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New design for calculating Project Management Maturity (PMM)

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Abstract

This research aims to present a framework for calculating the project management maturity in organizations by drawing inspiration from literature review on existing maturity models. The assessment is based on existence or not of the characteristic by dimension or area. Each dimension contains a number of capabilities to assess. This framework is a mixed maturity model that combines between sequential and staged models according to the scope of assessment: dimension or the entire organization.

This paper will have direct positive impacts by facilitating to the enterprise, whatever its nature, the adoption and development of its own maturity model that is adapted to the repository or methodology it uses. The Enterprise PMO or strategic PMO can thus use this framework to improve the maturity of its organization.

Keywords: Project management maturity,assessement, mixed model, dimension, capability

1. Introduction

Every organization seeks to improve its way of managing projects. For this, it invests in several actions, which include creation of PMO, staff training, introduction of an integrated project management. But to ensure the effectiveness of these actions, it is necessary to evaluate them to get the expected level following the PDCA approach.

This paper aims to provide a matrix for calculating the maturity of project management by drawing inspiration from literature review on the existing maturity models. To do this, we'll start at first, with a review of literature in which we will define the two types of PPM Maturity models (sequential and staged) and its main features and we will define parameters of the study like capability, dimension and maturity levels. Then we will describe the research methodology based on a comparative analysis which will allow us to propose a hybrid model that combines between the two types of models advantages. And finally we will present the formula design for calculating Project Management Maturity, the subject of this paper.

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2. Literature Review

During these last years, several researchers (Crawford, 2002 - Kerzner, 2004 - Ibbs & Kwak, 2000 - Cooke & Davies, 2004 and others) and institutions (PMI-OPM3, SEI-CMMI-PPMMM Gartner, OGC, P3M3 and other) addressed the topic of maturity in project management and have developed models for evaluating the maturity of project management based on best practices in order to structure the working methods and to promote the continuous improvement. This first phase consists of a literature review on project management maturity assessment. These definitions will clarify the profusion of terminologies that apply to project management maturity.

2.1. Maturity- Capability-Best Practice

In general usage, maturity means fully developed, or perfected. it is in either meaning (1) "fully developed" or (2) "perfected" that the word is used in the term "maturity models" (Cooke-Davies, 2004).

Maturity Levels mean a grouped capabilities that describe increasingly greater orders of consistency, visibility, and control within the organization (J.Schlichter,1999). In the lowest level, processes and practices of dimensions are ad hoc or least defined –Reactive, and the highest level incorporates intelligent feedback in a continuous improvement process.

A Capability is a specific competency that must exist in an organization in order for it to execute project management processes and deliver project management services and products (OPM3, 2008). We can know the existence or not of capability by verifying if outcomes are present and measuring them in terms of metrics (Raju Rao, 2005).

Best Practice is defined by OPM3 as Optimal way currently recognized by industry to achieve a stated goal or objective. The model also takes into account a stepwise progression of capabilities in terms of stages of Standardization, Measurement, Control and Improvement or SMCI.

2.2. Project Management Maturity Model

There is no generally agreed definition of what a mature project based organization looks like (Cooke-Davies, T. J., 2004b). Thereby, there is a growing number of "maturity models" being provided to organizations, either directly or indirectly, to assist with the assessment of how "mature" an organization is (Cooke-Davies, T.J., 2004a). This is because a maturity model allows an organization to assess and compare its own practices against best practices or those employed by competitors, with the intention to map out a structured path to improvement (Pennypacker et al., 2003). An organization in the context of project management maturity models does not necessarily refer to an entire company. A maturity model can also be applied to a business unit, functional groups or departments (TJ Man, 2007).

Implementing a PPM Maturity Model over existing project management practice create an opportunity to see the relationship between the Business Process Life Cycle with the maturing project management practices (Tim Cermak, al., 2011) and to "measure" project performance, particularly on the part of those concerned with governance, portfolio management, and enterprise-wide project management (Egberding & Cooke-Davies, Unpublished). Basically, a maturity model is a framework describing the ideal progression toward desired improvement using several successive stages or levels (TJ Man, 2007).

