ANALYZING PROJECT MANAGEMENT MATURITY LEVEL IN INDONESIA

Eliot Simangunsong
Prasetiya Mulya Business School
elliot@pmbs.ac.id

Elisabeth N. Da Silva
Prasetiya Mulya Business School
novira.dasilva@pmbs.ac.id

Abstract

Project management has been generally known and increasingly used by many organizations to gain competitive advantage. In this context, many studies have proposed maturity models to evaluate how project management knowledge has been deployed effectively and efficiently in organization. As a developing country, Indonesia needs many development projects managed by government and private companies in different industries. Here, a study to assess project management maturity level in Indonesian businesses may bring insight about current business practices, which is important to speed up country development and business sustainability. Adapting the Project Management Maturity Model (ProMMM), a survey instrument has been developed and applied to professionals from Jakarta and surrounding area. The result of analysis shows that construction and primary industry have a higher maturity level compare to manufacturing and services. It is to be noted, however, that the level of project management understanding is low across industries. This indicates that more quality project management training or certification is required to improve overall project management knowledge in Indonesia.

Keywords: Project management, maturity model, benchmarking

Business environment is rapidly changing these days and companies must demonstrate their ability to respond to these changes and achieve competitive objectives. Crawford, et al. (1999) proposes managing organization by projects as an approach to gain this ability. Here, management by project provides a framework for an organization to adjust plans and scenarios by effectively use all available resources to meet targets. Projects and therefore project management is now considered as a critical process and competency which most organizations needed.

The increasing number of project management practitioners has certain effect on project management, especially after the establishment of Project Management Institute (PMI) in 1969. The PMI initiates standard, such as Project Management Body of Knowledge (PMBoK) and certification process, such as Project Management Professional (PMP). The knowledge of Project Management is important

because many projects in business are deemed unsuccessful because lacking of knowledge in project management (Vergopia, 2008). For example, Eve (2007) did an empirical study by surveying 100 senior managers in aerospace organizations and found clear evidence that training of project management methodology improves both individuals and organization's project performance. Recent empirical study by Rehman et al. (2011) found that the high rate of project failures in Pakistan were associated with lack of competence in the project management. They propose that more training in project management system is needed in Pakistan, especially for public sector organizations which were the weakest areas. Arguably, companies that successfully implement project management would be characterized by good knowledge of project management and organization support toward project management (Rehman et al., 2011).

In order to measure project management competency, many studies have proposed maturity models to rating project management performance (Vergopia, 2008). The project management maturity model provides the framework that enable organization to develop its capabilities to deliver project successfully project after project (Pennypacker and Grant, 2003; Hillson, 2003). The higher level of maturity means the greater degree of capability to manage a project. A low project management maturity score is referred to organization that facing many project management issues such as cost overruns, missed completion time, or less satisfied project outcome. A high project management maturity score means that the organization has adopted a proper framework in their project process and able to meet all targets.

In the context of Indonesia, Bay and Skitmore (2006) conducted an empirical study of 70 respondents and found that project management knowledge have not been used effectively in businesses, although over 85% of respondents agree that the knowledge of project management is important. Hari G. Soeparto, the former head of Indonesian PMI chapter, also emphasizes the importance of project management knowledge in Indonesia because as a developing country, many development projects are needed in various sectors (IT News, 2008). A recent research by Jugdev and Mathur (2012) also confirms that further research is still needed to investigate the role of project management to generate competitive advantage.

Therefore, this paper seeks to review literature on project management maturity followed by an empirical research to assess project management maturity in Indonesian businesses. The objective is to determine the level of project management maturity across a wide range of industries in Indonesia as there is only one such research in the context of Indonesia (Bay and Skitmore, 2006).

LITERATURE REVIEW

Cleland and Ireland (2006) defines a project as *"a combination of organizational resources pulled together to create something that did not previously exist and have a distinct lifecycle"*. A project is typically complex, unique process with many constraints and

time limitation to meet customer needs (Gray and Larson, 2002; PMI, 2008). A project should be managed seriously with sufficient support from top management. Project Management is *"... the application of knowledge, skills, tools and techniques to activities within a project in order to meet or exceed stakeholders' needs and expectations"* as defined in The Project Management Body of Knowledge (PMBOK) of the Project Management Institute (PMI) (http://www.pmi.org). Managing a project is a challenging process because different skills and tools may be needed for different project and also requires comprehensive planning and coordination (Kerzner, 1998; PMI, 2008).

