

Enhancing Maturity Model of Project Management for Scaling Construction Projects: A Review

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Abstract: The projects are delayed and their budget increases due to the lack of management processes followed by the organization. There are various tools available with the help of which the projects can be completed effectively. Maturity model is one of the tools, by opting that the organization can attain higher project management. Organizations are predicted to be successful when talk is about project effectiveness and efficiency, having the higher project management maturity level and therefore having a competitive advantage in the marketplace. There are various maturity models established by different authors valid for construction as well as other industries. This paper reviewed how the Project management maturity model enhances the construction projects.

Keywords: Project Management Maturity Model (PMMM), Maturity Models (MMs), Construction Projects.

I. INTRODUCTION

A project is a complicated decisive work in the construction industry as well as in other ones. There are various ups and downs while executing the project in the prescribed time and cost. For the proper execution of these projects the project management techniques and tools are utilized. These project management techniques are well known to every project manager, owner or the other technically sound authorities, even though they fail to submit the project in scheduled time. Even the tools and techniques in scheduling of the project are evolved but the projects are going cost-overrun and time-overrun and deals with uncertainty. Project management is gaining a rapid popularity and with this the organizations are becoming mature by delivering projects successfully. The modern enterprises need to assess themselves in all their areas of execution. Maturity model is the tool with the help of which any organization can know their areas in which they lack and are good at. Project management maturity model allows the organization/project to know in which of the area they need improvement for proper execution of projects. It facilitates a roadmap for improving performance by taking needed steps towards project management maturity advancement and improvement.

II. MATURITY MODELS (MMs)

Maturity is the degree to which a particular procedure is expressly characterized, oversaw, estimated, well-ordered, and powerful. Maturity infers a capability for development in capacity and shows equally the lavishness of processes in project management of an association with which it is connected in undertakings all through the association. Researchers are doing continuous struggle to find the different ways for improving organization's project management (PM) competence so that these can get benefits from project management. There are various methods by applying them we can improve the PM competence of an organization viz. proper training, specific mentoring, benchmarking, usage of latest tools & techniques and proper maturity model usage.

A proper frame work of Maturity models facilitates a focused and advance enhancement of project management capability for the effective delivery of projects. It helps to know the organization about how mature their project management practices are and measures the shortcomings of that organization. A controlled and arranged framework helps to establish models in which the authority has to submit issues related to management and engineering processes. Software Engineering Institute developed the 1st maturity model at Carnegie Mellon University which was known as Capability maturity model (CMM). Majority of the maturity models are following the 5 levels created by CMM which starts from the lowest level to the highest level of maturity that is from initial level to continuous improvement level as shown in Figure 1. If the maturity level is high that doesn't mean the organization is using cultured tools and methodologies. It shows that the organization is only capable of selecting and applying the correct processes of management with proper practices and advance tools.

