

# Analysis Of Project Portfolio Management Maturity Model At Indonesia Construction State-Owned Enterprise

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**Abstract-** This paper aim to explain what parameters that create a PPM Maturity Model and determine the PPM Maturity Level for BUMN Construction Services companies. It begins with analyzing which PPM parameters affect the PPM Maturity Model, then create maps of the PPM maturity level and finally determines the most influential parameters in the PPM Maturity Level in BUMN Construction Service Companies in Indonesia.

**Index Terms-** Indonesia Construction State-Owned Enterprises, Competitiveness, Project Portfolio Management, PPM Maturity Model, PPM Maturity Level

## I. INTRODUCTION

In The Standard for Portfolio Management – Seventh Edition (Project Management Institute, 2017) it is explained that Portfolio is defined as projects, programs, subsidiary portfolios and operations that are managed as a group to achieve strategic goals. Project Portfolio Management (PPM) is the centralized management of the processes, methods and technologies used by project managers (PMs) and project management offices (PMOs) to analyze and collectively manage current or proposed projects based on key characteristics.

Maturity models generally provide a starting point for organizations to benchmark the current level of quality of portfolio management activities and provide guidance for improvement. There are several best practices for identifying the maturity level of project portfolio management within an organization. The general characteristic of the maturity model is that the model is divided into 5 (five) different levels. An increase in maturity level is described as progress from a lower level to a more advanced level. An organization there is no need to aim at achieving the highest maturity level as soon as possible. On the other hand, the targeted maturity level must be in accordance with the current business needs of the organization, the organization's ability to accept change, and the availability of resources that will build change.

## II. PPM MATURITY MODEL LITERATURE

A project portfolio management maturity model is a tool used to assess and measure the progress of an organization's project portfolio management capabilities. The model typically consists of a set of levels or stages, each of which represents a different level of capability. Organizations can use the model to track their own progress, as well as to benchmark their capabilities against those of other organizations.

A project portfolio management maturity level is a measure of the ability of an organization to manage its projects effectively. The maturity level is determined by the organization's ability to identify and prioritize projects, allocate resources, and track and report on project progress.

The Capability Maturity Model (CMM) was developed by the Software Engineering Institute (SEI) in the 1980s and can be applied to a wide variety of organizations in all business settings. CMM was originally created after a study showed that there was a relationship between the quality of software use and the quality of the development process used. This model provides best practice examples for the development and identification of maturity processes within an organization. The model also takes into account an analysis of the current situation, past experiences, shared practices, and a framework for prioritizing future actions and plans that the organization should be able to set targets for and the corrective steps needed to achieve them. Definition for each level of maturity level is described below:

- Level 1: The first level "Initial" offers as a starting point for implementing new processes to a disordered situation. Individual efforts play remarkable role for project success. The success of a single project or program cannot be transferred to becoming projects as there is no definition and documentation for the processes used.
- Level 2: The second "Repeatable" level emphasizes the disciplined repetition of documented processes. The earlier success can be repeated and projects benefit for defined essential processes and basic project management methods.
- Level 3: On third level the organization has gained benefit from the repetition and processes are being defined as a standard processes. CMM refers to standard software

processes, but the model may be applied to business processes as well. Standardization, documentation and integration play the key role on “Defined” level.

- Level 4: On fourth “Managed” level processes are managed, monitored and measured by examining the gathered data.
- Level 5: On the fifth level the organization is improving the processes through monitoring feedback from the processes that are in use. The level is “Optimizing”.

