The Indonesian Journal of Computer Science
www.ijcs.net
Volume 13, Issue 4, August 2024
https://doi.org/10.33022/ijcs.v13i4.4290

Project Management Maturity Level and PMBOK 7th Recommendations: Case Study of an IT Service Provider Company

Maria Clara Egie[1], Bob Hardian[2], Teguh Rahardjo[3]
maria.clara@ui.ac.id[1], hardian@ui.ac.id[2], teguhr2000@gmail.com[3]
[1,2,3] Universitas Indonesia

Article Information

Received : 10 Jul 2024
Revised : 19 Jul 2024
Accepted : 8 Aug 2024

Keywords

Project Management, Maturity Model, Project Management Maturity Model, PMBOK 7th

Abstract

As a provider of consulting and solutions in the ICT field, PT XYZ has the responsibility to complete projects within budget, on time, and meeting all specified scopes. However, projects from 2022-2023 have experienced delays in completion ranging from 1-6 months from the initial planning. This has resulted in the projects being considered unsuccessful due to these delays. Based on the analysis, there is a need to analyze the project management maturity level in PT XYZ's CRM division. This research aims to measure the project management maturity level and provide recommendations to improve it to the desired level. The maturity level measurement will use the Kerzner Project Management Maturity Model (KPM3). Through the measurement results, it was found that PT XYZ's CRM division has not yet passed the first level. Recommendations have been provided based on KPM3 to progress to the next level. Knowledge area-specific recommendations have also been given based on the 7th edition of PMBOK.

A. Introduction

In the current development of the world, information technology (IT) has become a vital aspect for organizations and companies to support business operational processes. Gartner predicts that company spending on IT will increase by 6.2% annually until 2022 [1]. Nowadays, many companies have used IT as a strategic weapon to remain competitive with other companies. Based on a survey conducted by The Standish Group International, the success rate of software development projects in Asia is only 22%, with 58% encountering problems and 20% ending in failure [2]. The success rate of information technology project implementation in Indonesia remains relatively low, below 50% [3]. A successful project is one that meets three criteria completed on time, within budget, and meeting its objectives [4] .

PT XYZ is one of the leading providers of Information and Communication Technology (ICT) solutions and distribution in Indonesia. One of the digital transformation solutions offered is the implementation of CRM system. However, based on documentation and observations from 2021 to 2023, 20% of project implementations experienced delays of 1-6 months from the initial plan. This caused resources whose project development schedules were delayed to be unable to move on to the next planned projects, necessitating the company to hire additional external outsourcing to cover the shortfall in the project team. Furthermore, payment settlements were also delayed due to the go-live delays.

Table 1. Problem Definition

Expectation	Realization	Problem
All project implementations can be completed on time, meet requirements, and stay within budget.	The project experienced delays beyond the initial estimates, and there was an increase in outsourcing.	During 2022-2023, there were projects that experienced delays

The root problem will be analyzed using fishbone analysis with the main problem stated as “The project completion has not met the target timeline.” Those problems will be categorized into three main domains: people, organization, and processes [5]. They are explained in detail in Table 2.

Table 2. Problem Domain

Domain	Problem
People	The number of human resources is not proportionate to the IT projects. The quality of human resources is inconsistent.
Organization	There is no mapping of human resources based on competencies yet. There are no KPIs in place to measure the effectiveness of human resource performance.
Process	The level of project management maturity is unknown. The schedule created does not align with the capabilities of the human resources.

In this research, problems in the process domain will be tried to solve first, specifically the issue of the unknown level of project management maturity. Referring to several studies, project management can be developed and improved using a maturity model as a measurement instrument and improvement guide [6] Project maturity within an organization also impacts project success [7]. More than 25% of the 30% of mature organizations experience an increase in project success compared to immature organizations [8]. A high level of project management maturity can have a positive impact on the company's reputation.

One way to address issues in project implementation within the CRM division is by creating resource planning that aligns with accurate scheduling before the project begins. This ensures that human resource needs are met to fulfill project requirements and achieve project goals. Human resource planning and scheduling are processes within Project Human Resource Management and Project Schedule Management, which are knowledge areas in project management [4]. Therefore, analyzing the current level of project management maturity in the CRM division is an appropriate solution. This analysis helps determine the current state of project management and provides recommendations for improvement to achieve the desired level of project management maturity [9].

