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## Project Management Maturity Models – A Critical Review

### A case study within Swedish engineering and construction organizations

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#### Abstract

Different kinds of project management maturity models (PM<sup>3</sup>s) exist today, most of them inspired by the capability maturity model (CMM) developed in the beginning of the 90ies, originally intended to measure capability in software development projects. Research indicates that organizations with higher project management (PM) maturity levels are expected to be successful in terms of project effectiveness and efficiency, and thus have a competitive advantage in the marketplace. Though, despite several PM<sup>3</sup>s developed during a time period of over 20 years, knowledge about how PM<sup>3</sup>s are applied in organizations is sparse within the PM literature. This paper explores how major engineering and construction companies view PM maturity and PM<sup>3</sup>s in order to develop and improve their PM practices. These kinds of organizations are mainly project-intensive, objective oriented, and have the capabilities to perform overall business development initiatives, i.e. suitable for applying PM<sup>3</sup>s.

The contribution of PM<sup>3</sup>s to organizational improvement and development is somewhat unclear. Therefore, a literature review highlights different aspects regarding PM<sup>3</sup>s, specifically their purpose, strengths, and weaknesses. To what extent PM<sup>3</sup>s are used, interviews have been conducted with seven respondents within different project intensive organizations, in their roles as project managers or in charge of PM development. How a PM<sup>3</sup> can be introduced and applied is explored via an in-depth case study at the major mining company in Sweden, LKAB. However, tentative results show that the application of PM<sup>3</sup>s in Swedish engineering and construction organizations are limited, indicating that further research is needed.

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#### 1. Introduction

Research during the last decades has showed an increased interest for project management (PM) in many organizations (Söderlund, 2005), due to increased project work in all types of industries (Besner & Hobbs, 2006; Turner & Müller, 2005; Jacques, Garger, & Thomas, 2008; Shim & Lee, 2001). In general, PM can be defined as

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“Application of knowledge, skills, tools and techniques to project activities to meet project requirements” (Project Management Institute, 2004). Consequently, the field of PM has extended its focus from study of a single project to means of how a company or organization can use projects to achieve its goals, e.g. with PM portfolio (Martinsuo&Lehtonen, 2007). As many businesses recognize PM as a key activity, they are striving for gaining benefits to their businesses through effective management of projects (Hillson, 2003). PM effectiveness can be seen as to achieve the required cost, time and quality objectives (e.g. Clarke, 1999). Some authors also point out the importance of PM efficiency, e.g. how to minimize the firm input given a level of output, see e.g. Parast(2011). Achieving effectiveness (and efficiency) requires that organizations have various processes in place that support PM within and across projects, where project management maturity models (further on PM<sup>3</sup>s) can support the measurement of the organization’s PM processes and their adequacy (Hillson, 2003). However, most descriptions of PM<sup>3</sup>s are mainly emphasizing effectiveness (Hillson, 2003; Kwak&Ibbs, 2002).

There is a need to look at an organization’s “complete” picture of PM effectiveness and therefore assessment frameworks have become increasingly prevalent, in particular, the development and application of PM<sup>3</sup>s (Crawford, 2006). According to Mullaly (2006) the majority of these frameworks have been developed in the beginning of 2000. Grant and Pennypacker (2006) have estimated more than 30 models available on the market, for example OPM3 (Organizational Project Management Maturity Model) (PMI, 2008), SPICE (Structure Process Improvement for Construction Enterprises)(Sarshar, Haigh & Amaratunga, 2004) and (PM)<sup>2</sup> (Project Management Process Maturity Model) (Kwak&Ibbs, 2002). Most of these models have similarities in their structure and content, inspired by the Capability Maturity Model (CMM) developed by the Software Engineering Institute of Carnegie-Mellon University between 1986 and 1993 (Cooke-Davies &Arzymanow, 2003). Most of the PM<sup>3</sup>s are based on the concept that organizations advance through a series of five stages to maturity: initial level, repeatable level, defined level, managed level and optimizing level. These five levels define an ordinal scale for measuring the maturity of an organization’s process and for evaluating its process capability. The levels also help an organization prioritize its improvement efforts (Cooke-Davies &Arzymanow, 2003).