Gartner has developed their own maturity levels that can be applied to any type of business that needs upgrading. Gartner (2014) stated that the model is particularly suitable for program and portfolio management maturity, which is abbreviated as PPM. In the Gartner model, each level has specific dimensions which are the characteristics of business functions at a certain maturity level. Improvements and upgrades to a higher level are cumulative. In the Gartner model, there are 5 (five) core dimensions that are interconnected:

- People
- PPM Practices and Processes
- Value and Financial Management
- Technology and Relationships

Definition for each level of maturity level is described below:

- Level 1: Characteristic for level one in this maturity model is that there are no standards for project or program management that would be in use in an organization. Resource management is limited to critical projects and do not support the resourcing requirements of less critical projects. As the organization has no capability to manage larger projects, they may be outsourced to external vendors. There is no financial management for projects and programs, instead they may be funded out of a departmental budget. Tools for managing projects and programs are modest and not commonly used, the tools are often used by a single person such as project manager (PM) and thus serve no bigger purpose providing valuable information to higher level of organization such as portfolio and executive level. Therefore the organization has no visibility over the entity of projects and programs, and cannot react proactively to changes until they have occurred. That is the reason why the level one has been named “Reactive”. An external factor may awaken the organization for improvement of internal processes and practises. A change in the demand is a positive external factor that can consequently lead the organization to put effort for raising up to a higher maturity level.
- Level 2: Level two in Gartner’s model describes an organization that is driven by repeatable processes, a terminology that has been introduced as Capability Maturity Model Integration (CMMI). On level two, the organization benefits from visibility to single projects, which provides the organization with an ability to make proactive and accurate decisions, however there the benefits do not reach the portfolio level, as there is no oversight into multiple programs or projects and the data may be unreliable for value and financial management purposes. The organization may have taken project and program management tools in

use as well as supportive functions and practices such as workspaces for team working. The internal relationships and interdependencies between the business and IT are not steady as IT does not necessarily have capability to adopt huge amount of processes, but business either may not recognize IT within the organization as a service provider or as a reliable partner. The level two organizations have established some required processes and practices that serve the purpose on operative level, but the organization is not quite capable to manage the entirety and come across with hindrances. Hence level two is “Emerging Discipline”.

- Level 3: Level three maturity refers to “initial integration”, where the organization has started to reach a systematic and balanced way of working among the five core dimensions. On level three the organization is capable for proactive resource allocation that is being managed from portfolio level, where also projects and programs are being approved according to predefined project benefits that are described in the form of a business case. The organization is also focusing on individual performance improvement and career paths are defined as mentioned in figure three. Along with the portfolio management thinking comes the visibility over multiple areas that enhances effective decision making. The organization is able to take into account the effects of changes and plan how the changes should be executed in order to maximize benefits. Also the communication flow and knowledge transfer is improved as the portfolio perception provides organization with an understanding of the selected projects and programs, their expected results and business benefits as well as the chances for the success. However, on level three the organizations do not have the adequate technology and tools to support the intelligent analysis behind the decision making. The lack of tools prevents real time visibility over reliable financial data.
- Level 4: According to the Gartner’s model, on level four organizations change their focus from building portfolio management maturity to capability of business value generation. The organization is mature enough for effective project and program management practices, which consequently are aligned with the corporate strategic execution. On portfolio level portfolio optimization takes place along with risk management, and there is monitoring processes established for value and benefit realization. The people dimension is being affected by the competence development and centres of competency, which enable advanced workload management, on-going capacity planning as well as resource pools to utilize for finding experienced internal candidates. Level four requires internal integration within the organization and has therefore been named as “Effective Integration” that improves the enterprise adaptability and resilience.
- Level 5: The highest level five is “Effective Innovation”. The level emphasizes change management and communications as core competencies. IT is expected to bring strategic and tactical value and is seen as a future market facilitator. The established project, program and PMO practices are in place and fulfilling their expected roles and responsibilities. The technology provides

accessible and up to date data, resources are being managed across the organization to serve project initiatives in the most expedient way. Constant innovation is being encouraged and expected across the organization, as the foundation is now mature but requires continuous innovation that the organization may stay on top of operations and markets. The organization is running both change operations and innovative development initiatives.

