a more complete set of criteria the author used the results of the previous analysis of the 'risk' concept and project risk management process.

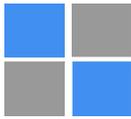
Purpose and limitations of the study

In order to achieve the aim of the study, the author did not select the criteria of one type or origin, but rather combined several types and origins in the set of criteria, selected according to the same principles for the purpose of evaluation or use for development. In a set of criteria, the criteria may be of equal or different weights or otherwise ranked or in relationship.

The risk register is a project risk management document. The size and structure of the risk register may vary from small to large. The number of risk register columns selected in the study is from 5 to 40.

The amount of information in the risk register columns may vary from a few words up to several paragraphs of text for one kind of risk, the register may contain one risk register table and several other tables, information may be organized in a table or tables and a table structure grouping or merging columns or rows in a table.

The author breaks the information on the risk register into 2 groups: the content of the risk register, such as the content of columns, and the size of the risk register, such as the number of columns. This study will not analyse the structure of risk records or the content of documents with a risk register as part of annex, neither will it deal with the relevance of risk records to the project for which the relevant risk register.



To create the set of criteria, the author chose the notion 'risk' decisive concept 'event' and project risk management process.

Results of previous research

Previous studies dealt with the notion 'risk' by examining it through ontological, epistemological and methodological analysis.

In the Cambridge Dictionary (dictionary.cambridge.org) ontology is "the part of philosophy that studies what it means to exist" and in the English Oxford Living Dictionaries (en.oxforddictionaries.com) as "The branch of metaphysics dealing with the nature of being." In the ontological analysis, the concepts determining the definitions of the concept 'risk' in 24 definitions were examined by determining the decisive concept or concepts, limiter/limiters of the decisive concept volume and the ranking of the limiter/limiters of the decisive concept volume by ontological category and definitions and uses of the notion 'event' in the sources.

In dictionaries, 'event' has several meanings. The author chose one or several definitions where it can be concluded that their meaning is close to the one in the dictionary definitions. In the Cambridge Dictionary one of the 'event' definitions is "anything that happens, especially something important or unusual", in the Macmillan Dictionary (www.macmillandictionary.com) 'event' is "something that happens, especially something that involves several people" or "used in a general way to talk about a combination of things that happen", in the English Oxford Living Dictionaries 'event' is "a thing that happens or takes place, especially one of importance", in the Merriam-Webster dictionary (www.merriam-webster.com) 'event' is "a postulated outcome, condition, or eventuality" or "something that happens" or "a noteworthy happening", or "a subset of the possible outcomes of an experiment", and in the Collins English Dictionary (www.collinsdictionary.com) "an event is something that happens, especially when it is unusual or important. You can use events to describe all the things that are happening in a particular situation" or "anything that takes place or happens, esp something important; happening; incident" or "the actual or final outcome; result", and in the American English "a happening or occurrence, esp. when important". The definitions of the 'risk' concept include information about the decisive concept or concepts and about limiters of the decisive concept that facilitates risk identification and analysis. Correct use of the concepts and limiters that are used in the definitions of the 'risk' concept can promote development of project risk management documents, which might be an applicable register for all participants of the project risk management process.

The term 'ontology' is defined in the English Oxford Living Dictionaries as "The branch of metaphysics dealing with the nature of being", in the Cambridge Dictionary : "the part of philosophy that studies what it means to exist", in the Macmillan Dictionaries: "the type of philosophy that deals with the study of existence" and in the Merriam-Webster dictionary the first meaning is "a branch of metaphysics concerned with the nature and relations of being", the second "a particular theory about the nature of being or the kinds of things that have existence". The author believes, the content of the 'risk' concept is determined by several decisive concepts, which either specify, narrow down or widen the content of the concepts. It can be assumed that the authors of the definitions believe that this is the way, how to define the concept of 'risk' better or more precisely. However, considering that science requires precise definition of the basic concepts, the listing of several decisive concepts cannot provide for a more complete and precise definition, if the source does not contain the definitions of the decisive concepts or the decisive concepts are not used in the source text or are not used frequently enough to make conclusions about the content of the concepts [Uzulans, 2017].