Project management maturity represents the degree of one organization in defining, managing, measuring and controling a project effectively (Dooley et al., 2001). Jugdev and Mathur (2012) added the use of a project management office, tools and techniques, methodology, standards, processes, program and portfolio management practices, and efficiency and effectiveness practices. A successful project management is characterized by organization ability to deliver a project performance timely, within budget and specifications in a consistent manner (Vergopia, 2008). Many studies propose models of project management maturity to measure effectiveness or efficiency of project management (Pennypacker and Grant, 2003; Hillson, 2003). Vergopia (2008) classify project management maturity models into three categories. The first category is models for specific company, for example, The Trillium Model used by Bell Canada. The second category is models for specific industry/ profession, for example, Capability Maturity Model (CMM) for software organizations (Vergopia, 2008), SPICE for construction industry (Hutchinson and Finnemore, 1999; Sarshar et al., 2000). The third categories is models for general purposes and fit all organizations involved in project management, for example, Kerzner's Project Management Maturity Model (Vergopia, 2008), The PM Solutions Project Management Maturity Model (Pennypacker and Grant, 2003), Berkeley PM Process Maturity Model $(PM)^2$ (Kwak and Ibbs, 2002), ProMMM (Hillson, 2003), and the PMI OPM3 Model (Fahrenkrog et al., 2003).

Because of many different maturity models, this research is focused on four models for general industry and commonly used. The first model is the Capability Maturity Model (CMM) (Pennypacker and Grant, 2003). CMM was developed in 1993 by Carnegie Mellon University and the Software Engineering Institute (SEI) after years of research (http://www.sei.cmu.edu/). Currently, this model is known as Capability Maturity Model Integration (CMMI). The model has five level of process maturity, i.e., initial, repeatable, defined, managed and optimizing. This model is considered too voluminous (over 500 pages), difficult to understand, and complex in nature (Vergopia, 2008). An empirical study by de Oliveira (2010), et al in 19 software production companies (429 respondents), has founded that the CMMI model is questionable to be applied in the same way for each and every organizations surveyed .

The second maturity model is the PM Solutions Project Management Ma-

turity Model (PMMM) (Pennypacker and Grant, 2003). Adapted from the CMM and the nine knowledge areas of PMI, this model helps organizations with step by step project management capabilities to achieve project management excellence. There are five levels of maturity included in the PM Solutions PMMM, i.e., initial, structured and standard, organizational standard, managed process, and optimizing process. However, similar with the Capability Maturity Model (CMM), the PM Solutions PMMM is also considered as a difficult model which is tiresome and repetitious to follow (Vergopia, 2008).

Kwak and Ibbs propose the third popular model – the Project Management Process Maturity (PM) Model (Kwak and Ibbs, 2002). This model is also consists of 5-level PM process maturity, focused on the strength and weakness of current PM practices to help to achieve higher PM maturity. The model is being continuously developed because it incorporates current project management researches and practices (Kwak and Ibbs, 2002). However, as with other non-specific models, this generic model does not offer specific direction as to how to move a PM process from one maturity level to another (Vergopia, 2008).

The fourth model is the Project Management Maturity Model (ProMMM), which is proposed by PMProfesional Solutions Limited, a UK-based project management organization. Hillson use this model in a case study of a multinational organization to measure its project management maturity (Hillson, 2003). He found that the model helps the organization to develop a project-aware culture and staff competency. ProMMM framework consists of four maturity level described below:

1. Naïve: project management is unstructured, repetitive and reactive; past experiences are not used to enhance future projects.

2. Novice: early adopter to project management knowledge, aware benefit of project management although the PM process have not been implemented well.

3. Normalized: management of projects and formalization of project management process is widely implemented, but not all cases have excellent result.

4. Natural: project management has been internalized in all aspects of the business; the organization adapts project management best practices to gain competitive advantage.