Consulting firm Lee Merkhofer explains the five stages of project portfolio management in detail. Each stage shows the reasons behind selecting unsuccessful projects in an organization. This model helps with detecting performance gaps and realistic targets and provides practical suggestions for improvement. Definition for each level of maturity level is described below:

- Level 1: In figure five the level one is described as a foundation, in which the organization has some project type of work and the business benefits of projects have been introduced on a very general level and there is no proper business case analysis if any. The organization has no selection criteria for project decisions, there is no regular portfolio management that would provide real-time data for business strategic purposes, there is no clear definition for roles and responsibilities, risks may be identified but are not being managed and there is lack of project resource coordination which lead to resource over-commitment. The organization is not able to make proactive decisions based on real-time data as the organization does not manage an entire project portfolio, instead projects are being funded, reviewed and managed separately from each other with the exception of shared resources that are competed between the projects. Termination of a project is usually executed for the reason of cost or duration overrun.
- Level 2: Level two describes the basics for project portfolio management maturity. On the second level the organization is able to collect projects into a portfolio according to the ability to accomplish the projects with the available resources. The organization may be able to create business case analyses for larger projects, but there is no clear connection to value creation. Project prioritization is unpretentious, even though the organization can rank projects based on the resource over allocation that is clearly visible at the portfolio level. However besides of the awareness on portfolio level, the resource needs are not being methodically managed. Projects may have overlapping business benefits. On the second level of project portfolio management maturity the project data will be received collectively and the portfolio data is being updated on regular basis, but there is no performance monitoring or forecasting, and planning is mainly focused on scheduling. Program management exists on technical level, when interrelated projects are being managed under a program. Risks are being identified at the early stage but not managed throughout the project. Knowledge sharing is not organization wide.
- Level 3: Level three is the Value Management. Reaching the third level gives an organization a maturity that allows proactive decision making based on reliable and accurate project data. The organization is able to select the right mixture of projects, which create value and return on

investment. Project portfolio is being fully managed with standardized, documented processes, roles and responsibilities. Different tools, metrics and processes are applied on portfolio level such as performance monitoring, forecasting, quality assurance, auditing, risk management and for validating the realization of project benefits to business. The projects under project portfolio are being managed and their dependencies have been recognized. In general, the level three provides an organization with a logical and systematic way of aligning business initiatives into value adding projects.

- Level 4: Level four is the Optimization, which is a level with mature and systematic business processes. Project portfolio is being proactively and analytically managed and profound quantitative analysing methods are supporting decision making. Characteristic for level four is that risks have clear ownership, risks are being monitored, controlled and evaluated against the organization's tolerance for them, aiming at supporting the portfolio optimization. Value management from level three has been brought to an advanced level, as there is a measured and validated model for value estimating. The same model supports several portfolio level decisions such as project prioritization, funding and resource allocation. Stakeholder communication and cooperation is efficient and informative. The senior executives are committed to project portfolio management and they are provided with high-quality and up-to-date reports about progress, costs and risks for enhanced decision making.
- Level 5: Level five is the highest level and called Core Competency, in which an organization obtains the best value for project portfolio management. Besides of the company wide competence in portfolio management, there are processes for continuous improvement develop knowledge and skills. The planning and optimization, funding and resourcing decisions are made in order for obtaining the greatest value for business according to the defined strategic objectives. Processes take place for risk, benefit, stakeholder and resource management, as the importance and impact has been acknowledged on portfolio level. Therefore organization is able for proactive future planning as executive level is aware of the future capacity and resource requirements. The value can be measured and tracked for business initiatives and based on the information, crucial decisions can be made to mitigating risks, identifying business opportunities and ensuring sustainability in business operations.

The Office of Government Commerce (OGC) provides the most usable set of maturity models. PRINCE2 Maturity Model (P2MM) defines a model for the best project management, including the project management activities required to fulfill the project according to the quality, scope, and cost within the agreed timeframe. P2MM acts as a method under the broader Portfolio, Program, Project Management Maturity Model (P3M3), which identifies five progressive levels of maturity model similar to CMM. Definition for each level of maturity level is described below:



- Level 1: The level one “Initial process” ask if the organization is able to identify projects and programs and manage them separately from ongoing business activities.
- Level 2: The second level “Repeatable Process” questions organization’s ability to run processes according to standards that are at least minimally specified.
- Level 3: “Defined Process” is the third level that examines if the organization have controlled processes that allow adjustment to individual project purposes.
- Level 4: Fourth level that is “Managed Process” highlights the quality performance measurability and predictability.
- Level 5: Level five “Optimized Process” underline proactive management of technology and continuous improvement of processes.