The general opinion is that organizations with higher maturity levels are expected to be successful in terms of project effectiveness and efficiency and also have a competitive advantage in the marketplace (Cooke-Davies &Arzymanow, 2003). For example, a PM<sup>3</sup> can be used to measure current capability and define improvement targets for organizations wishing to improve the effectiveness of their PM, in order to deliver projects successfully in long term (Hillson, 2003; Mittermaier&Steyn, 2009). The many models developed also indicate that the use of a PM<sup>3</sup> is important to project intensive organizations to become more effective and efficient. Even though many PM<sup>3</sup>s have been developed empirical research (case studies) of organizations using the PM<sup>3</sup>s is sparse, and findings from the realization of identified improvement potentials are limited. Some researchers even state that there is no evidence of the implications of using PM<sup>3</sup>s (Kwak&Ibbs, 2002; Jugdev& Thomas, 2002). There are some results from measuring PM maturity within different types of business areas, for example in petrochemical and defense industries (Cooke-Davies &Arzymanow, 2003) and in construction and engineering companies (Pretorius et al., 2012). How single organizations apply PM<sup>3</sup>s, and develop their PM performance based on the results, is not revealed in literature however. Therefore, the purpose of this study is to investigate why and how companies apply PM<sup>3</sup>s.

## 2. Method

The research project is of an exploratory nature trying to better understand, clarify and define the use of PM<sup>3</sup>s and hence why they are not applied in greater extent. The research design is based upon qualitative research with the aim to facilitate the application of PM<sup>3</sup>s by increasing the understanding of challenges in their applications. Most of the PM<sup>3</sup>s available are suitable for traditional PM characteristics, i.e. with a focus on activity-, time- and resource planning, see e.g. Pollack (2007). Depending on the view of PM in organizations – as strategic enabler or as a “fad” (Mullaly, 2006), the purpose to apply PM<sup>3</sup>s differs. The applicability of project maturity models, requires usually a relative large amount of resources and time to manage (Jugdev& Thomas, 2002), therefore it can be assumed that the use of PM<sup>3</sup>s are most suitable in major project-based organizations. The study presented in this paper explores how the concept PM maturity is applied/not applied in project-based organizations, focusing on Swedish engineering and construction projects. The empirical study involved a single case study and a minor survey consisting of seven companies from the mining, hydro power, construction, and civil engineering industries, which are all involved in engineering and construction projects. By choosing only Swedish companies, cultural differences could to some extent be avoided that otherwise could interfere in the analysis. The criteria for selecting the companies have been that they were project-intensive initiating several projects each year, could be classified as large companies (i.e., composed of more than 250 employees according

to EU definition; <http://ec.europa.eu/enterprise>), and were acting in a complex project environments (i.e., large engineering and construction projects).

The single case study applied within the major mining company in Sweden, LKAB. The rationale for choosing a single case methodology was that the case gave an opportunity to observe and analyze a phenomenon which is difficult to get access to, which is in line with the reasoning by Yin (2003). Another important application of the case study methodology is when we want to describe an intervention and the real-life context in which it occurred (Merriam, 1988), i.e. in this case, grasping the opinions of those participating in the use of the PM<sup>3</sup>.

The single case study have been performed by interviewing totally 9 respondents (2 project managers - i.e. responsible for several project leaders, 2 project coordinators/administrators, 4 project leaders, and 1 project department development manager). The project department development manager was the initiator of the PM maturity assessment. The minor survey has involved 7 respondents from 7 companies, holding the role as project managers or responsible for the overall project development (e.g. model and method development). All interviews have been performed based on a semi-structured interview questionnaire, focusing on the views and applications of PM<sup>3</sup>s. During the single case study, interviews lasted for approximately one hour and were executed within the organization. However, two of the interviews were performed by telephone, due to certain circumstances. The interviews during the survey lasted approximately ½ hour. All interviews were performed during spring 2013.