There are four attributes, i.e., culture, process, experience, and application, to describe each level of ProMMM. By using this attributes, organizations can assess their current maturity level and set target to achieve next maturity level. Hillson explains that the maturity measurement process is easy to deploy, either using survey questionnaires or interviews, and interpretation of data is straightforward and easy to understand (Hillson, 2003). Arguably, The ProMMM offers an easy framework that can be used by any organization to assess their project management capabilities. Vergopia added that this model also helps organization to improve PM capabilities by bench-

Table 1. Project Management Maturity Model for General Organization

Model	Origin	Target	Description
CMM (Vergopia, 2008)	SEI	Software Industries	5 level - initial, repeatable, defined, managed and optimizing.
PMMM (Crawford, 2006)	PM Solutions	Project-driven Organizations	5 level - initial, structured and standard, organizational standard, managed process, optimizing process
$(PM)^2$ (Kwak and Ibbs, 2002, Vergopia, 2008)	Berkeley PM	Project-driven Organizations	5 level , adopting PM solutions – ad hoc, planned, managed, integrated, sustained
ProMMM (Hillson, 2003)	PM Professional	Project-driven Organizations	4 level – naïve, novice, normalized, natural

marking itself against ProMMM Level (Vergopia, 2008). Summary of the four maturity models are presented in table 1.

It is to be noted that a universally accepted view of project management maturity does not exist (Pasian, 2011). There is a lack of consensus for the current generation of project management maturity models – with their purpose, design, and value being the subject of ongoing discussion. Many studies argue effectiveness and validity of the models. For example, Skulmoski found that no specific model suits all types of project and empirical evidence is still needed to determine which model can be used to most project success (Skulmoski, 2001). Jugdev and Thomas discuss that project management maturity models are not flexible, may identify problems but not provide solutions; organizations must develop a plan to solve such emerging problems (Jugdev and Thomas, 2002). Some of the models are focused on the work process but disregard human resource or organizational perspectives. Hillson also voiced their concern about difficulties in assessing and interpreting the maturity models because of their inherently complex structure (Hillson, 2003). Recent study by Jugdev and Mathur argue that maturity models only focus on tangible resources (e.g. project management tools, techniques, and standards) and not intangible ones; this enable imitation by competitor and may prohibit using this model to gain competitive advantage (Jugdev and Mathur, 2012).

Despite these weaknesses, Jugdev and Thomas explain that maturity models have given a valuable contribution to assess project management maturity level in organizations (Jugdev and Thomas, 2002). The application of many models also has shown that corporate project performance can be linked with project management competency. Cooke-Davies also found that research on maturity models have broadened discussion and increasing recognition of stages of improvements in project executions (Cooke-Davies and FAPM, 2004).

To date, research of project management maturity models are relatively rare in the context of Indonesian's industries. Project management development in Indonesia is started in 1980s, when Indonesia's project management practitioners started to join PMI (USA Chapter). PMI Chapter Indonesia is established in 1996. Other association, called Indonesian Society of Project Management Professional (IAMPI) is also established in 1999 to accommodate project management practitioners from outside of PMI-Indonesia, especially from IT and Construction

industries. Some industries, for example construction, require each project manager to have a certification in project management. Project management knowledge has been viewed as one of critical learning process and therefore it is important to assess project management maturity level in Indonesia.

RESEARCH METHODOLOGY

This study is arranged into four stages: *first*, defining the research area and the research subject relevant to academicians and practitioners in the field of project management; *second*, reviewing the literature to investigate the current level of understanding in the research area as well as potential unexplored research gaps; *third*, identifying the research gap to be explored and develop research design, which is discussed in this section; and *fourth*, executing the research design.

As suggested in the literature review, an empirical research, in terms of survey research, is needed to answer the research questions. Survey research is the activity of systematically collecting data, information and opinion from a population or sample of a population (Filippini, 1997). Survey research is important because: *first*, empirical data is very significant in theory building and rationalization (Flyvbjerg, 2004); *second*, it provides such an opportunity to engage with practicing managers; and *third*, it allows certain problems which cannot be studied using traditional quantitative approaches, such as new product development (Swamidass, 1991; Pagell and Krause, 1999), to be explored. Survey research is a quantitative method that requires a standardized format, for example, a questionnaire, which is used to define or describe variables, or to analyze relationships between variables (Malhotra and Grover, 1998).