In the Collins English Dictionary epistemology is “the theory of knowledge, esp the critical study of its validity, methods, and scope”, while in the Merriam-Webster Dictionary it is “the study or a theory of the nature and grounds of knowledge especially with reference to its limits and validity”, in the Cambridge Dictionary (dictionary.cambridge.org) epistemology it reads “the part of philosophy that is about the study of how we know things”. The author concluded that “The first kind of definitions does not have preconditions, anything can be an event, the main aspect is the act of happening and its consequences. The second kind of definitions has preconditions, after the identification of which it is possible to identify the result. The second kind of definitions can be considered similar to the definition of “event” in the probability theory, similar to Merriam-Webster definition “a subset of the possible outcomes of an experiment”. It can be concluded that according to the definitions of the first kind the identification of risks must be started by identifying the influence as only after that it can be assessed which events have an effect on the project as anything can be an event.” [Uzulans, 2017].

The term ‘methodology’ has different definitions. The term ‘methodology’ is defined in the English Oxford Living Dictionaries as “A system of methods used in a particular area of study or activity”, in the Cambridge Dictionary “a system of ways of doing, teaching, or studying something”, in the Macmillan Dictionaries “the methods and principles used for doing a particular kind of work, especially scientific or academic research”, in the Merriam-Webster dictionary (www.merriam-webster.com): “a body of methods, rules, and postulates employed by a discipline” or “a particular procedure or set of procedures” or “the analysis of the principles or procedures of inquiry in a particular field”, and in the Collins English Dictionary “A methodology is a system of methods and principles for doing something, for example for teaching or for carrying out research” with differences between British English “the system of methods and principles used in a particular discipline” and American English “the science of method, or orderly arrangement; specif., the branch of logic concerned with the application of the principles of reasoning to scientific and philosophical inquiry”. The author concluded that “The definitions in the sources are of different lengths and structures. To determine what should be included in the risk register we can use the information from the definition of the concept ‘risk’. The length and structure of the definitions is not a factor in determining the amount of information to be used for the risk register.” [Uzulans, 2018]. However, this conclusion needs to be clarified, as the author's conclusion on the structure of the definition should be confirmed or rejected by additional research.

The results of three studies have been summarized in Table 1.

Table 1.

Concepts used in the definitions of the notion ‘risk’

Decisive concept or concepts	Concepts used in the definitions
factors, events	external, affect, progress, success, project, likelihood, assumption, probable, unlikely, analysis of importance, assumptions
event, condition	occurs, positive impact, negative impact, project objective
event, condition	uncertain, occurs, positive effect, negative effect, project’s objectives

Source: Compiled by the author

Project risk management process

The project risk management process is similar in different sources for project management literature. In the ISO 21500:2012 standard there are the following groups of the



risk management process: to identify risks, assess risks, treat risks, and control risks. Each group of the process has primary inputs and primary outputs, see Table 2.

Table 2.

ISO 21500:2012 risk management process

Criteria symbol	Risk management process groups	Primary outputs
ISO1	identify risks	Risk register
ISO2	assess risks	Prioritized risks
ISO3	treat risks	Risk responses Change requests
ISO4	control risks	Change requests Corrective actions

Source: Compiled by the author from ISO 21500:2012

A Guide to the Project Management Body of Knowledge risk management process provides for the following: to plan risk management, identify risks, perform qualitative risk analysis, perform quantitative risk analysis, plan risk response, and control risks. Each group has primary inputs and primary outputs, see Table 3.

Table 3.

A Guide to the Project Management Body of Knowledge risk management process

Criteria symbol	Risk management process	Primary outputs
Not used	Plan risk management	Risk management plan
PMI1	Identify risks	Risk register
PMI2A	Perform Qualitative Risk Analysis	Project documents updates
PMI2B	Perform Quantitative Risk Analysis	Project documents updates
PMI3	Plan Risk Responses	Project management plan updates Project documents updates
PMI4	Control Risks	Work performance information Change requests Project management plan updates Project documents updates Organizational process assets updates

Source: Compiled by the author from A Guide to the Project Management Body of Knowledge

Set of Criteria

According to the analysis of the ‘risk’ concept in the project risk management process and the division of the tables into 2 categories, the content of the register and the size of the register criteria set was created, see Table 4.

Table 4.

Criteria for evaluation

Criteria category	Risk register information	Criteria description	Criteria subcategory
RRC	Risk register content	The risk descriptions correspond to the definition of ‘event’	RRC D
		The notion ‘risk’ complies with the limits set out in the risk	RRC L



		definition	
RRV	Risk register volume	The risk register columns contain information for the project risk management process	RRV_ISO_... RRV_PMI_...
		The risk register contains references to other project management documents which contain the relevant information about project risk management	RRV_D

Source: The author's compilation

Analysis of the risk registers according to the set of criteria

For the analysis, the author selected 10 risk registers that were publicly available on the Internet in March 2020. The search was performed on www.google.com with queries ““project risk register” site:org”, ““project risk register” site:gov” and ““project risk register” site:edu”. The author assumed that 10 registers are sufficient to evaluate the possibility of using the set of criteria.