### 3. Theoretical framework

The evolution of PM typically lags behind development of other capabilities within a company. It is not until the need for PM development becomes critical that organizations pay attention to improving their PM skills (Crawford, 2006). Improved PM maturity facilitates for continuous improvements (CI) within PM, which is essential for the success of international organizations (Jung & Wang, 2006). The concept of “maturity” is being used increasingly to describe the state of an organization’s effectiveness (Crawford, 2006). It can refer to a state where the organization is in a perfect condition to achieve its objectives. Project maturity would then mean that the organization is perfectly conditioned to deal with its projects (Andersen & Jessen, 2003). The Project Management Institute (PMI) emphasizes organizational PM, defined as the systematic management of projects, programs, and portfolios in alignment with the achievement of strategic goals. Organizational PM maturity is the degree to which an organization practices this type of PM (PMI, 2008).

There exist several different PM<sup>3</sup>s. One common model is the OPM3 (Organizational Project Management Maturity Model), developed by the PMI (Mittermaier & Steyn, 2009). This model aims to integrate, assess, and improve PM practices (Yazici, 2009). The model also support organizations’ development of the capabilities that strengthen the processes used to manage all projects within the organization and to relate those projects closely to the corporate strategy (Grant & Pennypacker, 2006). It provides a hierarchical structure with a number of best practices, each comprising multiple capabilities. Each capability leads to outcomes which can be assessed by key performance indicators and metrics. Three organizational levels; projects, programs and portfolios are measured according to four levels of maturity: standardize, measure, control, continuously improve (Hillson, 2003).

Another example of project maturity model is the PM<sup>2</sup> (Project Management Process Maturity Model) which provides means for identifying and measuring different PM levels by integrating nine PM knowledge areas with five project processes under a quantified scheme (Kwak & Ibbs, 2002). The PM<sup>2</sup> provides an orderly and disciplined process to achieve higher levels of PM maturity. Ibbs and Kwak give one example of measuring PM practices and performance. They integrate PM knowledge areas and PM phases against actual project performance data, so their study is a step toward a factual and quantitative way to measure PM practices and performance (Ibbs and Kwak, 2000). Other models that are being used to assess PM maturity include the assessment of PM processes as a part of the organization’s overall quality assessment of business processes, using models such as the Baldrige National Quality Award (BNQA) or the European Forum for Quality Management’s “Business Excellence” model (EFQM) (Cooke-Davies & Arzymanow, 2003). The concept of maturity indicates that there might be a development from one level of capability to a higher one. It should be logical to consider that maturity develops in time, and that it can be recognized through certain steps or stages. However, in the real world we will not find the fully matured organization. Therefore it makes sense to talk about a certain degree of maturity and make an effort to measure or characterize the maturity of the organization (Andersen & Jessen, 2003).

### 3.1. Uses and benefits

Maturity models are designed to provide a framework that an organization needs to develop its capabilities, in order to deliver projects successfully in the long term (Jugdev& Thomas, 2002; Mittermaier&Steyn, 2009). According to Crawford (2006) the benefits of PM maturity assessment lie in setting direction, prioritizing actions, and beginning cultural change rather than primarily identifying the current level at which an organization is performing. Another purpose of using a PM<sup>3</sup> is to compare project capability between organizations, or between a specific organization and industry norms (Mittermaier&Steyn, 2009), as a means to benchmark their maturity relative to others (Cooke-Davies &Arzymanow, 2003; Grant and Pennypacker, 2006). But only to make comparisons is not enough, any model selected to measure PM maturity must point out a logical path for progressive development (Crawford, 2006). Also, each organization has to look at its own results and find out where the organization has a great deal to gain in increased project maturity (Hillson, 2003). It is important that the assessment itself to be repeatable, provide consistent measurements and results, and provide for some degree of benchmarking with other organizations. This provides the basis for any assessment to be utilized as a “checkup” tool to measure progress and to identify the next logical steps forward (Crawford, 2006) and hence support organizations to view PM as a strategic enabler (Mullaly, 2006).

### 3.2. A critical review of applying PM<sup>3</sup>s

Too often the implementation of new tools or techniques within an organization becomes a panacea that should solve all problems, according to Crawford (2006) PM<sup>3</sup>s can be misapplied the same way. There are also possibilities for different kind of errors in the assessment, i.e. that measuring maturity usually will be more subjective than objective (Andersen &Jessen, 2003). Therefore, determining the correct level of maturity in an organization can be more an art than science (Crawford, 2006). The subjective nature to determining the level of maturity makes it important to use an assessment tool that has been tested and proven to achieve consistent and correct results (Crawford, 2006).