A survey questionnaire has been developed to address the research objectives. The ProMMM model, discussed in the study by Hillson (2003), has been adopted as the basis for this study, because of its applicability and practical guidance. The types of question are described as follows:

1. Project management criticality, to capture culture attribute, is described in the question of how the organization react to the statement that effective project management is critical to business success.

2. Project management commitment, also to illustrate culture attributes, is described in the question of how committed the organization to a systematic management of process.

3. Project management formality, to describe process attribute, is presented in the question of how fully defined the project management process.

4. Project management maturity, also to describe process attribute, is described in a question of how stable and mature the project management process.

5. Project management understanding, to capture experience attribute, is presented in the question of how well the staff understand project management principles.

6. Project management practicality, to point out application attribute, is

presented in the question how experienced are the staff in project management technique and skills.

7. Project management scope, to capture application attribute, is described in the question of what is the scope of project management process application.

The questions listed above are used to explore respondents' perception on current state of their organizations in managing projects. Additional questions are also developed, i.e., general description of the company profiles, level of project management training, respondent particular experience in applying project management, etc.

The questions derived from the ProMMM framework had also been applied in other studies such as Rush et al. (2007) who adapted the model to asses technological capabilities of firms, Bryde and Leighton (2009) on benchmarking survey of PM maturity in The UK Higher Education (HE), Karlsen (2011) who conducted in-depth interviews with project management professionals to study the effectiveness of current uncertainty management practice in projects, and (Rezaeean and Falaki, 2012) who also use ProMMM framework to develop a structured questionnaire which then been used to assess effectiveness of project management. Therefore, it is reasonable to assume applicability of the survey instrument for the purpose of this research.

This empirical research is consisted of web-based survey (mainly) and paper-based survey if the respondent asked for it. Each respondent is questioned the overall project management maturity level in his or her company. The questions in the survey correspond precisely to the descriptions of each of the four levels of project management maturity model as discussed in the study of Hillson (2003).

This research categorizes respondents from five different industries in the Jakarta area as follows:

- Constructions: including Engineering
- Services: including Financial and Commerce, Transportation, Government, Education, Information System , Marketing and PR, Health, Consultant
- Manufacturing: including Design/ Procurement and Research and Development
- Oil/Gas and Primary industries: including Petrochemical and Natural Resources (Mining/Forestry/Agriculture)
- Other industries

Commercially available business databases (e.g. KOMPAS, BPS) and a University Alumni Database have been used to filter potential respondent. The survey was carried out from August 2011 to December 2011 and from 338 respondents contacted, 127 filled out and returned the survey, yielding a response rate of 37 per cent. Statistical analysis is performed to measure project maturity and to gauge the relationships between factors that contribute to the project maturity.

Table 2. Industry Profiles

Industry	Frequency	Percent
Construction	25	19.7
Services	45	35.4
Manufacturing	19	15.0
Oil/Gas Primary Industries	36	28.3
Other	2	1.6
Total	2	1.6

Table 3. Respondent‘s Current Position

Current Position	Frequency	Percent
Project Team Member	28	22
Project Manager	31	24.4
Project Management Manager	8	6.3
Project Owner	3	2.4
Functional Manager	16	12.6
Senior Manager	9	7.1
Consultant	8	6.3
Other	24	18.9
Total	127	100

Everything possible has been done to reduce potential problem on the survey research. A pilot survey is conducted before sending the questionnaire out to the sampled population; this is very important as it helps to erase any research bias, and any misunderstandings. An online survey is also provided and this gives advantage in terms of enabling the researcher to ask respondent to fill the survey again to complete the questionnaire. A dedicated research assistant is available to contact each potential respondent and help them to fill the survey properly. This research uses a survey to measure project management maturity model in Indonesia, by incorporating the concepts available in the literature and this increase validity of the research instrument and can be “re-tested” by other researchers.

RESULT AND DISCUSSION

The profile of the respondent is presented in Table II and Table III. The table shows that the respondents are evenly represented from the four industries although Services and Oil/Gas Primary Industry represent 63% respondents. More than half (54%) respondent’s current positions are in project management, varies from project team member up to project owner. The other respondents also have current position at managerial level. This data arguably shows relevancy of the respondents on answering the questionnaire, thus increase data validity. In addition, 92% of respondent have more than one year experience in project management, and 39% of them have more than five years experience. This information also strengthens the quality of empirical data collected in this research. In term of business scale, most of the respondents come from organizations with more than 100 employees (76%). This indicates that respondent comes from medium to large companies. The value of project also implies this assumption, where 84% respondent’s organizations yearly project value is above 500 million rupiah.

