

FORMATION APPROACH FOR PROJECT MANAGEMENT MATURITY MEASUREMENT

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crossref <http://dx.doi.org/10.5755/j01.em.18.2.4604>

Abstract

Business success is one of the most important organization's activity's characteristics. In most cases, this is accomplished through the usage of modern project management for achieving strategic goals. Contemporary project management is based on permanent continuous enhancement project management maturity in progress organization.

More and more public and private sectors organizations become interested in the project management and its influence to reaching of organizational strategic goals. They are making efforts to improve professional knowledge and skills in project management and trying to increase project management maturity (PMM) level.

Methodology used in this research is based on identifying and evaluating key issues regarding evaluation PMM and understanding peculiarities of project management in organizations with its specific challenges environment.

The theoretical analysis of existing maturity models allowed comparing them and identifying their advantages and disadvantages. Most of well known PMM models could be used in various organizations and industries, but not particularly for organizations characterized with specific activity, like higher schools and others.

The type of the article: *Theoretical paper.*

Keywords: *project management, project management maturity, project management maturity model, OPM3, P3M3.*

JEL Classification: *O22, H43.*

1. Introduction

Today project management is becoming an increasingly important part of the whole organization management system. It is connected to the organization's strategic and tactical management. Various types of public and private sector organizations are improving their project management processes and trying to achieve the excellence by a way of project management maturity development.

For organizations, which realize the importance of project management and seek for the ways how to increase PMM, project management theorists can offer various PMM models. Since the Capability Maturity Model (CMM) has been developed, the world saw more than thirty new project management maturity models. Variety of these models can be seen as an advantage to organizations, which are trying to improve their project management, but on the other hand it makes some difficulties in choosing the best model for a particular organization.

PMM characteristic on a scientific discourse have been analyzed by such researchers as Andersen & Jessen (2003), Kerzner (2001), Kwak, Ibbs (2002), Cooke-Davies, Arzymanow (2003), Larson, Gray (2011), Fahrenkrog, Wesman (2003), Turner (2010), PMI (2013a, 2013b) and others.

Research problem: There are more than 30 PMM models in the world, but they are lacking more detailed description of their elements, are heavily understandable and have some other disadvantages. So, researchers should analyze existing PMM models, their features, advantages, disadvantages and try to create new models which eliminate previous models' weaknesses.

This paper's *purpose* is to present coherent solutions to complement existing approaches used to measure project management maturity and to adopt appropriate management decisions. So the task of this article is to develop project management maturity model which is based on analyzes of well known PMM models.

The theoretical analysis of existing PMM models based on scientific literature analysis, comparative analysis, data structuring and evaluation *methods* allowed comparing them and identifying their features. **Result.** As the review of the literature shows, organizations with higher project management maturity level have formal and structured project management processes that are integrated into one system. Also these organizations have singular project management methodologies, best practices analysis systems and etc. Organizations with high PM maturity level are continuously improving their processes. The results will be appropriate to be used in estimating the maturity level in organizations.

Practical implication of this new PMM model is that the survey based on its usage could disclose and assess the real situation and the main problematic aspects of project management in organizations which are carrying out projects to achieve their strategic goals in growing specific competitive environment.

2. The conception of project management maturity

The concept of maturity for most people associates with full development. It is similar to project management. There are a lot of various definitions of the PMM concept in the scientific literature.

Larson and Gray (2011) present, that PMM concept has been presented for the first time in the late 1980s, when United States government and Software Engineering Institute (SEI) was trying to find a tool for successful software development. The result of these efforts was the CMM which concentrates on implementation of best practice during the management of organization's software development projects. It is necessary to say, that CMM model takes a very important place, since this model was designed it spread across various industries. So today CMM could be considered as a predecessor of other existing PMM models.

A term PMM can be defined in different ways. "Maturity in project management is the implementation of a standard methodology and accompanying processes such that there exists a high likelihood of repeated successes" (Kerzner, 2001, p. 58). Similar to Kerzner, another author Būda (2011) links PMM with organization's capability to repeat present success in future projects. Warilow (2009) presents other meaning of PMM. He says that "Organizational Project Management Maturity describes an organization's overall ability to select and manage projects in a way that supports its strategic goals" (Warilow, 2009, p. 1). Analysis of various concepts of maturity has shown, that mostly PMM relates with repeatable project success and dimension of organization's strategic goals.

As analysis of different authors shown, there are a lot of differences between mature and immature organizations. According to Sowden, Hinkley, Clarke (2010) immature organization differs from mature because it acts reactively, has a lot of problems with time and quality assurance while mature organization uses standardized methods and effectively copes with project management. This type of organization implements projects on time and within defined budget more often. However, it is necessary to mention, that according to Andersen & Jessen (2003), in practice, there are no organizations that could be attributed to the highest maturity level. Each organization has to choose optimal maturity level according to its capabilities.