A criticism of using PM<sup>3</sup>s is the focus on explicit PM knowledge areas and not on intangible assets (Jugdev& Thomas, 2002), which are not measurable but can contribute to a mature PM capability, e.g. context-specific values as customer involvement and tacit “human factors”, e.g. trust and creativity (Pasian et al., 2012). Another aspect which may prevent potential users to apply PM<sup>3</sup>s is the comprehensive and complex frameworks, e.g. OPM3 (Hillson, 2003). In sum, a literature review by Jugdev and Thomas (2002) summarize some major criticism of PM<sup>3</sup>s:

- The models are inflexible when a flexible model is required for managing change and improvements;
- The models are typically geared toward identifying problem and raising awareness but not solving problems;
- The models do not account for the rapid pace of change with which firms adopt new technology and change processes, practices, management systems, or policies;
- The model’s five maturity levels do not offer enough deep level of details to measure progress over time;
- The models are overly disciplinary, impractical, and overwhelming as methodologies;
- The models focus on the work processes and some ignore the human resource or organizational aspects.
- The models have some limitations from a theoretical perspective as they are based on software maturity models that lack a theoretical basis.

PM improvements based on maturity assessment should be performed in a series of smaller steps and in sync with other corporate process maturity, including e.g. financial management and software engineering (Crawford, 2006). CMM requires a considerable amount of time and effort to implement and often needs a major shift in culture and attitude (Jiang et al., 2004). As many PM<sup>3</sup>s are based upon the CMM, similar challenges should be valid. Therefore, many organizations will never need to realize level five in maturity (Crawford, 2006). However, according to Hillson (2003) each organization has to look at its own results from using a PM<sup>3</sup> and find out where the organization has a great deal to gain in increased project maturity. Striving to increase the maturity level just for the sake of having a higher level is unwise. It is more important to identify what specific actions to be implemented to move the organization forward, to have a vision and improve the capability of PM with targeted efforts (Crawford, 2006).

### 3.3. Experiences from applying PM<sup>3</sup> in practice

Experiences from using PM<sup>3</sup>s in project-intensive organizations are lacking, i.e. how to improve their way of PM based on maturity assessment results. Most studies of PM<sup>3</sup>s are based on overall surveys, e.g. assessment of PM maturity in petrochemical and defense industries (Cooke-Davies and Arzymanow, 2003), construction and engineering companies (Pretorius et al., 2012), and in a review by Grant and Pennypacker (2006) of PM maturity levels among four major industries: professional, scientific and technical services; information; finance and insurance; and manufacturing. One case study at a company level has been found based on the ProMMM (The project management maturity model) (Hillson, 2003). The study was undertaken for a multinational organization wishing to enhance PM capability, and using the PM<sup>3</sup> model to define a starting point for their improvement initiative. Overall benefits from the maturity assessment mentioned are focus on areas with specific improvement needs, defined scope of improvement initiatives and implementation plans. However, how the study was executed, e.g. amount of responses and opinions by the respondents to the assessment, how to continue using PM<sup>3</sup>s or difficulties during the study are not described.

Based on a literature review, Yazici (2009) emphasizes the need for further research on PM maturity and how this relates to project performance. She also states that organizations should continue investing in PM<sup>3</sup>s to improve their maturity levels. Also, the role of PM as a strategic enabler in organizations needs to be further explored (Mullaly, 2006) and the need of future longitudinal research to monitor the evolution of PM maturity (Grant & Pennypacker, 2006). Kwak and Ibbs (2002) state that future research should continue to focus on increasing the understanding of the PM maturity and its benefits of PM knowledge areas and processes. Real-world case studies reporting how an organization actually applies a PM<sup>3</sup> would also be beneficial to the PM community. One study by Pretorius et al. (2012) investigated if 'industries of origin' (engineering-based industries) can be expected to be more mature in terms of PM than industries (e.g. IT industry) adapted PM principles and practices later on. Their study found no difference in the maturity levels of the two industries. On the contrary, they found a significant difference between the average percentage of completed projects that were successful in the South African IT sector and the African engineering and construction industry. In 2008 the IT industry had a higher percentage of successful projects.