This research uses the ProMMM framework to predict organization

Table 4. PM attribute from all respondents

Indicators	Attribute	Definitions	Number of Respondents	Mean Maturity Level
PM Criticality	Culture	The extent of project management criticality to business success?	127	3.45
PM Commitment	Culture	The extent of organization's commitment to proactive and systematic management of projects	127	3.05
PM Formality	Process	An indicator of formality of project management processes	123	3.34
PM Maturity	Process	An indicator of maturity of project management processes	123	2.79
PM Understanding	Experience	The extent of staff understanding on the underlying principles of project management	124	2.4
PM Practicality	Application	The level of staff familiarity in using the practical skills and techniques of project management	124	2.37
PM Scope	Application	The scope of application of project management processes	124	2.73
				2.88

Table 5. PM attribute from all respondents

Industries	PM Criticality	PM Commitment	PM Formality	PM Maturity	PM Understanding	PM Practicality	PM Scope	Average Rating
Construction	3,72	3,12	3,21	2,92	2,80	2,56	3,00	3,05
Services	3,29	2,91	3,37	2,70	2,35	2,30	2,44	2,77
Manufacturing	3,47	3,05	3,28	2,61	2,28	2,22	2,67	2,80
Oil and Primary	3,47	3,22	3,47	2,94	2,25	2,42	2,97	2,96
Other	3,00	2,00	2,50	2,00	2,00	2,00	2,00	2,21

maturity level (1 – Naïve, 2 – Novice, 3 – Normalized, and 4 – Natural), by investigating four attributes, i.e., culture, process, experience, and application (Hillson, 2003). Table 4 present a summary of PM attribute from all respondents.

PM Criticality has the highest mean score (3.45). Overall ProMMM level is calculated from the average score of all four attributes, with resulted in a score of 2.88. This shows that in general, based on the ProMMM framework, Indonesian companies' project management maturity level is categorized as Novice (below maturity level 3).

From industry perspective, this study finds that maturity level is different across industries. Table 5 presents the maturity level from each industry, where each attribute of project management is calculated and then added to get overall average rating.

In general, Construction industry has the highest maturity level (3.05) and the only industry that reach normalized maturity level. The second industry is oil and primary industry followed by manufacturing, services and other. Due to low response rate for other industry (only two respondents), this industry is omitted from further discussion below. The result of this study is parallel with previous study

by Pennypacker (123 respondents in USA) (Pennypacker and Grant, 2003), and Zwikael and Globerson (201 project managers in Israel) (Zwikael and Globerson, 2006), that mentioned Construction and Engineering Companies have highest maturity level than other industry.

Another finding from analyzing across industries is that culture (criticality and commitment) and process (formality and maturity) tend to have higher score compare to experience (understanding) and application (practicality and scope). This implies that in general, organizations in Indonesia have put their concern on the importance of Project Management in their organizations, but has low level of experience and application of project management (understanding and practicality). The score of project management understanding is particularly low; this indicates that education and training of project management is needed. This score is confirmed in other data analysis that shows that even though 73.4% respondent mentions that their organization requires experienced project managers, only 30% of them require project management certification for project managers. From 127 respondents, only 42.2% have undertaken any project management training. Therefore, it is reasonable to conclude that more quality project management training is needed to improve project management maturity across industries in Indonesia.

CONCLUSION

The study has reviewed literature on project management maturity and finds that although many maturity models have been developed, it is clear that empirical studies is needed to assess viability of the models in practice. This issue became prevalent as practically research on project management maturity is non-existing in the context of Indonesia.

Adopting the ProMMM model, an empirical research has been conducted in Indonesia. The result of the study shows that construction is the only Industry that has maturity level 3 (Normalized), in which management of projects and formalization of project management process is widely implemented, but not all cases have excellent result. Lack of proper project management training and certification is one major issue identified in this study as determinant of the overall project management maturity level in Indonesia.

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