The author selected only those lists that contained at least one column with a description of risks, for the results of the risk analysis and columns with information on risk responses or risk control, see Table 5.

Table 5.

Risk register characteristics

Source no.	Risk register name	Short description
1.	Risk register EAA Storage Reservoir, document Appendix B Cost Estimates and Risk Analysis	The risk register is part of a document that contains information about the project. There are 16 columns in the register, the risks are arranged according to the risk categories and there is a short explanation of the left of the categories. The risk register is also containing risk matrix, overall project scope, cost value ranges, and footnotes. An explanation of the column names is given in the footnotes.
2.	Table 3 – Condensed Risk Register – Construction un Table 4 – Condensed Risk Register – O&M document Appendix N Cost and Schedule Risk Analysis	The risk register is part of a document that contains information about the project. There are 16 columns in the risk register and footnotes. The risks are arranged according to risk categories.
3.	Without title	There are 18 columns in the risk register, the columns are arranged according to the stages of the risk management process.
4.	Border Patrol Facilities and Tactical Infrastructure Risk Register	There are 12 columns in the risk register, part of the information is hidden. The risk register contains a table with project information and a summary of risk management.
5.	Table C5-2. Risk Register, document Risk Analysis Methodologies and Procedures	The risk register is part of a document that contains information about the project. There are 5 columns in the risk register and footnotes.
6.	Project Name: Minnesota Health Insurance Exchange Project Risk Register	There are 14 columns in the risk register.
7.	Attachment A Risk Register, document Attachment B AECOM, Amended Risk Management Plan (July 2019)	The risk register is part of a document that contains information about the project. There are 5 columns in the risk register and 8 columns contain a list of information to be entered.



8.	LIGO M060045-00-M, document Advanced LIGO Risk Management Plan	The risk register is part of a document that contains information about the project. There are 18 columns in the risk register, 2 separate tables with risk value, 12 columns are grouped according to the stages of the risk management process.
9.	Appendix B: Example risk registers, document RICS professional guidance, UK Management of risk 1st edition	The risk register is part of a document that contains information about the project with 2 risk registers. In the first one, there are 40 columns, 26 columns are grouped according to the stages of the risk management process. In the second one, there are 16 columns, columns are grouped according to the stages of the risk management process.
10.	Project Risk Register Triangle Transit - Durham-Orange County Corridor	There are 14 columns in the risk register and 1 separate table with risk value.

Source: The author's valuation

The registers were evaluated according to the selected criteria, see Table 6.

Table 6.

The risk register's compliance with criteria

Source no.	Compliance with criteria
1.	RRC_D, RRC_L ISO1, ISO2, ISO3; PMI1, PMI2A, PMI2B, PMI3
2.	RRC_D, RRC_L ISO1, ISO2, ISO3; PMI1, PMI2A, PMI2B, PMI3
3.	Only for selected risks RRC_D, RRC_L ISO1, ISO2, ISO3, ISO4; PMI1, PMI2A, PMI2B, PMI3, PMI4
4.	RRC_D, RRC_L ISO1, ISO2, ISO3; PMI1, PMI2A, PMI2B, PMI3, PMI4
5.	RRC_D, RRC_L ISO1, ISO2; PMI1, PMI2A, PMI2B
6.	RRC_D, RRC_L ISO1, ISO2, ISO3, ISO4; PMI1, PMI2A, PMI2B, PMI3, PMI4
7.	RRC_D, RRC_L ISO1, ISO2, ISO3, ISO4; PMI1, PMI2A, PMI2B, PMI3, PMI4
8.	RRC_D, RRC_L ISO1, ISO2, ISO3; PMI1, PMI2A, PMI2B, PMI3
9.	For the first table RRC_D, RRC_L ISO1, ISO2, ISO3, ISO4; PMI1, PMI2A, PMI2B, PMI3, PMI4 For the second table RRC_D, RRC_L ISO1, ISO2, ISO3, ISO4; PMI1, PMI2A, PMI2B, PMI3, PMI4
10.	RRC_D, RRC_L ISO1, ISO2, ISO3; PMI1, PMI2A, PMI2B, PMI3

Source: The author's valuation



Conclusions

The author is aware that the number of risk registers selected for analysis is insufficient to assess the correctness, number and relationship of the selected criteria. However, it can be concluded that the development and use of a set of criteria for the analysis of risk registers was a correct approach. On the other hand, it was not possible to apply the established set of criteria to the recommendations for the development of risk registers, because the selected set of criteria did not contain a enough criteria and the relationship among the criteria was incompletely determined. In order to be able to use the research result for the development of reasonable recommendations for the establishing risk registers, a study is required, in which additional criteria will be selected in addition to the 2 existing criteria – the definition of the ‘risk’ notion and project risk management process.

