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Measurement of Information Technology Management Capability Using COBIT 5.0 in The Facility Management Department of PT Permata Graha Nusantara

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***Abstract*— IT governance, overseen by a company's board of directors and executive management, plays a crucial role in ensuring that the organization's information technology aligns with and furthers its strategic goals. However, when IT governance lacks support for individual departments, it can adversely impact their functionality. Recognizing this, it becomes imperative to assess the current level of IT governance in place. This study focuses on the Facility Management Department of PT Permata Graha Nusantara, responsible for building management services. The department aims to evaluate if its existing IT system effectively supports operational activities and enhances customer service. The evaluation employs the COBIT 5.0 framework as a benchmark, testing five domains: Manage Portfolios, Manage Suppliers, Manage Quality, Manage Availability and Capacity, and Manage Problems. Each domain serves distinct purposes and objectives, measured against COBIT 5.0 standards. The results are presented in Capability Levels ranging from 0 to 5. Despite the Facility Management department setting a target of Level 4, the actual results indicate Level 3 in all tested domains. Consequently, the department must implement improvements guided by recommendations derived from the COBIT 5.0 framework to align with its desired IT governance capabilities.**

***Index Terms*— Capability Level, COBIT 5.0, IT Governance**

I. INTRODUCTION

IT Governance is a responsibility of the board of directors and executive management of a company that ensures that the company's information technology supports and expands the company's strategy and goals through leadership, organizational structure and Information Technology processes [1], [2]. IT Governance is closely related to corporate governance [3]. IT governance impacts all levels of the organization, from operational management to senior and executive management, and the board of directors [4], [5]. PT Permata Graha Nusantara (PERMATA) is a subsidiary of PT Perusahaan Gas Negara located in West Jakarta and focuses on supporting the business activities of the PGN Group and companies outside the PGN Group in the form of: Facility Management (FM), Asset Management (AM), Entrepreneurial Real Estate (ERE), Developer and Archive Management. Business processes at PT Permata Graha Nusantara refer to ISO 9001: 2015, ISO 14001 standards and the Safety and Health Management System (SMK3).

The Department of Facility Management at PT Permata Graha Nusantara have goals to provide quality and excellent services in services such as: Building management services, area and office facilities, office support services, operational support services, document / archive management and maintenance services, HBB management services and inventory, Temporary Facilities services, supporting services for network operations and facilities, transportation supply services, and stationery supply services. To achieve these goals, the Facility Management Department must integrate the IT system with ongoing business processes. The ongoing IT system must be able to support operational activities and be able to provide better services to their customers. To achieve this goal, the Facility Management department wants to ascertain whether the existing IT system can provide more value to PT Permata Graha Nusantara's business portfolio for business development (Manage Portfolios), check whether supplier performance is satisfactory for the department of Facility Management operations (Manage Suppliers), ensuring the quality of the existing IT system in accordance with the expectations of the Stakeholders (Manage Quality), checking whether the existing IT system has sufficient resources for now until the future (Manage Availability and Capacity), and checking whether the IT division of the

Facility department Management can overcome problems related to IT systems (Manage Problems).

To measure the level of IT governance, standards are required to be used as a guide to make the measurement results valid [6]. Some standards that are often used to measure the level of IT governance include: ITIL (Information Technology Infrastructure Library), ISO / IEC 17799, and COBIT (Control Objectives for Information and Related Technology) [7]. This study only focuses on the deparment of Facility Management to measure the level of IT capabilities currently running using COBIT version 5 standards and questionnaires distributed to selected respondents. COBIT standards provide the most detailed information about strategies and controls in IT so they can run in line with business strategies and achieve company goals [8], [9]. From this research, PT Permata Graha Nusantara will find out the results of the pre-assessment for the ongoing IT capability level. Based on the findings from the results of the measurement of IT capability level, it produces recommendations for the IT management so that it runs along with business processes to bring the company towards better business goals.

II. THEORITICAL BASIS

A. *Information System Audit Goals*

Template ini there are several objectives to be achieved from information system audit. According to Gondodiyoto [10], there are 5 objectives such as:

1. Asset security, in a company that is used as an information system asset such as hardware, software, and human resources. All assets must be maintained. Therefore, securing assets is one of the most important goals and must be met.
2. Maintaining data integration, in a data there are certain attributes where each attribute has a completeness that must be maintained because it is very important. This makes data integration one of the important things and is one of the objectives in conducting an information system audit.
3. System effectiveness, the next goal in conducting an information system audit is to maintain the effectiveness of the system. Therefore, information systems can be said to be effective if the information system is always available to meet user needs.
4. System efficiency, this is one of the important things to maintain the company's system so that it has adequate capacity. If the quality of the company's system decreases, management must immediately conduct an evaluation. A system can be said to be efficient what if the system can meet user needs with the use of very minimal resources.
5. Economically, the purpose of this audit is to pay attention to the costs and benefits so that the investment results that have been made are in accordance with the costs incurred.