## 4. Empiric

From interviews of representatives for seven major construction and engineering companies in Sweden, none of them measured PM maturity or applied a PM<sup>3</sup>. One of the organizations, a major authority, had applied a PM<sup>3</sup> for seven years ago, with the purpose to do a benchmarking with other authorities concerning PM. According to the respondent, the application of PM<sup>3</sup> was initiated by a few individuals with little involvement from senior management. Hence, the PM maturity measurement took place at only one occasion. The concepts project maturity or PM<sup>3</sup> were unknown for most of the respondents, and consequently in their organizations. Further, several of the respondents stated an absence of a common organizational PM model and a lack in managing experiences, learning and working with (continuous) improvements. Some respondents viewed PM<sup>3</sup> (after a brief explanation of the concept by the authors) to be a too theoretical model, i.e. not suitable in practice. In general, several respondents also pointed out too "slimmed" organizations as an issue, i.e. too little time and resources working with development and improvements in a long term perspective by means of for example a PM<sup>3</sup>.

One construction and engineering company that recently performed a PM maturity assessment, via a PM<sup>3</sup>, is LKAB. LKAB is the major mining company in Sweden with a net turnover approximately 31 billion SEK 2012, and is completely state-owned. The company is also active in the Northern parts of Norway where major ore cargoes are shipped from the harbor in Narvik. The company has approximately 4200 employees and the major business areas are Mining, Refining and Logistics. Approximately 100 employees are working in the Project department, which is divided into eight divisions and a staff function. Hundreds of projects are initiated or performed each year within LKAB. Major construction and engineering projects of strategic importance, e.g. development of new mining levels or infrastructures for iron logistics, are planned and managed by the Project department. The projects are initiated by internal clients and planned and performed by the Project department, which consists mainly of project managers (i.e. division managers, in charge of several project leaders), project leaders (i.e. in charge of one or several projects) and project coordinators (i.e. administrative support to project managers and leaders). To execute the projects, personnel from other units within LKAB or entrepreneurs are contracted to participate in the different projects. The measuring of PM maturity within the Project department was an initiative by the manager for PM development, a staff function within the department. An electronic survey consisting of structured questions (with given answering alternatives) were sent out to all employees

within the Project department in 2012. The survey had a focus on seven PM processes, with one open question for each process. The survey was estimated to take 20 minutes to answer, and the employees had a period of two weeks to respond. The response rate was 73 percent.

The PM<sup>3</sup> used to measure PM effectiveness at LKAB was inspired by the P3M3 model (Portfolio, Programme and Project Management Maturity Model), developed by the Office of Government Commerce (OGC) in UK. The measurement was performed by a consultant company. In its original form, the model focuses on portfolio, program and PM maturity, however, the measurement at LKAB only focused on PM, decided by the manager of PM development, as portfolios and program were not common concepts within the company. The model framework is based upon five maturity PM process levels; 1) awareness, 2) repeatable, 3) defined, 4) managed and 5) optimized (where five represent the highest level). The maturity levels are used to assess seven PM processes; Management Control, Benefits Management, Financial Management, Stakeholder Engagement, Risk Management, Organizational Governance, and Resource Management.

#### 4.1. Results

The overall result from the PM maturity assessment was presented at the company according to the seven PM processes. For example, the Risk Management process scored approximately 4.0, while Resource Management, Stakeholder Management, and Management Control scored approximately 3.0. The results were then summarized by presenting descriptive analysis and answers from the open questions. The descriptive analysis presented; (1) a distribution of the amount of responses at the different divisions, (2) a comparisons regarding the score on the seven processes; the divisions, the different PM roles, and years of employment (categorized in three different periods), and (3) open answers related to the seven processes. The distribution of the amount of responses at the divisions revealed that there were some differences concerning the distribution. Also, the distribution of the comparisons regarding the score on the seven processes varied. For example, the category 'construction managers' had relative low score at Management Control and Resource Management, and 'project leaders' low on Benefits Management and Stakeholder Management. Thus, as stated in the final report from the study, further investigation of the statistics need to be performed. Also, the report listed all the open answers related to the seven processes, highlighting that they need to be categorized and analyzed further.