While planning the study, the author had intended to use the weight measurement of the criteria, the study process revealed that the weight of the selected criteria could not be determined without additional studies on the selected criteria.

All registers met the criteria RRC_D and RRC_L. However, the conformity assessment criterion cannot be considered as reliable, as the presence of columns in the risk registers only partially confirms compliance. It would therefore be necessary to identify other features that confirm the register compliance with the criteria, incl. evaluating the conformity of the column contents.

The 5 risk registers examined in the study complied with all groups in the project management process SO1, ISO2, ISO3, ISO4; PMI1, PMI2A, PMI2B, PMI3, PMI4, one risk register with 2 tables, one of which covered the entire process group.

Also, for the criteria SO1, ISO2, ISO3, ISO4; PMI1, PMI2A, PMI2B, PMI3, PMI4 the conformity assessment criterion cannot be considered as reliable, as the presence of columns in the risk registers only partially confirms compliance. In addition, an analysis of the project risk management process is required because the process groups or steps are the same, however, the content of the groups or steps is not the same.

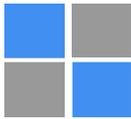
The main conclusion of the study is that the developed set of criteria ensures the development of better, but still insufficiently substantiated recommendations for the establishment and evaluation of registers. The third group of evaluation criteria could be a project analysis corresponding to the risk register.

References

- Appendix B Cost Estimates and Risk Analysis*, accessed March 2020, https://www.sfwmd.gov/sites/default/files/documents/cepp_pacr_appendix_b_cost_estimates_risk_analysis.pdf
- Appendix N Cost and Schedule Risk Analysis*, accessed March 2020, http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Multimodal/Port_Priority/Waterway%20Documents/Appendix%20N%20-%20Cost%20and%20Schedule%20Risk%20Analysis.pdf
- Advanced LIGO Risk Management Plan*, accessed March 2020, <https://dcc.ligo.org/public/0010/M060045/001/Risk%20Management%20Plan%20M060045-00.pdf>
- Attachment B AECOM, Amended Risk Management Plan (July 2019)*, accessed March 2020, <http://www.klamathrenewal.org/wp-content/uploads/2019/07/Attachment-B.pdf>
- Border Patrol Facilities and Tactical Infrastructure Risk Register*, accessed March 2020, https://www.dhs.gov/sites/default/files/publications/bw11_foia_cbp_007329_-_007334.pdf
- Project Name: Minnesota Health Insurance Exchange Project Risk Register*, accessed March 2020, https://www.mnsure.org/assets/BC9-1-ITAttachmentN_tcm34-184086.pdf
- Project Risk Register Triangle Transit - Durham-Orange County Corridor*, accessed March 2020, <https://gotriangle.org/sites/default/files/2.12-00766-risk-register-final-082212-riskdistrution.pdf>



- RICS professional guidance, UK Management of risk 1st edition*, accessed March 2020, <https://www.rics.org/globalassets/rics-website/media/upholding-professional-standards/sector-standards/construction/black-book/management-of-risk-1st-edition-rics.pdf>
- Risk Analysis Methodologies and Procedures*, accessed March 2020, <http://www1.coe.neu.edu/~atouran/FTA%20White%20Paper%20on%20Risk%20Analysis-Final%20June%202004.pdf>
- Risk register without title*, accessed March 2020, <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/f0005571-ex-risk-register2-level2-a11y.pdf>
- Uzulans J., 2017. *The Epistemological Analysis of the Concept “Risk” in Project Risk Management*. Riga: University of Latvia.
- Uzulans J., 2017. *The Ontological Analysis of the Project Risk Management Concept “Risk”*. Riga: Riga Technical University.
- Uzulans J., 2018. *Methodological Analysis of the Project Risk Management Concept ‘Risk’*. Riga: University of Latvia.