The capability maturity model was developed in the process-quality world of the 1980s (Greg Hutchings, 2001). It was based on the following principle "the quality of a system is highly influenced by the quality of the process used to acquire, develop and maintain it" (SEI, 2006). CMM was migrated into software and was developed and popularized by the Software Engineering Institute at Carnegie Mellon University from 1987 until 1997. This model was later replaced by its successor, the Capability Maturity Model Integration (CMMI) in 2002 the year of publication of the first version 1.1. The latest version of CMMI (2.1), released in 2006, comprises a framework that allows the generation of multiple models. CMMI for development is one of those models: it provides guidance for managing, measuring, and monitoring software development processes and help organizations to improve their software development processes for both products and services by describing characteristics of best practices. CMMI offers five maturity levels that can only be reached one after the other in order to stage the process improvement effort (Level 1-Initial, Level 2 -Managed, Level 3 - Defined, Level 4 - Quantitatively Managed, Level 5 - Optimizing) (SEI, 2006).

The development of Capability Maturity Models had inspired the emergence of other maturity models in the same field of Software Development. Examples of these are the Test Process Improvement (TPI) Model developed by Sogeti (Koomen, T. & Pol, M., 1998), the Usability Maturity Model (Earthy, J. , 1999), and Portfolio, Program & Project Management Maturity Model (P3M3, 2006): "P3M3 is an improved version of the Project Management Maturity Model, based on the process maturity framework that evolved into the Software Engineering Institute's (SEI) Capability Maturity Model (CMM)". P3M3 is described also by a five level maturity framework (Level 1 - initial process, Level 2 - repeatable process, Level 3 - defined process, Level 4 - managed process, Level 5 - optimized process). It was concluded that the development of a descriptive reference model would be beneficial in providing organizations with more effective guidance for establishing process improvement programs (P3M3, 2006).

The concept of project management maturity was developed also by PMI since 1998 in the framework of PMI standards in order to help companies better manage all their projects (J.Schlichter, 1999) to arrive at the model maturity of organizational project management (OPMMM) also called OPM3. The development of this standard was inspired by the increasing interest in a maturity model that enables organizations to bridge the gap between organizational strategy and successful projects (Schlichter, J., 2000). This model identifies a number of best practices that facilitate the path of organizational maturity (OPM3, 2008). This model is closely aligned to the PMBOK. OPM3 Knowledge Foundation defines Organizational Project Management as the "systematic management of projects, programs and portfolios in alignment with the achievement of strategic goals". The essence of this concept is that the projects, programs and portfolios are related and their interrelationships need to be considered in a holistic way in order to successfully meet organizational objectives (Raju Rao, 2005).

The adoption of a project management maturity model allows the company to evaluate its objective measurement criteria and its high degree of repeatability (Ben Voivedich, 2001). He adds, "An effective model carefully applied can gain quick and sustainable credibility with either external client or internal management structure, especially if it is carefully and intelligently tailored to suit the existing project management application". A PPM maturity model can also minimize negative effects of poorly executed projects with little or no formal project management by providing a roadmap to scale with the organization, and assists to maximize the positive organizational and cultural changes by facilitating the adoption and implementation of new process methodology (Tim Cermak, al. , 2011). Americo Pinto (2010) distinguished between two types of maturity, maturity of the PMO and maturity of organization processes. This distinction, according to him, is very interesting initiatives to encourage the evolution of PMO.

Project management Maturity Model is thus used to assess the maturity level of the organization. It allows it to have an overview of its current capacities in project management, identify gaps and reveal areas of potential project management improvement.

2.3. PPM Maturity Model types

Maturity models differ from one another in the concepts they embody and the suggestions they make as to how the path to maturity looks like (Johnson, J. al., 2001). Prominent models use two different types of graduation (hierarchical and process-driven): in hierarchical model, like Gartner's PPM Maturity Model and SEI-CMMI, the maturity level is characterized by a number of capabilities and the progression is sequential. In this type of models, maturity is defined by "the ability of the organization as a whole to embrace such things as project management or portfolio management, and at what level of complexity and with what level of effort" (Gartner, 2012). The process-driven/staged model, like OPM3 (2008) and P3M3 (2006), assumes that more process equals both higher maturity and greater value. This type is called, also, staged model by Schlichter (1999), in this model, "the maturity level of each process is indicated in a profile, which allows capability and improvement measurements that enable the implementation of metrics-driven improvement programs". The progression is not necessarily sequential. As for CMMI, there are two different improvement models; the continuous model and the staged model: The continuous model applies specific process improvement achievements for each process area. These are measured by capability levels from zero to five. And in the staged model, the overall maturity of the organization is measured by maturity levels from one to five (Sonja Koppensteiner, 2005). According to research done by Beverly L. Pasian, al. (2011), current generation of project management maturity models is dominated by process-oriented factors.