Managing portfolio maturity is a critical process for ensuring that organizations develop the right amount of process based on the needs of the organization. Acuity PPM is hyper-focused on this concept of organizational maturity because they have seen many companies fail to adopt and utilize traditional PPM software. Portfolio management maturity models are very useful for assessing the current state of the portfolio processes and how to arrive at a higher level of maturity. Definition for each level of maturity level is described below:

- Level 1: The key word for level 1 is “inconsistency”. No standards exist at this level, many project and portfolio processes do not exist at this level, and what does exist is applied in an ad hoc way. What little processes are in place are carried out in an ad hoc fashion..
- Level 2: At level 2, some standardization of processes exist, although most processes are still immature. Nevertheless, some processes are defined and documented, and the organization is getting some benefit from portfolio management. At this stage, the organization should have visibility of all major projects in a central tool. The primary focus is on getting basic governance standards and processes set up for reviewing project requests. Basic prioritization may begin at this point with rudimentary understanding of resource capacity management.
- Level 3: Level 3 is a significant step for the organization as it regularly and effectively uses portfolio mechanics. Processes are well defined and established in the organization, with process documentation made freely available to the organization. Level 3 signifies the real shift from a single project view to an aggregate portfolio view. In the previous two levels, even though there is visibility of the portfolio as a whole, emphasis was placed on individual projects. By level 3, organizations better understand how projects interact with each other. Governance bodies seek to understand the implications to the portfolio based on specific project decisions, the key question being “what will this do to the portfolio?”
- Level 4: Level 4 marks the advance of the organization in its use of portfolio management. Here governance bodies begin to utilize optimization techniques to drive even greater value to the portfolio with little or no extra cost. Project Management Offices (PMO’s) are advanced as well, enabling the organization to collect higher quality data that can be used for various optimization techniques, such as

resource capacity optimization. The organization feeds the portfolio system regularly with accurate and up-to-date project information. Users of the portfolio system feel very comfortable with the tool and can use many of the advanced features. Prioritization as a project selection tool has been replaced by efficient frontier analysis. Schedule optimization is used to unlock even greater value from the portfolio.

- Level 5: The key difference between level 4 and 5 is that at level 5, there is so much organizational rigor and process discipline that the organization proactively uses optimization techniques, and does so with little or no resistance. Quality data is constantly fed into the portfolio system. Several enterprise systems are integrated with the portfolio system making it a critical system for the performance of the organization. Senior management from across the company rely upon project and portfolio reports for making organizational decisions.

The IPMA Delta Model offers a perspective for project management competencies by applying competency baselines at different organizational levels from project, individual and organizational perspectives. The IPMA Delta Module uses the same five definitions as CMM and P3M3, but refers to them as competency classes, not maturity levels. These competency classes assist with the identification of an organization’s current project management competencies and offer assistance for competency improvement. These classes sequentially from one to five are initiation, determination, standardization, management, and optimization. This class aims to assess the use of project management standards, structures and processes, the scale of which varies from a minimal level of knowledge to active management and continuous improvement. The assessment is based on IPMA Organizational Competence Baseline (IPMA OCB) standards, IPMA Project Excellence Model, and ISO21500, which are best practices, concepts and processes for project management (IPMA 2015). Definition for each level of maturity level is described below:

- Level 1: The achievements of PM are at a personal level. There are individuals who perform well, but performance is coincidental. The organisation has no formal PM standards, structures and processes in place.
- Level 2: There are partially defined PP&PM standards, structures and processes in place which are partially applied in the organisation.
- Level 3: There are fully defined PP&PM standards, structures and processes in place which are mostly applied throughout the organisation.
- Level 4: There are fully defined PP&P standards, structures and processes in place which are fully applied throughout the organisation, which the Management actively controls.
- Level 5: There are fully defined PP&PM standards, structures and processes in place which are fully applied throughout the organisation, which the Management actively controls and continuously develops.