POSSIBILITIES OF CRISIS MANAGEMENT IN TRANSPORT INFRASTRUCTURE PROJECTS

Vondruška Michal

Department of Construction Management and Economics, Faculty of Civil Engineering,
CTU in Prague, Czech Republic
Tencalla s.r.o. – Construction management consulting

Abstract:

Project crisis management is a sub-category of project management whose principles cannot be clearly defined on the basis of exact research. In finding the best way to bring the project out of the crisis, we must start from the essence of the best practice method - ie generalization of best experience. However, this path is very difficult because no reasonable subject is interested in sharing information that his project is in crisis and the project management system has failed. Therefore, we are often forced to resort to the reverse procedure, by analyzing the worst practice. Opportunity to search for possible crisis management procedures for transport infrastructure construction is the crisis of the key public contract of the Czech Republic - "D1 modernization - section 12, EXIT 90 Humpolec - EXIT 104 Větrný Jeníkov" worth EUR 69 million. The crisis of this unfinished public contract consists in the departure of an international consortium of contractors from construction due to unresolved disputes.

Key words: *project, crisis, management.*

JEL code: M11, D21

Introduction

An increasing pressure on speed, safety and comfort of transportation necessitates the provision of relevant quality of transport infrastructure and the associated allocation of sufficient funding for the realisation of road and motorway structures.

Financial support from EU funds for the transport sector in the Czech Republic in the 2014–2020 program period is realised specifically by the means of the Operation Program Transportation (OPT). OPT is the largest EU operation program in the Czech Republic – it accounts for EUR 4.695 billion; that is roughly 20 % of all funding for the Czech Republic from EU funds for 2014–2020.

The right balance needs to be struck between the available funding the Government and EU plans to invest into the transport infrastructure and the achievement of the desired objective, which is the provision of relevant technology and quality standards of road and motorway structures.

Besides allocation of funding, the key prerequisite to achieve those goals is also to improve the legislation framework in order for the building process to simplify, accelerate and make the contractor selection process more transparent and quality Project management.

There are proven EU standards for allocating sources of finance and is seamless. The opposite is in the preparation and implementation of constructions. Although the Ministry of Transport of the Czech Republic accepted the use of models of FIDIC international contract terms and recommended methodologies for their use, there are still problems in implementation and procurement. This paper will try to briefly analyse the issue of the D1 motorway modernisation crisis project and look for a possible starting point for solving other projects using the best practice method.



Research results and discussion

Case study- Crisis of Project D1 Motorway modernisation in section No.12

The D1 motorway, connecting Prague, Brno and Ostrava, is the busiest road on the entire motorway network in the Czech Republic. Intensities in both directions in 24 hours: almost 100,000 vehicles near Prague. The total length is 366 km. The main section between Prague and Brno has been in operation since the age of 80. of the last century, other sections have been completed in the last 30 years. The need to modernise the oldest Czech motorway is obvious when driving through the unrepaired sections. The Portland cement concrete pavement shows defects in the form of ruptures and vertical shifts of cement concrete slabs, which reflects in uncomfortable bumping. The asphalt concrete surface also shows tracks worn by vehicles and surface disintegration. Local repairs of those defects are no longer effective plus they do not tackle the shift of cement concrete slabs. Most of the bridges are in very bad technical condition, parameters of exit lanes and connecting lanes are in violation of technical regulations and do not meet safety requirements. The condition of rest stops is also inadequate; they are missing in some places and are obsolete in others.

Focus of Project D1 Motorway modernisation

Modernisation of the section is designed to extend the existing width from 26.5 metres to 28 metres. It widens the hard shoulder (emergency stopping strip) of the motorway on each side by 0.75 metres, which increases safety in case of emergency vehicle stopping. That involves the possibility to lead traffic in 2 + 2 lanes in one direction during one lane closure. At this time, the 2 + 2 mode is not possible in the existing lanes and that is why any closure or accident results in congestion caused by narrowing of the traffic flow into single lane, i.e. in the 2 + 1 overall. Motorway modernisation furthermore involves renovation of the road construction, alignment of turn and merge lanes and median strip crossovers. Pavement widening has to go hand in hand with widening of motorway bridges and overpasses need to be broadened. The modernisation also includes renovation of sewage with the addition of new safety features. Guard rails are replaced throughout the section and the existing SOS emergency calling system is modernised. Renovation also applies to all cable lines in the median strip, and noise control systems are added. In line with modern traffic management on motorways, the telematics systems are also planned to be added.

The modernization is divided into 20 sub-interjunction sections. Part of the construction section is always part of the traffic restriction one level crossing. These conditions result in the start and end of the constructions of individual sections, which are between 3 and 14.7 kilometers long. For each section, there is a separate preparation of the building, including a project design, a permit of construction and a tender for suppliers.

Identification of the crisis

In 2017 the Road and Motorway Directorate concluded (RMD) a tender for the modernization of the 14 km long section No. 12 - EXIT 90 Humpolec – EXIT 104 Větrný Jeníkov.