However, maturity model may be appropriate for one type of organization and not be so for another. This is why many organizations have combined between several maturity models like the case of Siemens Industry-Industry automation, as it undertook the challenge to accelerate its organizational project management maturity by practical application of multiple maturity models (CMM, OPM3) and an analysis of expected and realized benefits (Joseph A. Sopko, al., 2012). Another example of an organization that chose to combine several maturity models is Harris RF

Communications, the leading global supplier of secure radio communications, tactical communication networks and embedded high-grade encryption solutions for military, public safety, government and commercial customers (Harris RF, 2013). The choice of the company to be the first in its category requires a commitment to excellence in the project management culture, its processes, and the project management delivery system (Scott, 2009a). This transformation has been successful by combining OPM3, ISO, and CMMI standards (Scott, 2009b).

3. Methodology

3.1. Research Goal

The project management maturity model is used to evaluate and criticize the organization project management system to improving it. Theoretically, it should be possible to assess how "mature" a project-based organization is by looking at a combination of what aspects of project performance or project management practice it measures, and what the results of those measurements show (Cooke-Davies, 2004b). In this paper we aim to identify a new method to calculate the maturity of a company in project management based on the existence or not of the characteristic (function or capability) by dimension or area.

3.2. The framework description

In our study, and based on a survey conducted in Morocco and aimed project managers (Houda Tahri, Unpublished), we have defined four dimensions for assessment (Methodology, Communication, IT tools, and managerial skills) that represent the common features and functions most commonly used in large organizations in Morocco. Inspired by the Gartner model "PPM Maturity, 2012" organizations are evaluated according to the Dimension on five levels (Level 0 - Adhoc mode - nonexistent maturity, Level 1- reactive mode, Level 2 - Disciplined Mode, Level 3 - Adjusted Mode, Level 4 - Effective Mode, Level 5- Optimized Mode).

The organization wishing to be assessed may have a different level of maturity from one dimension to another. The experience supported by the results of the investigation, shows that there are mature organizations in certain areas without the whole being. That means for an organization X, it may have a maturity level 2 in dimension methodology and 3 in the communication dimension for example. This is a concrete case found in public institutions where communication is relatively developed compared to the methodology (organizational structures of projects, standardization, procedures and work processes) (Houda Tahri, Unpublished). Thus, in this framework we speak of dimension maturity instead of organizational maturity.

It is therefore a mixed maturity model, which combines between hierarchical (sequential) model and the process-driven model (staged). In each framework dimension, the maturity level is characterized by a number of capabilities and the progression is sequential (sequential model). And in framework dimensions as a whole, the maturity level of each characteristic (capability or function) is indicated in a profile (staged model, as defined in the literature review), and progression is not necessarily sequential.

3.3. The Reference Model for assessment

According to TJ Man (2007) researches, a maturity model for PM is made up of two parts: a maturity reference model and an assessment method. The maturity reference model is considered a measuring staff; it elaborates on 'what' an assessor should assess in order to determine the maturity of an organization. And the description of the assessment method describes 'how' assessors should carry out the assessment to determine maturity. Each company may have a different reference model. In our study, we will focus on the "how"; the second part of maturity models i.e. the assessment method.

Based on a given reference (the one chosen or used by the company, if it has), we will try to customize our maturity assessment framework. For that we will develop the characteristics of the organization in project management and classify them according to the predefined dimensions and the characteristics of each maturity level.

We refer Cijk code this feature (i = Dimension i, j = level of maturity j and k = the number of the feature) this gives us the following matrix:

	N1 = Reactive	N2 = Disciplined	N3 = Adjusted	N4 = Effective	N5 = Optimized
D1= Methodology	C111 :	C121 :	C131 :	C141 :	C151 :
		C122 :	C132 :	C142 :	C152 :
		C123 :	C133 :	C143 :	C153 :
		C124 :	C134 :	C144 :	C154 :
				C145 :	C155 :
D2= IT Resources	C211 :	C221 :	C231 :	C241 :	C251 :
			C232 :	C242 :	C252 :
			C233 :		
D3= Managerial skills	C311 :	C321 :	C331 :	C341 :	C351 :
	C312 :	C322 :	C332 :	C342 :	C352 :
		C323 :	C333 :	C343 :	C353 :
			C334 :		
D4= Relationship	C411 :	C421 :	C431 :	C441 :	C451 :
D5= Communication	C511 :	C521 :	C531 :	C541 :	C551 :

Table 1: Framework for assessing Project Management Maturity (PMM)

The value of Cijk is 1 or 0; which means consecutively the presence or absence of the attribute.