In summary, it can be stated that higher PMM rate is related not only with more effective project management but also with other positive changes. In order to increase the success replay opportunities, each organization must assess the current situation critically and decide what steps need to be taken to change it and reach the higher PMM level.

3. Theoretical analyses of project management maturity models

In practice there are many tools and techniques that are used in the organization PMM assessment. During evaluation we took notice of various maturity models typically describe the specific project management dimensions, related to maturity levels. According to Brooks and Clark (2009), existing maturity models have a lot of differences. These differences include the following: "maturity" definition in the logical structure of the model, project management knowledge areas that they use and the scope of maturity model.

The analysis of the existing maturity models have shown that some models are based on the nine project management knowledge areas or on project life cycle aspects (for example (PM)²) while others are concentrated not only on project but also on the program or project portfolio management (like P3M3). It should be noted, that various PMM models have different numbers of levels in PMM model. For example, Kerzner (2009) presents PMM model with 5 maturity levels while Cognizant Technology Solutions (2013) presents the 6 level PMM model, where maturity measurement begins at zero level. As analysis of scientific literature has shown, there are some differences between maturity levels definitions in various models as well (Table 1).

Table 1. Definition of maturity levels in various PMM models

PMM model	1 level	2 level	3 level	4 level	5 level
CMM (1991)	Initial	Repeatable	Defined	Managed	Optimizing
Berkeley's (PM)² (1997)	Ad- Hoc	Planned	Managed	Managed at Corporate level	Continuous learning
Kerzner's PMM model	Common Language	Common Processes	Singular Methodology	Benchmarking	Continuous Improvement
OPM3 (2003)	Ad – hoc	Formal application of project management	Institutionalization of project management	Management of project management system	Optimization of project management system
P3M3 (2006)	Awareness	Repeatable	Defined	Managed	Optimized

Source: adapted by the authors with reference to Haar (2008), Larson and Gray (2011).

PMM model adaptation to particular organization can lead to positive results. For example, according to Wright and Jones (2008), OPM3 not only helps to assess organization's current maturity level or identify areas for improvement but also links organizational success with project, program and portfolio management best practices. Bull (2007) says that OPM3 has a multi-dimensional approach to process maturity achievement. Benefits of using P3M3 model are identified by Sowden, Hinley, Clarke (2010). They highlight that P3M3 helps to get better understanding of organization's strengths and weaknesses, justify investment in portfolio, program or project management improvements, or determine what skills are needed to meet the business needs.

Existing PMM models have been designed as an auxiliary tool to help organizations to improve their PMM situation, but nevertheless some authors are critical. According to Vergopia (2008), PMM models are often considered as impractical, inflexible, increasing bureaucracy or burdensome for the organization's creative decision-making. Young and Zapata (2011) also present a critical view to existing maturity models. According to them, majority of PMM models are incomplete, they lack a more detailed description of certain elements. Authors writing on maturity models state that their models include all of the processes necessary for successful projects, but Young and Zapata (2011) contradict saying that these models lack empirical evidence and, in some cases, a deeper theoretical justification.

In summary, the authors of different PMM models understand maturity in different ways but, on the other hand, they have some similar ideas also. Every researcher in the field of project management tries to create new, original and superior PMM model but as analysis of existing models has shown, majority of them consist of 5 maturity levels, characterized by similar

definitions of level name. It should be noted that not only levels definitions but also maturity levels descriptions in different models remain quite similar and are very close to their predecessors (CMM). The conclusion can be drawn that the development of PMM models is constantly looking for improved problem solving options.

4. Proposed Project Management Maturity Assessment Model

Today the benefit of effective project management is valued not only by business industry but also by other types of organizations. No exception are the organizations like higher schools and others, which use projects to reach their strategic goals. Organizations integrate project management into their organizational management system and try to find the best way for the improvement of project management skills.

The scientific literature is rich in maturity models that are designed for different industries, but none of them are presented especially for assessment of specific activity PMM. This problem prompted the creation of new PMM maturity model (Table 2). The proposed model is formed as a tool to test gathering information about higher school PMM characteristics and identify its strengths and weaknesses, which has the greatest impact to the particular organization's PMM.