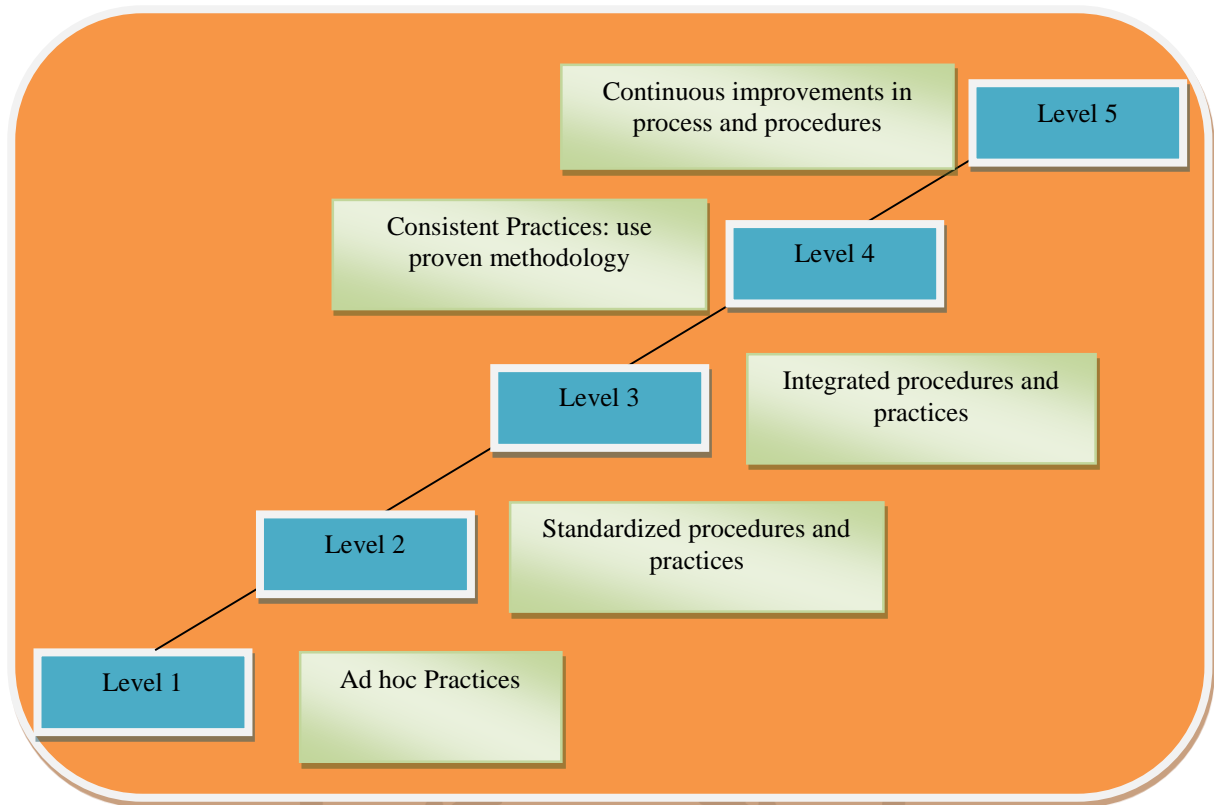


Figure 1: A typical 5 level Project Management maturity Model [1]

III. BENEFITS OF MMS

The following benefits can be comprehended for your projects after applying maturity model tool:

1. The project visibility and control are improvised for the project performance.
2. The total performance for certainty and understanding are also optimized.
3. Profit increases.
4. The management staff starts focusing on the customers instead of turning the crank.
5. The project started delivered on real-time and within defined budget.
6. The communication within the team and in between the senior to junior optimized.

IV. CRITICAL LITERATURE REVIEW

Following is the utmost essential part of a review paper, the critical literature from different National and International Journals/Conferences of Project management and other.

Ibbs et al. (2000) included 8 project management (PM) knowledge areas with 6 PM phases. They included 4 different industries viz. construction, telecommunication, information technology and manufacturing. They concluded that their used methodology can be applied to other industries/companies for proper understanding of PM. [7]

Kam et al. (2002) conveyed the complications of the resource-based frameworks (RBV) and relate it to project management. They stated that focusing mostly on explicit project management knowledge areas which are quantified by Maturity Models (MMs) by the respective firms; then the firm can accomplish competitive equality but may fail over taking advantage of the intangible assets. They concluded that the MMs result in an impermanent competitive advantage but lacks in a sustainable competitive advantage. [10]

Zhai et al. (2007) constructed a conceptual Construction Project Management Maturity Model (CPM3) by integrating generic Project Management Maturity Model (PM3) principles. They concluded that the objective of introducing PM3 to the construction industry is to familiarize the industry with a new management technique for improving standards of construction management and the overall standards of the entire construction business. [19]

Mitchell et al. (2008) examined the actual Organizational Project Management Maturity Model (OPM3) cases from Australia, New Zealand, and the United States for finding the profits of maturity assessments that is taken. They concluded that there are organizational profits for organizations to do maturity assessments. [14]

Naomi Brookes et al. (2009) presented number of differences between different Project Management Maturity Models (PMMM) and assessed the existing PMMMs. They evaluated that PMMM was used by the organizations frequently not consistently. They concluded by highlighting the inadequate empirical proof that connects project maturity [15]

Pretorius et al. (2012) found that the Project Management Body of Knowledge (PMBOK) knowledge areas link positively with project results. They concluded that the main functions like scope, time, cost and quality management having the direct relationship with project results. [17]