The winner of the contract was the international TGS Joint Venture, formed by Toto S.p.A. Costruzioni Generali (Italy), GEOSAN GROUP a. s. (Czech Republic) and SP Sine Midas Story (Kazakhstan). The contract price was CZK 1.75 billion (EUR 69 million). The completion date was set for 2020. In D1 modernization contracts, this is the first case in which companies that have not yet built anything in the Czech Republic will start work. In view of the practice and EU funding of the project, revised FIDIC contracts were used. The announcement



of the winner was delayed over a year. The RMD first checked for a long time whether the company made a mistake in the offer or whether some budget items were too low. Then the closure of the competition delayed the disintegration of the Children of the Earth against the building permit. During the implementation of the work, the contractor discovered hidden obstacles concerning the site of the work, namely in the form of a collision of the newly built sewerage system with the existing highway body and gas pipeline, and also in the form of different geological conditions at the site of the newly built bridge. The Contractor immediately notified both of these hidden obstacles to the Client and proposed to him to change of work. However, an agreement on the amendment of the contract for work has not been reached.

The process of work has reached a considerable slip as a result of unresolved claims. The RMD applied sanctions and the dispute was also publicized in the media. The disputes were so high that the supplier withdrew from the contract at the end of 2018. At the same time, the RMD declared that it was unilaterally cancelling the contract. The next procedure in the case shall be decided by the conduct of the interested parties or, where appropriate, by the competent court. In order to secure the work in progress and to complete the order, it was necessary to launch a new tender according to standard procedures. Thus, the order will not be completed at the scheduled time. New supplier Skanska a.s. was definitely confirmed in early 2020. The construction will be completed in 2021 for the price of 2.44 billion CZK (EUR 94 million). The costs paid to the original supplier have not yet been published.

General knowledge on crisis management

As a **Project Crisis**, we can consider an unstable situation in which the balance of the basic characteristics of the project is disturbed and which poses an imminent and serious threat to the project's priority objectives. The crisis can occur unexpectedly and with little probability. It is an extraordinary event in which control of the project is lost.

Then **Crisis Management** is a process that involves capturing and evaluating crisis signals and introducing measures to overcome the crisis and minimise damage.

Crisis situations arise by accumulating more risks or activating a high risk. Not all risks can be assumed and the following list in Table 1 presents possible examples of crisis situations in the construction of line structures.

The Early Warning System enables the management of a construction project to monitor symptoms and indicators of crisis situations using standard management procedures. This system provides the managing elements with information on when the construction project is already in crisis and when it is therefore necessary to start crisis management of the project. The system consists in monitoring negative trends in the project using standard mechanisms. The parameters of the crisis condition and the definition of negative trends of the construction project are compiled in the design of the Early Warning System matrix in Table 1. The individual segments of the matrix are dependent on the project contract parameters, building control mechanisms, financial stability and human resources quality in a specific organization

FIDIC is international standard forms of contract for use on national and international construction projects. These documents cover a range of issues including risk management, project sustainability management, environment, integrity management, dispute resolution techniques and insurance and a number of guides for quality-based selection, procurement and tendering procedures.



Table 1

Design matrix to detect the symptoms of a crisis in the early warning system for transport projects

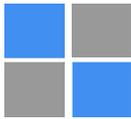
Symptoms of crisis	Quantifiable negative trends	Non-quantifiable negative trends
Signals affected inside the project	<ul style="list-style-type: none"> - Continuous economic evaluation of the project - Track and evaluate time progress - Errors in the implementation documentation - Frequent project changes - Quality tracking and records - Deploying Work Capacities - Occupational safety - Risk accumulation 	<ul style="list-style-type: none"> - Interpersonal problems in relation: <ul style="list-style-type: none"> - client – contractor - contractor – designer - client – building manager - building manager – contractor - construction manager - designer - Passive access of project participants - Loss of motivation - Liqueur in problem solving - Frequent replacement of contractors
Signals affected outside the project	<ul style="list-style-type: none"> - Insolvency proceedings conducted with the contractor - Changes in legislative, environmental and technical conditions of construction - Secondary insolvency - Obtaining bank guarantees - Change in bank financing conditions - Limitation of budget chapters of the state budget 	<ul style="list-style-type: none"> - Reaction of activist movements - Change in political support for construction - Changes caused by economic and social situation

Source: author's construction based on best practice analysis

Discussion

A detailed analysis of the crisis of project D1 Motorway modernisation EXIT 90 Humpolec – EXIT 104 Větrný Jeníkov identified three underlying causes of the occurrence of a crisis condition.