Table 2. Project Management Maturity Assessment Model

Significant project management assessment directions	Significance of the direction	Project management maturity levels				
		1	2	3	4	5
		Indicator's indexes of PM level				
1. PMBOK project management knowledge areas	S1	I ₁₁	I ₂₁	I ₃₁	I ₄₁	I ₅₁
2. Human Resource management/development	S2	I ₁₂	I ₂₂	I ₃₂	I ₄₂	I ₅₂
3. Stakeholders management	S3	I ₁₃	I ₂₃	I ₃₃	I ₄₃	I ₅₃
4. Project selection and their compatibility with the organization's strategy	S4	I ₁₄	I ₂₄	I ₃₄	I ₄₄	I ₅₄
5. Collection and analysis of data related to project management	S5	I ₁₅	I ₂₅	I ₃₅	I ₄₅	I ₅₅
6. Standardization of the project management processes	S6	I ₁₆	I ₂₆	I ₃₆	I ₄₆	I ₅₆
Index of PM level	1,00	$I_1 = \sum I_{1i}$	$I_2 = \sum I_{2i}$	$I_3 = \sum I_{3i}$	$I_4 = \sum I_{4i}$	$I_5 = \sum I_{5i}$
Adjusted index of PM level		I _{1a}	I _{2a}	I _{3a}	I _{4a}	I _{5a}

The proposed model structure includes a number of earlier model elements: Paulk & etc. (1993) described CMM model, also Kerzner (2001) presented a model, Ibbs & Kwak (2002) described Berkeley's (PM)², Larson and Gray (2011) – OPM3, Sowden, Hinley, Clarke (2010) described P3M3 model. The highlight of the proposed maturity model considers the newest elements of PMBOK[®] Guide (5th Edition) (PMI, 2013a). According to this, stakeholders' management is an integral separate area of project management knowledge as a whole. So, this model could be named as a combination of existing models presented in a new way and with new insights. New model consists of traditional five maturity levels that are associated with six project management directions. These directions are following:

- PMBOK project management knowledge areas;
- Human Resource management/development;
- Stakeholders management;
- Project selection and their compatibility with the organization's strategy;
- Collection and analysis of data related to project management;
- Standardization of the project management processes.

First maturity level is named *initial* because being in this level means that organization starts

to develop project management processes. This level of organization has a lot of project management problems that are caused by the gaps of project management skills. Organization doesn't prepare project management training for its employees, therefore the project management success depends on individual efforts. Often organizations have basic project management processes, but do not use them systematically and consistently.

Second maturity level is named *advanced processes*. The presence at this level means that the organization's project management is in an advanced level. It has project cost analyses, time management tools, scope change control and risk management processes, but part of them is still not documented. Organizations prepare basic project management trainings and project team starts to feel the support of organization's senior management.

Third maturity level in the proposed PMM model is named *standardization*. Institution of this level has formed a friendly environment for project management. Project planning, implementation, monitoring and other processes in organizations are based on official documents, which are considered as organizational standards. The needs of project management are understood not only by the project team, but also by all members of the organization who are ready to give full support to the project team.

Fourth PMM maturity level in this new model could be described as *evaluation*. Organizations in this level perform internal and external audits, surveys and analyze communication, quality, time and other management problems. Organization uses quantitative and qualitative methods and measures organization's situation in comparison to other universities or various business industries.

As analysis has shown, existing models lack detailed description of organization behavioral changes. So fifth maturity level is named "*continuous learning and changed behavior*". It characterizes that organizations, which have achieved this maturity level and purposefully develop organizational continuous learning and changing behavior, are prone to change and improve. It prepares project management maturity raising programs, ensures that projects goals are in line with strategic goals of high school.

For evaluation of significance (S_i) of every chosen project management assessment directions it is recommended to involve qualified experts.

In the next step, questionnaire respondents quantitatively estimate every of project management maturity levels: they choose and give indicator's indexes regarding all six significant project management assessment directions (I_{1i} , I_{2i} , I_{3i} , I_{4i} , I_{5i} and I_{6i}).

As mentioned above, every chosen project management assessment direction has different impact (S_i) on PMM level's index I . Consequently it is necessary to adjust indexes of PM level under S_i . For example, adjusted index of the first PM level:

$$I_1 = \sum I_{1i} * S_i \quad (1)$$

In conclusion, it is necessary to say that the way to the project management excellence is long and hard. This requires efforts of all members of the organization. Understandable, all organization's staff should be encouraged to collect best practices, to learn from past mistakes, actively participate in the improvement of project management processes and try to achieve the higher maturity of organization's project management.

5. Conclusions

The theoretical analysis showed that many of cited authors linked PMM with the systematic project selection and project use for the achievement of the strategic goals. PMM is understood as application of standardized processes, learned lessons and bests practice to continuous project management processes improvement.

The scientific literature is rich in PMM models, but it lacks detailed empirical research. Existing PMM models differ in their scope, structure, and areas of analyzed organizational project management. However, the tendency to improve project management process can be noticed in all

the models analyzed.

The proposed maturity model is composed of some components from earlier models, adapting them to the organization's specifics. The practical application of the model can help assessing the current situation in the institution and identify areas which should be improved. However, it is also important to note that this model could be used like a tool for assessment of level of project management maturity, but if organization wants to change and reach higher PMM level it needs to change its behavior.

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