There are two commonly used project management methodologies, the Project Management Body of Knowledge (PMBOK) and PRINCE2 . There are several commonly used models to measure project management maturity [10], including Kerzner's Project Management Maturity Model (KPM3) developed by Harold Kerzner, the Capability Maturity Model Integration (CMMI) developed by the Software Engineering Institute (SEI), the Organizational Project Management Maturity Model (OPM3) developed by the Project Management Institute (PMI), the Portfolio, Programme, and Project Management Maturity Model (P3M3), and PM Solutions' Project Management Maturity Model (PMS-PMMM).

Kerzner's Project Management Maturity Model (K-PMMM) is a method for measuring the project management maturity of an organization, first developed by Kerzner in 2001 [11]. K-PMMM maps the maturity levels of CMM with the subject areas and practices in PMBOK [12]. K-PMMM consists of five maturity levels: common language, common processes, singular methodology, benchmarking, and continuous improvement. In previous research conducted by Novalina Hutabarat [13], the project management maturity level of her organization was measured using the KPM3 model, which references the knowledge areas in the PMBOK. The results indicated that the organization was at maturity level 1. Additionally, qualitative data analysis revealed 20 additional questions for the knowledge areas of integration management and stakeholder management.

Based on observations, interviews, and Ishikawa diagram analysis, this study will focus on project management issues. The measurement of project management maturity will refer to the PMBOK methodology, specifically KPM3 [11]. This model focuses on assessing maturity levels from the perspective of the human resources executing the project, which is a significant issue in project implementation within the CRM division. Therefore, the research question for this study is: (1) What is the level of project management maturity in the implementation of project management at PT XYZ? (2) What are the recommendations for improvement to enhance project management implementation to achieve the desired level of maturity for PT XYZ?

This study aims to measure the level of project management maturity and identify deficiencies in the project management implementation process. Based on the measurement results, the authors will provide improvement recommendations so that PT XYZ can achieve the desired level of maturity according to the seventh edition of the PMBOK. This research is also expected to serve as a reference for similar studies in the field of project management.

B. Research Method

The measurement of project management maturity level in this study employs a questionnaire from K-PMMM and additional questions from Hutabarat et al. This approach is taken because K-PMMM measurement refers to PMBOK, which is in line with the project management methodology at PT XYZ. Data collection will be conducted using a quantitative method, employing a questionnaire from K-PMMM that measures 8 project management subject areas based on PMBOK, with each subject area having 10 questions. Additional questionnaires from the study by Hutabarat et al. will measure 2 project management subject areas with 10 questions per subject area not covered in the K-PMMM questionnaire. The data from the completed questionnaires will be collected using digital forms. Interview data collection will be conducted online. Digital audio or visual interviews can be a good alternative to gather narratives and perspectives from respondents when face-to-face interviews are not feasible [14].

At maturity level 1, K-PMMM divides the questionnaire into 8 subject areas: Scope, Time, Cost, Human Resource, Procurement, Quality, Risk, and Communication. In the study by Hutabarat et al., additional questions are included for 2 subject areas: Integration and Stakeholder. The total number of questionnaire items at level 1 is 100 multiple-choice questions, where a correct answer is worth 10 points and an incorrect answer is worth 0 points. The maximum score achievable is 1000. To pass level 1, respondents need to achieve a score of 750 (75%) overall and a minimum score of 60 in each area.

The K-PMMM measurement uses the 10 knowledge areas from the sixth edition of PMBOK. However, in the seventh edition of PMBOK, knowledge areas are replaced with Performance Domains. The mapping of the 10 knowledge areas with the 8 performance domains in the PMBOK Seventh Edition can be seen in Table 3.

Table 3. Knowledge Areas to Performance Domains

	Stakeholder	Team	Dev. Apprch & Lifee Cycle	Planning	Project Work	Delivery	Measuremnet	Uncertainty
Scope						√		
Time				√			√	
Cost				√		√	√	
Resource		√		√	√		√	
Procurement					√			
Quality					√	√	√	
Risk								√
Communication				√	√			

Integration			√	√	√		√	
Stakeholder	√				√		√	

The results of the maturity level measurement will be validated again with the division heads to determine the desired maturity level. The interview results will be analyzed using thematic coding. To achieve the desired maturity level, recommendations will be drawn based on Kerzner and the PMBOK 7th Guide.