Cheng Siew et al. (2013) formulated a maturity model for sustainable construction which increases a proper and more affluent thought of the activities on sustainable construction. They concluded that their proposed maturity model could be used as a benchmark tool for deciding the accomplishments of a project regarding the improvement of sustainable construction. [4]

Jehan Zeb et al. (2013) found noteworthy differences for both the work processes and communication regarding the maturity in-between the municipalities of city and district. They concluded that those items which are prior in the sequence of work processes are comparatively extra defined and dignified while comparing to the later. [9]

Backlund et al. (2014) conducted minor survey of the mining, hydro power, construction, and civil engineering industries with a single case study on major mining company LKAB in Sweden. They found seldom occurrence of Project Management maturity assessment in Sweden and concluded that there should be a specific department whose intentions are to evaluate the level of maturity and to spot the areas of improvement in the project. [3]

Maria et al. (2014) improved the scope to advance PMMMs as business-oriented framework. They concluded that in order to improve the business-oriented performances in the organization the PMMMs are the most useful tools. [13]

Patel et al. (2016) collected 10 main dimensions of project management from Literature review and other new 4 from site interview and from Pilot survey. They developed a framework for Surat city to evaluate the Maturity Level of Construction projects, comparing every organization projects with each other. [16]

Gholamreza et al. (2018) applied the Delphi techniques using structured interviews with experts focusing on eight power plant construction projects in Iran. They concluded that the risk management methodology improvements will tops to high project cost & time and always improve the quality. [5]

Jana et al. (2018) structured an easy to use PMMM to assess the undertaking the executive's development dependent on the appraisal of utilization of task the board devices and strategies inside each phase of the venture life cycle considering the overwhelming kind of activities actualized. They inferred that by utilizing this data, skillful directors of the individual associations can reach inferences and take sufficient measures with respect to connected techniques and apparatuses of venture the board. [8]

The Table 1 explains about the maturity models adopted by the authors extracted from the literature review.

Table 1 MMs adopted by authors with major findings

Author	Opted MMs	Major Findings
Ibbs et al. (2000)	Organizational Project Management Maturity Model (OPM3)	Proposed model could break down the qualities and shortcomings of undertaking the board rehearses among different assorted organizations and ventures and furthermore distinguishes issue territories obstructing a task director's utilization inside the undertaking the executives procedure. [7]
Kwak et al. (2002)	Project management process maturity model (PM) ²	Research would help managers who are struggling to compute a budget for improving their organization's overall PM practices. [12]
Kevin et al. (2006)	Project management maturity model (PMMM)- PM Solutions	There are very few exceptions available with noteworthy difference in project management maturity between various industries. [11]
Hulya et al. (2009)	Organizational project management maturity model (OPM3)	Continuous investigation should be done by Organizations in PMM for improving the maturity levels. [6]
Pretorius et	Project management maturity	Majority of the organizations were at the level 3 and the

al. (2012)	model (PMMM)	project management organization obtaining average of 2.88 of maturity. [17]
Maria et al. (2014)	OPM3	Most effective PMMM is OPM3 among others. [13]
Andrej et al. (2015)	Capability maturity model (CMM)	Performance of Information and Communication technology (ICT) companies in Slovakia were severely depending over the project performance, as mostly all of them were providing services (consultancy, development, delivery) in spite of manufacturing of goods. [2]
Rhoda et al. (2015)	Construction Disability Management Maturity Model (CDM3)	The formulated model can be used by Worker's Compensation Boards, safety associations and other regulatory bodies across Canada and elsewhere for auditing purposes. [18]
Jana et al. (2018)	Project Methods and Management Tools Oriented Maturity Model (PM2TOM2)	The information from model allow the competent managers of the individual organizations to draw conclusions and take adequate actions regarding applied methods and tools of project management. [8]

V. CONCLUSION

The following conclusion can be outlined on the basis of critical literature review of papers:

The recent construction projects are lacking in many aspects of project management. They need to mature themselves by following certain techniques and tools. The project management maturity model application can lead an organization to its utmost level. MMs help construction projects to attain their best output and complete the project in time as well as in the scheduled cost. PMMM grant a roadmap to the construction projects for successful completion of projects.

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