- **Underestimating the Preparation** of the project by the client in the form of insufficient initial surveys, poor-quality initial project documentation, long period of competition.
- **Inappropriate** choice of the **Delivery system** by Design-Bid-Build according to the FIDIC Red Book, where the client is responsible for the completeness and correctness of the project documentation in the measured contract



- **Project management** failures that failed to respond in a timely manner to risk activation and incentives from the Early Warning System.
- Absolute **Absence of Crisis Management** method was detected in the project.

Possibilities of crisis management in transport infrastructure projects

The starting point for similar crises may be the start of application of the methodology for the preparation of the construction by the Design – Build method according to the FIDIC Yellow Book, which was already prepared for The SFDI (State Transport Infrastructure Fund) in 2015 by Deloitte Touche Tohmatsu's 2015 study and Methodology for preparation of transport infrastructure construction in Design-Build delivery system approved by the Ministry of Transport of the Czech Republic.

The essence of the Design – Build method according to the FIDIC Yellow Book method is to transfer responsibility for the completeness and correctness of the project documentation to the construction Contractor. However, this means a very significant increase in the risk on the part of the Client in the form of loss of control over the project documentation and thus to the mark-up of the whole project. Therefore, the client must develop increased activity in the preparation of the construction. It must clearly define responsibilities in the internal structure of project management, clearly define project objectives, project parameters, and define the scope of the construction. Very important is in the implementation phase of the project is setting the procedures for checking the Design – Build project documentation of the Contractor. The draft procedures for checking project documentation are drawn up in Table 2.

The proposed crisis management procedures form a process that has been organised in two phases.

The first phase is preparatory and is focused on proactive crisis management-prevention, on which, in direct dependence, the emergence of a possible crisis situation is solved by the second phase. When the crisis situation arises, the response rate is decisive, which determines the severity of the impact or impact on the risk situation, or the size of the damage caused and thus the nature of the response.

A crisis situation must be declared in the resolution of the crisis situation, that is to say, a special regime for the management of relevant activities to the process in which this risk situation arose – responsibility and competence for the coordination and complexity of the solution shall be taken over by the Crisis Staff and persons designated by that staff to deal with specific activities or measures. The solution of crisis communication is also external and internal communication. Openness within an investor organization and communication of experience is a prerequisite for effective internal crisis communication. The course of the crisis situation is monitored and an evaluation of the effectiveness of the system is carried out after the end of the crisis situation and, where appropriate, measures are taken to improve it. This way of management can be called follow-up crisis management.

The draft of proactive crisis management procedures for transport projects are drawn up in Table 3. The draft of follow-up crisis management procedures for transport projects are drawn up in Table 4.



Table 2

The draft procedures for checking project documentation

Legend:				Responsibility in the Client's team, Client's Architects and DESIGN/BUILD Contractor					
CD Conceptual design HMG Time schedule SOW Scope of works ZPD Zoning permit documentation (P)DBP (Proposal)Documentation for building permit BP Building permit K Approval for use DD Detail design		ASA approve of state authorities BD basic design P1,P2,Pn Proposal for a definitive solution of BD A1, A2, An Approved for implementation ABD As build documentation OM Operation manual !!! Client's control milestone		R -responsibility, S -synergies, I -information, C - control					
	Inputs	Procedure	Outputs	DG Section	Construction section	Project Manager	PM,deputy on site	Client' s Architects	DESIGN/BUILD Contractor
1.	CD			S	R			S	
2.	HMG			I	R			S	
3.	SOW				R			S	
4.	ZPD			I	R			S	
5.		PDBPP	DBP		I			C	R
6.		!!!			R	C		S	I
7.	ASA	BD	BP	I	I	I		I	R
8.		P1				I	C	S	R
9.		P2				I	C	S	R
10.		PN				I	C	S	R
11.		!!!			I	R	C	S	I
12.			A1			I	R	S	I
13.			A			I	R	S	I
14.			DD			I	C	S	R
15.		ABD	K	I	I	C	C	S	R
16.			POM	I	I	R	S	S	S

Source: author's construction based on best practice analysis



Table 3

The draft of proactive crisis management procedures for transport projects

	Activity	Project phase	Procedure S – start, F- finish, 1-n - steps	Responsibility in client's team R-responsibility, S-synergies, I-information						
				Directorate Section	Construction control section	Communication Unit	Crisis team	Project Manager PM	Project Manager deputy on site	Each employee
1	Analysis of possible crisis situations, creation of crisis scenarios	Preparatory phase of the project			R			S	S	S
2	Crisis readiness-processing plan				R			S		
3	Build a crisis team			S	R		I	S		
4	Set up an early warning system				R			S	S	
5	Approval of crisis preparedness plans, Coordination			I	R	I	I	I		
6	Application of preventive measures	Implementation phase of the project						R	S	S
7	Monitoring of the occurrence of a possible crisis situation							R	S	S
8	Identification and analysis of the causes of a possible crisis situation							R	S	S
9	Proactive measures to eliminate the occurrence of a crisis situation, evaluate the effectiveness of the measures taken,				I				R	S