C. Result and Discussion

The results of the level 1 maturity measurement are shown in the following table 4. The assessment results from respondents in each subject area indicate that only 2 out of 6 respondents surpassed the minimum required score of 750. Among all subject areas, the lowest average scores were in procurement, resource, and integration. This indicates that in project management, project managers are still not proficient in managing procurement. The results in the resource and integration subject areas demonstrate that improvements are needed in managing resources, particularly human resources, and in integrating the overall project.

Table 4. Questionnare Results

	R1	**R2**	**R3**	**R4**	**R5**	**R6**	**Avg.**
Scope	90	80	40	60	30	100	66.7
Time	80	50	60	10	40	70	51.7
Cost	80	80	30	20	20	100	55.0
Resource	60	20	40	20	30	90	43.4
Procurement	80	30	40	40	50	50	48.3
Quality	70	30	70	20	40	90	53.3
Risk	90	50	40	40	30	80	55.0
Communication	80	50	80	20	0	70	50.0
Integration	60	40	60	20	10	50	40.0
Stakeholder	70	70	40	20	30	90	53.3
Total	760	500	500	270	280	790	516.7
Pass(Y/N)	Y	N	N	N	N	Y	-

After analyzing the data and obtaining the project management maturity level results at PT XYZ, the researcher conducted interviews with division heads to determine the desired maturity level. Based on the online interviews, it was found that management aims for consultants to at least achieve the basic stages, specifically levels one and two.

The results of measuring the maturity level of IT project management indicate the current state. The influence on project success is sometimes unclear, thus organizations need to map assessment results with the company's strategic plans. To pass the first stage, the following recommendations based on Kerzner are proposed.

- Training is required for managers who have not achieved the minimum score at maturity level 1.
- Stakeholder management is necessary, along with the creation of a project charter, to ensure decision-making is unambiguous and does not hinder project development.

- Establishing competition standards for project management based on project management certification is needed to standardize the competency levels of managers in project development.
- Enhancing resource management by creating a project plan that includes a Work Breakdown Structure (WBS), project scope, and change management in accordance with the available resources.

The following are the recommendation results per knowledge area derived from the PMBOK 7th Guide.

Table 5. Recommendations Based on Knowledge Areas

Area	Recommendation
Scope	• Analyze and document the requirements gathered with stakeholders at the beginning of the project. • Create clear, concise, measurable, consistent, complete, and identifiable requirement documentation to be maintained throughout the project. • Assign the responsibility of requirement management to the project manager or application consultant. • Document the scope using tools such as the Work Breakdown Structure (WBS). • Define and document the acceptance criteria or project completion criteria.
Time	• Develop detailed project scope into specific tasks and related activities. • Analyze and estimate the effort, duration, and resources required to complete these tasks. • Allocate resources to activities and adjust according to the schedule estimates. • Measure the actual schedule against the planned schedule by tracking start and finish dates, task durations, performance on the critical path, and estimated completion times
Cost	• Estimate or quantitatively measure the projected costs. • Develop a budget plan that includes contingency activities and accommodates uncertainty risks. • Analyze the cost requirements to maintain quality. • Analyze the costs associated with change requests and complimentary costs. • Measure actual expenditures against the initial plan. • Measure the cost performance index to determine the efficiency of the work performed. • Measure business value using various metrics such as cost-benefit ratio, return on investment (ROI), and net present value (NPV) for presentation to stakeholders.
Resource	• Establish a clear vision and final objectives for the project. • Define the roles and responsibilities of each individual in the team. • Develop a project team charter and operational guidelines. • Identify the good performance of the project team and highlight the deficiencies for evaluation and learning purposes. • Identify and assess the skills of team members necessary to complete the project. • Ensure that the team's focus remains undivided. • Balance the workload evenly among individuals in the team. • Measure planned resource usage against actual resource usage.