The International Organization for Standardization (ISO) has established ISO9001 which is a standard similar to CMM. The ISO9000 standards are geared towards software development and maintenance practices. ISO 9001 does not provide a larger framework for process improvement. Instead,

this standard defines a minimum level for quality software processes.

Project Institute Finland Ltd. has developed a five-level maturity model for project portfolio management, which is based on the ABC Project Model. According to Matti Haukka, there is usually a governance model for investment projects but not for development projects that use personal resources (Haukka, 2013). He stated that the use of personal resources in project work creates a challenge for an organization that can only be controlled by adequately tested project portfolio management. To get the benefits of the tested PPM, there are prerequisites that must be met. Definition for each level of maturity level is described below:

- Level 1: On the first maturity level the organization is able to collect all on-going projects in a database. The database forms a portfolio of projects. To reach the maturity level, an organization should have project complexity classification methodology in use, definition which type of work is considered as a project and managed under PPM, clear ownership with role and responsibility definition for all projects and harmonized project management model used for project work. Project ownership is the main prerequisite on level one as it guarantees that there is at least one person held responsible for basic project information and awareness of decision-making.
- Level 2: Regular reporting practises define the level two. Project Management Office (PMO) plays the role of

maintaining and developing harmonized project management model that give the instructions for reporting practises. The reporting should serve the purpose on portfolio management by providing accurate data that supports decision making when weighting the balance of portfolio and its alignment with strategic objectives.

- Level 3: The continuous resource allocation updating and awareness of the current allocation rate is the key element on level three. Project institute Finland considers that the responsibility of resource allocation is on competent project managers. echnology is mentioned as an enabler, which should bring efficiency in resource management.
- Level 4: On level four it is suggested that PPM Board can select and prioritize the right projects according to the resources available. PMO is an administrative function that provides data for PPM Board. Project owners create the business cases and hand them out to PMO, which delivers them further to decision making level.
- Level 5: On level five the entire organization has been changed to function according to project and program orientation. Management practices focus on project ownership and management activities that ensure that the business benefits will be realized.

### III. INVESTIGATING OF PPM MATURITY MODEL FOR INDONESIA CONSTRUCTION STATE-OWNED ENTERPRISES

After looking at the definition of each level in the PPM maturity model, we will divide them into 5 key process areas (KPA), namely:

- Project Management
- Program Management
- Portfolio Management
- Knowledge management
- Bussiness and Organization

We can find the parameters that build the project portfolio management maturity model and we will put them into KPA. These parameters can be summed up as follows:

Key Process Area (KPA)	PPM Maturity Level Parameter
project management	personal skill
	project process
	project standards
	resource management
	change management
	risks management
	communication management
	project manager
program management	project decisions
	project interdependencies
	program standard

	program process
	business case analysis
	benefit management
	funding and resource management
	business initiatives
	competence development
	executives commitment
	value management
	Schedule optimization
	management control
portfolio management	portfolio standards
	portfolio structures
	portfolio processes
	project selecting
	project prioritization
	optimization techniques
knowledge management	knowledge transfer
	knowledge management
	knowledge improvement
Bussiness and Organization	Enterprise capability
	organization's standards
	corporate strategic
	technology

	data monitoring
	Enterprise adaptability and resilience
	innovative development
	sustainability in business operations
	internal integration
	financial management