The survey also included an opportunity for the respondents to leave open answers. A great number of opinions were therefore given with a main focus on possible improvements within each PM process area, but also general improvement areas were highlighted in the answers. The opinions indicated a major interest from the respondents for other PM aspects, i.e. not fully captured in the structured questions. However, several respondents were of the opinion that the questions were difficult to comprehend, mainly due to an unknown PM vocabulary, especially considering question about Benefits Management and Financial Management. Some of the opinions are summarized below related to the seven processes in the PM<sup>3</sup>.

Even if the Project department has a standardized PM model, several respondents pointed out the lack of carrying out projects in similar way, within and across organizational units. Some respondents also pointed out that steering group representatives sometimes questioned the PM model used, and forced the project leader to deviate from the model. Improved PM ICT-support system was also demanded, and improved exchange and storing of experiences, especially in the end phase of projects. Some opinions were that clients and steering groups need to be more involved in the assessment and evaluation of project benefits, and that different kind of benefits should be identified and discussed. Several respondents considered that the clients and steering groups had the main control of the "Financial Management" process, i.e. that the Project department mostly had to accept the financial framework given the projects.

Three overall questions were also included in the survey: What is most important to improve the PM at LKAB? What kind of support is most important to succeed with PM at LKAB? What are the next steps to obtain a higher level of PM maturity? The questions generated several open answers, however more or less the same answers were given in all three questions. Several answers focused on the importance of involvement and competence among the clients, mainly to improve common understanding of the activities during project initiation and planning. Also, a process for continuous competence development in general of employees in the PM department was emphasized. Other aspects highlighted in the open answers were a common way of working (involving e.g. checklists, templates and support systems), and to become a learning PM organization including learning from experiences and learning from others more experienced project leaders (for example mentors). Some more detailed demands in projects were improved: document handling and communication.

#### 4.2. Experiences from the PM<sup>3</sup> assessment

This section summarizes the interviews conducted at the company regarding the PM maturity assessment. The summarized areas concern how the respondents regarded the information prior the questionnaire was sent out, the relevance of the questions, and finally how the results of the assessment were presented.

Most of the respondents agreed upon the importance of the PM maturity assessment for LKAB as a company, i.e. to perform a current situation analysis discovering how the company was performing different aspects of PM. Based on that information potential improvement areas could be identified, to enable PM benchmarking, and to increase the understanding of how the clients experienced the PM performance. However, several of the respondents stated that they participated in the measurement as an every-day “work task”, i.e. with little intrinsic motivation. For example, the project leaders meant that they more or less answered the questionnaire dutifully. Though, according to one respondent, answering such a questionnaire could be a good opportunity for the personnel to be able to express opinions about the PM performed at the department. One of the respondents, belonged to the Norwegian part of company, considered that the PM maturity assessment mainly was of relevance for the Swedish part of the company, due to e.g. different laws and regulations.

Information about the upcoming maturity assessment, to the personnel within the Project department, was distributed via e-mails, and the project managers. Some respondents, mainly project managers or project coordinators, considered that they had enough of information and knowledge prior the study. The project leaders received the questionnaire via e-mail, and one meant that they had preferred some type of meeting, to discuss and prepare before the questionnaire was sent out. Regarding the relevance of the questions, most of the respondents found them to be relevant and to cover “all” important PM areas. However, one respondent considered that the closure phase (evaluation phase) in a project was lacking in the measurement. Though, in general, several of the project leaders had the view that many of the questions were “fuzzy”. These experiences were also to some part confirmed by one project coordinator that believed some respondents probably would have difficult to comprehend some of the questions, as the vocabulary used in the questionnaire could differ from the terminology used at the Project department, for example, the concepts of “Stakeholder” and “Benefits Management”. Also, one project leader meant that the questions could have been more in-depth, i.e. that the overall type of questions could make respondents to be less motivated answering them.

According to one respondent, some divisions had formal meetings to present the results, for others only the project managers got information about the results. According to most of the respondents the results from the assessment more or less confirmed what they already new/suspected. However, they meant that the results, i.e. the focus on strengths and improvements areas, were useful information for the company. But, several of the respondents also felt that the results were of less support in their professional roles, and that it was mostly statistics and facts presented and not so much about potential improvement activities. Several respondents wished for more reflection and discussion about the results and measures based on the assessment, and to discuss what to do with the results further on. Several respondents also stated that some of the questions in the survey were more directed, and valid, for the client representatives, e.g. Financial Management.