The transition to the next level (L+1) is conditioned by the satisfaction of all requirements of the current level (i.e. $\prod$ Cijk ≠ 0 for all j<L+1).

In our framework, the main features (functions or capabilities) of each level of maturity that the company must measure are classified below according to dimension type:

D1: Methodology
- C111: Process for priority projects
- C121: PMO implemented (Coordination role between project managers)
- C122: Project processes in place
- C123: Programs managed internally
- C124: Managing projects resource allocation began to be discussed
- C131: Project Portfolio Manager function established
- C132: PMO prioritizes projects portfolio (Coordination role + Assistance & Coach role for PM)
- C133: Tendency toward specialization
- C134: Involvement of enterprise architecture functions
- C141: Network of PPM leaders exist
- C142: Similar projects are managed as programs
- C143: The entire company is on federated Mode
- C144: Several PMOs (Coordination role + Assistance & Coach for Project Portfolio Managers - PPM)
- C145: Excellence centers for improved workload management
- C151: PPM Leaders exist in all areas of society
- C152: The selected specializations are performing
- C153: Global PMO or EPMO and several PMOs (Coordination role between PPM + oversight role of PMOs)
- C154: Pipeline managed in real time
- C155: Continuous process improvement

D2: IT Resources
- C211: Project planning tools for scheduling
- C221: Project planning tools for budgeting and scheduling
- C231: Portfolio management tools adopted
- C232: Dashboard reporting
- C233: Training, skills & competency development

- C241: Workflow added to the set of tools
- C242: Business users are familiarized with project management tools
- C251: A single integrated system that supports the reporting, collaboration and analysis
- C252: Portfolio extended beyond IT.

D3: Managerial skills
- C311: Allocation of resources for priority projects
- C312: Budget Forecast
- C321: labor costs calculated
- C322: Estimation of project benefits
- C323: Risk Analysis
- C331: the costs and budget are captured
- C332: Benefits identified in the project portfolio
- C333: Managing shared resources pool
- C334: Static portfolio dashboards
- C341: Capacity planning is activated
- C342: Integrated project management
- C343: Actuals performance monitoring
- C351: The portfolio is modeled and optimized appropriately, taking into account the risks
- C352: The programs have their own financial resources
- C353: Monitoring profits

D4: Relationship
- C411: Collaboration between staff DSI and Business Departments
- C421: Relationship manager role emerged
- C431: Relationship managers viewed as trusted advisors
- C441: Relationship manager performs the role of consultant to the business
- C451: Wider impacts are considered (Social responsibility, supply chain ...)

D5: Communication
- C511: Schedule reporting
- C521: Cost and risk reporting
- C531: ROI and profits reporting
- C541: Actuals performance reporting
- C551: Reporting and collaboration through a single integrated system.

After having identified the level of maturity domain, the organization can begin improving its maturity by dimension and stop at the desired level according to the requirements of the markets (Joseph Sopko, 2012).

4. Conclusion

Company that is running in the excellence in Project management way achieved marked advance and is strong in growth and changing Project management maturity path (Bronius & Ruta, 2011). Thus, to endeavor more potential benefits, company must adopt and develop Project, Program and Portfolio maturity management methodology at perfection (Vysocki, 2009). In this research, we tried to facilitate to the enterprise, whatever its nature, the adoption and development of its own maturity model that is adapted to the repository or methodology it uses. The Enterprise PMO or strategic PMO will be the most appropriate structure to accomplish this mission. This model will serve EPMO (Internal or External) to measure not only the maturity of project management in the company and improve it, but also the maturity of operational and business PMOs if they exist. This model could be used in future detailed surveys within the public and private Moroccan companies. And that firstly to know its own current level of project management maturity and trace the route of improvement according to the market demand. Secondly, to facilitate valid comparisons of project management maturity across a wide range of companies and across institutions, and to respond to the continuing need for timely industry benchmarks, which create competitiveness and improvement of work processes. With this model, future studies can adopt a more standard approach in benchmarking, assessment and

improvement. There are, however, several limitations of this study. First, the study did not consider all models of PMM presented in the review of literature for the large number of models and the tight time. This study does not fulfill the need for a detailed assessment model and specific improvement path. There is always a tradeoff between the level of detail considered and how well the model can be generalized and used. This model will give the company an idea of their level of maturity. Organization may later go into more detail by evaluating all capabilities by Dimension and that according to the Project Management standard adopted.

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