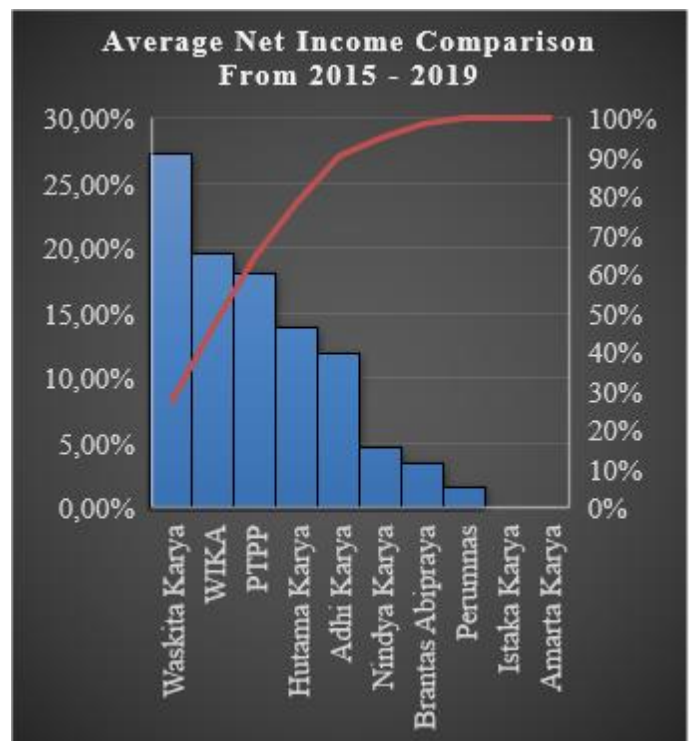
The target for this research is Indonesia Construction State-Owned Enterprise. Quoted from the official website of the Ministry of State-Owned Enterprises, there are 10 Construction Service State-Owned Enterprises, namely:

1. Perum Pembangunan Perumahan Nasional / Perumnas
2. PT Adhi Karya (Persero) Tbk / Adhi Karya
3. PT Amarta Karya (Persero) / Amarta Karya
4. PT Brantas Abipraya (Persero) / Brantas Abhipraya
5. PT Hutama Karya (Persero) / Hutama Karya
6. PT Istaka Karya (Persero) / Istaka Karya
7. PT Nindya Karya (Persero) / Nindya Karya
8. PT Pembangunan Perumahan (Persero) Tbk / PTPP
9. PT Waskita Karya (Persero) Tbk / Waskita Karya
10. PT Wijaya Karya (Persero) Tbk / WIKA

To find out which company is dominant, a comparison of the net income earned by the company is carried out. The following results are obtained:

No	State-Owned Enterprise	Average Net Income Comparison From 2015 - 2019
1	Waskita Karya	27,19%
2	WIKA	19,55%
3	PTPP	17,95%
4	Hutama Karya	13,81%
5	Adhi Karya	11,88%
6	Nindya Karya	4,68%
7	Brantas Abipraya	3,42%
8	Perumnas	1,51%
9	Istaka Karya	0,00%
10	Amarta Karya	0,00%

After getting the above results, a pareto analysis was carried out with the help of a chart. Pareto analysis is used to identify what contribution the individual components of a system make to the whole system. Companies that are the target of research are only companies that are in the "top 80% net". From that result, we can summarize that Waskita Karya, WIKA, PTPP, Hutama Karya and Adhi Karya will involved to this research.



#### IV. CONCLUSION

Project portfolio management (PPM) is the centralized management of the processes, methods, and technologies used by project managers and project management offices (PMOs) to analyze and collectively manage current or proposed projects based on numerous key characteristics. It is a method of organizing, controlling and prioritizing all the projects within an organization to ensure that they are aligned with the organizational strategy and to ensure that resources are used efficiently and effectively. PPM is used to help organizations identify, select, prioritize, manage, and report on projects, programs, and portfolios.

A project portfolio management maturity model is a tool used to assess and measure the progress of an organization's project portfolio management capabilities. A project portfolio management maturity level is a measure of the ability of an organization to manage its projects effectively.

This research aim to explain what parameters that create a PPM Maturity Model and determine the PPM Maturity Level for Owned-State Construction Services companies. Research will involved 5 Construction Service State-Owned Enterprises.

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