According to the manager for PM development (further on “the manager”) the aim with the PM maturity assessment was to make it possible for the Project department to compare its PM performance internally and with other project-based organizations, i.e. internal and external benchmarking. The intention was to frequently accomplished PM maturity assessments, eventually each second year, but no guiding principle was developed yet. The PM maturity assessment implied in itself a major change in working with PM development. Therefore, the managers meant it was important to first focusing on the PM performance, and in the future include assessment of project portfolio and program management. He also had a vision that the maturity assessments should involve PM in the complete company, not only the Project department. He considered that most of the important PM areas were included in the study, but measurement of so called softer aspects, as involvement and culture, was to some parts lacking. The results from the PM maturity assessment had only been known in approximately two months in the organization. Therefore, according to the manager, several project managers still needed more time to present and discuss the results with their employees. The manager also emphasize that a PM maturity assessment, as the one performed, only is possible if PM development is managed in a specific PM unit, as a project department or similar.

## 5. Analysis and recommendations

The theoretical framework reveals that PM maturity has become an important concept in evaluating PM capabilities within organizations. Such an evaluation is often based upon some type of PM<sup>3</sup> that assesses different levels of PM maturity. As many models exist today, different kinds of benefits from using them have been identified, but also obstacles and disadvantages. Based on previous reasoning, the analysis is structured according to comparing theory and empirical findings within the following areas: 1) Purpose and benefits, and 2) Strength and weaknesses.

### 5.1. Purpose and benefits

In the survey, the respondents highlighted several general factors which can affect the adoption of PM<sup>3</sup>s. Several respondents could comprehend the benefits of using PM<sup>3</sup>s, but some also considered PM<sup>3</sup>s to be a too theoretical concept, i.e. not useful in practice (also stated by Jugdev & Thomas, 2002). The choice of major construction and engineering companies has been made due to their availability of resources to perform an assessment in practice, and to implement improvement initiatives. However, none of the companies used PM<sup>3</sup>s or measured PM maturity in alternative ways. The findings indicate that overall PM improvements and development initiatives are lacking, especially as most of the respondents did not know about the concept PM<sup>3</sup>. One of the organizations had performed a PM maturity assessment, but only once, indicating that applying PM<sup>3</sup>s are too resource demanding, which is in line with the reasoning by Hillson (2003) and Jugdev and Thomas (2002). Some of the organizations lacked a standardized PM model, or common way of working in practice, which probably imply that the organizations are far from reconsidering using PM<sup>3</sup>s. A major focus on individuals, i.e. professional project leaders and project managers to make the projects run smoothly, were expressed by several respondents. Also, the respondents stated that the organizations were too “slimmed”, i.e. in possession of too little resources to be able working in a long term perspective, e.g. by means of PM<sup>3</sup>. This indicates lack of PM as a strategic enabler to develop organizational capabilities, e.g. considering PM infrastructure and a systematic way of working within the organization. This issue is also an issue discussed by Jugdev and Thomas (2002) and (Crawford, 2006). The respondents also highlighted a minor focus at experience feedback and CI within their project environments (which is the highest level in most PM<sup>3</sup>s), indicating a need of using PM<sup>3</sup>s in the future.

At LKAB they applied a PM<sup>3</sup> with the intention to make a benchmarking with other project-intensive organizations, but also to internally investigate where improvement initiatives were needed. The purpose for applying a PM<sup>3</sup> was to review the current status of different PM processes, pinpointing strengths and weaknesses, and hence be better in conducting projects in the future. This is in line with the reasoning by Hillson (2003), i.e. that the main purpose of PM maturity assessment is to look at its own results and find out where to increase PM maturity. The PM development manager also emphasizes the importance of focusing on PM improvements first (excluding portfolio and program management initially), to be able focusing on some improvement initiatives at time. This is according to that PM improvements should be performed in a series of smaller steps, not giant leaps (Crawford, 2006). However, as most of the respondents in the case study could not comprehend the benefit for the company, they did not experience that the maturity assessment facilitated their own situations in managing projects, i.e. lack of intrinsic motivation. Another issue is that the application of the PM<sup>3</sup> only affected the Project department, indicating that an overall PM development strategy is lacking.