Area	Recommendation
Procurement	• Conduct the bidding process with vendors. • Document the contracts established with vendors.
Quality	• Conduct evaluations to improve the quality of subsequent projects. • Determine the costs or efforts required to maintain project quality. • Measure project quality through completion criteria, the definition of done, or requirement documentation.
Risk	• Gather information through research, expert consultation, or market analysis to reduce potential uncertainties. • Prepare solution options for various possible outcomes. • Design multiple alternative methods for project execution. • Enhance the ability to adapt and respond quickly to changes or failures.
Communication	• Utilize communication methods such as push, pull, and interactive to engage stakeholders in project development. • Establish a communication plan with stakeholders that includes communication types, methods, timing of delivery, and information to be shared. • Manage acquired information and deliver it to stakeholders or those who require the information.
Integration	• Determine the development approach to be used. • Ensure that stages align with the chosen development approach. • Compile planning variables such as development approach, schedule, costs, and work estimates. All variables will reference project outcomes. • Evaluate team processes using a task list. • Identify work inefficiencies using lean production methods. • Conduct project evaluations to achieve process improvements and efficiency. • Measure and evaluate project targets against actual conditions to make decisions that generate business value.
Stakeholder	• Determine the development approach to be used. • Ensure that stages align with the chosen development approach. • Compile planning variables such as development approach, schedule, costs, and work estimates. All variables will reference project outcomes. • Evaluate team processes using a task list. • Identify work inefficiencies using lean production methods. • Conduct project evaluations to achieve process improvements and efficiency. • Measure and evaluate project targets against actual conditions to make decisions that generate business value.

D. Conclusion

This study assessed the project management maturity level through a case study at PT XYZ. From the responses to the K-PMMM questionnaire, it was found that PT XYZ has not yet fully achieved maturity level 1. At level 1, there were still 4 managers who did not pass the minimum required score. According to Kerzner's recommendations, there are five points that consultants can undertake to master the basics of project management.

One of the recommended suggestions to enhance project management maturity level is to develop an understanding of fundamental project management principles. Through this study, the improvement recommendations to be implemented by

management are viewed from the perspective of the seventh edition of PMBOK, which has been mapped with knowledge areas. Based on knowledge areas, only the scope knowledge area passed the minimum score of 60.

This research is expected to benefit the CRM division management of PT XYZ. Based on the proposed recommendations, the CRM division can formulate plans to enhance project management maturity. Future research could enrich the study by comparing with previous versions of PMBOK and validating with experts in the field of project management.

E. References

[1] Gartner, "Gartner Special Reports: Providing actionable insights into major trends.," 2018.

[2] The Standish Group International, "CHAOS Report 2015," The Standish Group International, 2015.

[3] T. Raharjo, B. Purwandari, R. Satria dan I. Solichah, "Critical Success Factors for Project Management Office: an Insight from Indonesia," *Third International Conference on Informatics and Computing,* pp. 1-6, 2018.

[4] Project Management Institute, A Guide to the Project Management Body of Knowledge, 6th penyunt., Pennsylvania: Project Management Institute, 2017.

[5] J. T. Marchewka, Information Technology Project Management: Providing Measurable Organizational Value, 5th penyunt., John Wiley, 2015.

[6] T. F. De Souza dan C. F. S. Gomes, "Assessment of maturity in project management: A bibliometric study of main models," *Procedia Computer Science,* pp. 92-101, 2015.

[7] E. Simangunsong dan E. N. Da Silva, "Analyzing Project Management Maturity Level in Indonesia," *The South East Asian journal of management,* pp. 72-84, 2013.

[8] K. P. Grant dan J. S. Pennypacker, "Project management maturity: An assessment of project management capabilities among and between selected industries," *IEEE Transactions on Engineering Management,* pp. 59-68, 2006.

[9] A. Rivera dan J. Kashiwagi, "Identifying the State of the Project Management," *Procedia Engineering,* vol. 145, p. 1386–1393, 2016.

[10] M. Khoshgoftar dan O. Osman, "Comparison of Maturity Models," *IEEE International Conference on Computer Science and Information Technology,* pp. 297-301, 2009.

[11] H. Kerzner, Strategic Planning for Project Management using a Project Management Maturity Model, Canada: John Wiley & Sons, 2019.

[12] V. Permana, Y. G. Sucahyo dan A. Gandhi, "Measuring Information Technology Project Management Maturity Level: A Case Study from a Project Based Organization in Indonesia," *International Conference on Information Technology Systems and Innovation,* 2017.

[13] N. Hutabarat, T. Raharjo, B. Hardian, A. Suhanto dan A. Wahbi, "PMMM Kerzner Questionnaire Validation for Project Management Maturity Level Assessment: One of the Largest Indonesia's State-Owned Banks," *International Conference on Advanced Computer Science and Information Systems,* 2021.

[14] S. Thunberg dan L. Arnell, "Pioneering the use of technologies in qualitative research – A research review of the use of digital interviews," *International Journal of Social Research Methodology,* vol. 25, no. 6, 2021.