Source: author's construction based on best practice analysis

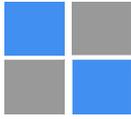


Table 4

The draft of follow-up crisis management procedures for transport projects

Emergency status/response detection	Procedure	Responsibility in the client's team							
		Directorate Section	Construction control	Communication Unit	Crisis team	Project Manager/PM	PM deputy on site	Each employee	
1. Possibility of negative medialization with influence on project objectives	1				R		S	S	S
2. Occurrence of an emergency	2 ← (S)						I	I	R
3. Immediate response to suppress or stop an emergency	3						S	S	R
4. Submission of emergency information	4		I				R	S	S
5. Evaluation of the emergency information obtained	5		R	I			S		
6. Emergency is not a crisis situation – solutions with standard procedures	6	I	R	I			S		
7. Immediate submission of emergency information and evaluation of the status quo	7	I	I	I			R		
8. Decision of section GR and section of construction management on convening of the crisis staff	8	R	S	I	I	S			
9. Crisis analysis	9				I	R	S		
10. Adoption of resolution decisions	10	I	I	I	R	S			
11. External crisis communication	11	S			R	S			
12. Internal crisis communication	12	I	S	R	S	S			I
13. Crisis management	13	I	S		R	S	S	S	
14. Solving operational tasks	14				I	R	S	S	
15. Analysis and evaluation of the effect of the measures carried out, proposal for preventive measures	15	I	S		R	S			
16. Taking preventive measures	16	R	I	I	S	S	S	S	

Source: author's construction based on best practice analysis

Conclusion:

This contribution responds to some adverse situations and negative phenomena that are currently reflected in the implementation of transport constructions in the Czech Republic in the traditional supplier-customer arrangement **Design-Bid-Build**, i.e. in the measured contract (FIDIC Red Book). These are, for example, non-compliance with the basic parameters of the project in the field of dates and budgets, disputes due to faulty project documentation and insufficient preparation of the building, the departure of the supplier from the construction and many others.

The use of contractual provisions in the form of sanctions under the contract for work in the enforcement of the rights of the Client is part of reactive management. However, as the latest experience in the reconstruction of the large Humpolec – Větrný Jeníkov motorway section shows, they are not effective enough and their implementation is extremely complicated for the investor. Reactive management and the bad interactive relationships of the participants of the construction project are high-risk for the success of the project and result in a project crisis. For the implementation of similar projects, it seems appropriate to consider the use of the alternative Design-Build supply system (FIDIC Yellow Book). The investor management of the preparation of transport infrastructure buildings should then be focused on proactive project management involving crisis management and the creation of a confidential cooperative environment with supply entities. The procedures for correctly defining the factual objectives of the project and project documentation are designed in Table 2.

The draft of proactive and follow-up crisis management procedures for transport projects are drawn up in Table 3 and Table 4. Both procedures are based on best practice and general knowledge of project management including crisis management.

References

- Loosemore, Martin. *Crisis management in construction projects*. Reston, Va.: American Society of Civil Engineers, c2000. ISBN 0784404917.
- Registry of contracts MoI, 2017. *Contract 02PT-004114 TGS-Joint venture*, Prague: Ministry of the Interior of the Czech republic.
- Skinner, J. C. a G. M. Mersham. *Disaster management: a guide to issues management and crisis communication*. New York: Oxford University Press, 2002. ISBN 0195783131.
- Tomek, Aleš, Michal Vondruška, a Radan Tomek. *Methodology for preparation of transport infrastructure constructions in Design-Build delivery system*. Prague: Fakulta stavební, ČVUT, Centrum pro efektivní a udržitelnou dopravní infrastrukturu (CESTI), 2019. ISBN 978-80-01-06664-5.
- Vondruška, Michal. *Krizové řízení stavebních projektů: Crisis management in the construction projects*. Brno: Akademické nakladatelství CERM, 2013. ISBN 978-80-7204-847-2.
- Klee, Lukáš. *Smluvní podmínky FIDIC*. 2. vydání. Praha: Wolters Kluwer, 2017. ISBN 978-80-7552-161-3.

ISSN 0250-1023



9 770250 102632