### 5.2. Strengths and weaknesses

Findings of obstacles and driving forces are based on the in-depth case study.

Several respondents felt that the questions were difficult to comprehend, fuzzy or misdirected. Even so, the PM development manager pointed out the importance of using a well-proven PM<sup>3</sup> and using the same set of questions, to be able to perform internal and external benchmarking. This reasoning is in accordance with Crawford (2006) who means that it is very important to use an assessment tool that has been tested and proven to achieve consistent and correct results, due to the subjective nature of determining the level of maturity. However, an initial pre study could have been performed with a few respondents, to identify questions which were experienced as “fuzzy”, to discuss and explain the questionnaire more in depth to the respondents before the study took place.



The results from the assessment seem to have confirmed what most respondents more or less already knew, and presented as mainly statistics and facts, which seems to affect some of the respondents' interest for the study results negatively. The study also indicates that there was a lack of intrinsic motivation in answering the questionnaire, i.e. "what's in it for me?". That issue could affect the way of answering the questions considering both reflection of the questions and the extent of answering. It seems to be important that the efforts put in by the personnel gives something meaningful results in return. Discussion, reflections, strategies and action plans are therefore important tasks to follow up a PM maturity assessment. Also, the results shows a difference in motivation (in answering the PM survey) between managers/coordinators and project leaders. The readiness and preparedness before the survey differed a lot depending on what role in the organization. Managers and coordinators seem to have had more information than the project leaders, and to be more committed. Attention to the employees' intrinsic motivation seems to be important before performing a PM maturity assessment. It also seems to be important that the results are followed-up by reflection and learning activities close to the presentation of results. This confirms to some part the criticism of PM<sup>3</sup>s focusing on explicit PM knowledge elements and not on intangible assets, the human resource or organizational aspects (Jugdev& Thomas, 2002; Pasion et al., 2012). Specifically, it seems to be little learning activities based on the results from the PM maturity assessment, with most focus was on information than communication. However, according to the PM development manager the results should be discussed within the divisions and be a basis for improvement initiatives, but that needed more time and should be managed during the rest of 2013.

## 6. Conclusions and discussions

The study of several major construction and engineering companies in Sweden revealed that PM maturity assessment seldom occurring, which is somewhat surprising since these kind of businesses should obtain many benefits from an assessment. A major reason to the sparse attention of maturity assessment, by means of some PM<sup>3</sup>, seems to be insufficient focus on a common way of working, with too much reliance on individual project managers and project leaders. Another reason might be the concentration of engineering competence in this kind of companies, which might hamper the interest for organizational development, for example by means of PM maturity assessments. Overall, the findings seem to share the view of (Crawford, 2006) on PM development in companies, which typically lags behind development of other capabilities within a company.

A precondition to introduce a PM<sup>3</sup> seems to be a long term perspective in developing PM competence and skills, i.e. to have a specific unit or department responsible for PM planning, execution and development. LKAB has a project department and has recently applied a PM<sup>3</sup> with the intention to evaluate their maturity level and to identify improvement areas. The initially results from the assessment have not yet been discussed throughout the organization, i.e. as a basis for reflection and learning activities, to in a next step develop objectives and strategies. Management commitment and the use of a standardized PM<sup>3</sup> have been major strengths in the maturity assessment so far. A challenge will be to uphold motivation among the employees to make use of the results and thereby also create preconditions for their involvement and engagement in coming PM maturity assessments.

### 6.1. Further research

Overall, the results in this study highlight the need for further research that develop the PM role as a strategic enabler and thus can be a means to build competitive advantage. The study of PM maturity assessment and PM<sup>3</sup>s has revealed further research areas for inquiry. Why are PM maturity assessments uncommon in construction and engineering companies (in Sweden)? How are organizations working with PM maturity assessment in the long run, i.e. improving their PM performance based on results from frequently using PM<sup>3</sup>s? Further studies of PM maturity assessments at LKAB, and of other organizations applying PM<sup>3</sup>s should be valuable in these perspectives.

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