B. *IT Governance*

According to Weill [11], IT Governance is an authority and responsibility correctly in making a decision in the use of information technology in companies. Meanwhile, according to Van Grembergen [12], IT Governance is a capacity that has been determined by the board of directors, executive management, and IT management to control the entire IT strategy by ensuring the integration of business and IT companies. From the two explanations above, it can be concluded that IT Governance is a standard set by the executive branch of company that deals with standards of the authority and responsibility of IT strategies by ensuring the integration of business and IT companies. With IT Governance, the information management system within the company runs smoothly and in harmony. IT Governance allows one division to be well connected and integrated with other divisions [13]. IT Governance is a structure of relationships and processes to direct and control a company in achieving goals by providing added value when balancing risks by adapting the company's IT and business processes [15]. The relationship between IT Governance and Business Management is very important because IT Governance is the main support in carrying out business governance [15], [16].

C. *COBIT*

Based on information from the International Professional Association (ISACA) [17] Control Objectives for Information and Related Technologies (COBIT) is a framework developed for Information Technology (IT) management and IT governance. COBIT is known as a very popular IT governance framework and is widely used by various large companies in the world. If you dive deeper, COBIT is very complex and there are many things that are not widely known by the general public [18], [19]. COBIT 5 is the overarching business and management framework for governance and management of enterprise IT. This volume documents the five principles of COBIT 5 and defines the 7 supporting enablers that form the framework. COBIT 5 is the only business framework for the governance and management of enterprise IT [20]. COBIT 5 was published in 2012. Since then, other frameworks and standards have evolved, resulting in a different landscape. The emergence of new technological and business trends in the use of IT [21].

III. RESEARCH METHODOLOGIES

PT Permata Graha Nusantara (PERMATA) is a subsidiary of PT Perusahaan Gas Negara Tbk, located in West Jakarta. PT PERMATA was established in 2014 as a company to support the operational activities of the PGN Group. PT PERMATA engaged in the field of asset management, property development, and providing services to support operational activities. During its journey, PT PERMATA continued to grow to provide the best service for the PGN Group and expand to include several SOEs in Indonesia. The vision of the company is to become a developer of an integrated natural gas-based area that are environmentally friendly and a professional manager of Building Management and Facility Management and its derivative products. The missions of the company are provides Building Management and Facility Management services including building management, office support services, and other supporting services as well as professional asset management. Besides that, provide integrated industrial and residential areas based on natural gas energy that are clean and environmentally friendly.

A. IT Process

In accordance with the framework COBIT 5.0 and the results of consultations with the department, This selected IT process is based on the results of joint discussions with the auditee. Of the 37 processes, 5 processes were selected to be evaluated. The main factor in selecting these five processes is based on the main focus that the company is facing. These are the IT process that will be evaluated:

1. APO05 Manage Portfolios
2. APO10 Manage Suppliers
3. APO11 Manage Quality
4. BAI04 Manage Availability and Capacity
5. DSS03 Manage Problems

B. Research Method

During the research process the research method that will be used is observation, interview and questionnaire to collect the data needed and COBIT 5.0 framework to process the results of data collection. The research conducted was pre-assessment. The nature of this study is used to provide an estimate of the level of IT capability owned by the Facility Management department.

C. Data Collection Techniques

In this research there are 3 kinds of data collection techniques to get the data needed. These techniques include:

1. Observation of documentation made and managed by the company as well as field observations, during the process of collecting data-data will be monitored by the operational conditions of the department. In making observations are based on the Process Assessment Model from COBIT 5.0.
2. Interview, data collection will be done by interviewing several sources to find out the purpose of pre-assessment and choosing what domain to be tested. resource persons in the interview process are:
    1. The head of the Facility Management department, in this interview it was found that this department had obtained ISO 9001 certification and wanted to conduct an audit of the IT system used in the department.
    2. The head of the IT division of the Facility Management department, in this interview stage, gave several questions for each process chosen by the head of the Facility Management department. The number of questions asked can be seen in table 1 below:

Table 1. Number of interview questions

Process Name	Number of Questions
APO05 Manage Portofolio	8
APO10 Manage Suppliers	8
APO11 Manage Quality	9
BAI04 Manage Availability and Capacity	5
DSS03 Manage Problems	5

3. Questionnaire, following the conditions set in COBIT 5.0 framework, the questionnaire was distributed according to the criteria contained in the COBIT 5.0 framework. At the stage of filling out the questionnaire the respondents were 3 IT staffs and 1 senior IT person along with the head of the IT division. Each process tested has a number of questions which can be seen in table 2 below:

Table 2. Number of questions for each process

Process	Number of Questions				
	Level 1	Level 2	Level 3	Level 4	Level 5
APO05	28	10	11	11	8
APO10	27	10	11	11	8
APO11	34	10	11	11	8
BAI04	25	10	11	11	8
DSS03	23	10	11	11	8

D. Research Theory Framework

Based on the COBIT 5.0 framework there are 5 domains where each domain has a different process. In this study, 3 domains from COBIT 5.0 were

selected, namely the Align, Plan, and Organize, Build, Acquire, and Implement, and Deliver, Service, and Support. The domain tested are chosen by the Facility Management department.

From the domains which have been selected previously, 5 processes will be taken, namely APO05, APO10, APO11, BAI04, and DSS03. Every process tested will be calculated with the capability level that is divided into 6 levels, Level 0 Incomplete, Level 1 Performed, Level 2 Managed, Level 3 Established, Level 4 Predictable, Level 5 Optimizing.

IV. Result and Discussion

A. *Questionnaire Results*

The distribution of questionnaires for this study was distributed to 5 people in the IT division consisting of 1 head of division, 1 senior IT person and 3 IT staffs assigned to maintain and manage the application system used by the department to manage suppliers, provide services continuously continuously to the client namely PGN and members of the PGN group, and develops application systems to adapt to changes in business processes that will occur in the future. Questionnaire questions were made according to the domains tested in the study. From the results of filling out the questionnaire, the capability level of the department will be calculated. The following are the results of the questionnaire calculations for each domain.

Table 3. Achievement of every process tested

No.	Process	Level 1	Level 2	Level 3	Level 4	Level 5
1	**APO05**	89.07%	88.86%	78.44%	N	N
2	**APO10**	88.20%	89.40%	78.67%	N	N
3	**APO11**	90.88%	89.33%	79.55%	N	N
4	**BAI04**	90.19%	85.68%	82.07%	N	N
5	**DSS03**	91.13%	87.06%	82.72%	N	N

Based on table 3 it was found that all domains tested in the Facility Management department were declared to have been carried out completely at level 1 and 2. However, problems were still found such as making documents that were not according to standards, lack of establishing good relationships with suppliers, lack of supervision and management of the capacity of the department division, and the problems that still occur in the department that cannot be resolved, making all domains tested stopped at level 2.

B. *Audit Findings*

From the results of the questionnaire, several audit findings were found which can be seen in the following table 4.

Table 4. Audit Findings

Audit Findings
APO05 Manage Portofolio
1. The required infrastructure and work environment for managing departmental portfolios have not been identified as part of the standard process for portfolio management.
2. A standard, including guidelines, has not been determined to explain the important elements that must be included in the department's portfolio management.
3. Lack of sequence and interaction that occurs between department portfolio management and other processes.
4. The infrastructure and work environment needed to manage a portfolio are not yet fully available, regulated and maintained.
5. Appropriate data has not been taken and analyzed as a basis for understanding behavior and demonstrating the effectiveness and compatibility of departmental portfolio management, and has not evaluated the improvements that can be made.
6. The roles, responsibilities and authorities needed to manage the department's portfolio have not been assigned and communicated.
APO10 Manage Suppliers
1. There is no standard, including guidance to explain important elements that must be incorporated into supplier management.
2. The infrastructure and work environment needed to manage supplier departments have not yet been identified as part of the standards for supplier management.
3. There is no order and interaction between department suppliers and other processes.
4. Management of supplier department contracts has not been determined based on a standard.
5. Appropriate data have not been collected and analyzed as a basis for understanding behavior and demonstrating the effectiveness and suitability of supplier contract management, and a lack of evaluation related to improvements to supplier contract management.
6. Resources and information needed to manage supplier contracts are not yet available, regulated, and maintained.
APO11 Manage Quality
1. The infrastructure and work environment required by quality management have not yet been identified as part of the standard for maintaining service quality.
2. Competence and roles for quality management have not been identified as part of a standard that has been tested.
3. Lack of order and interaction between quality management and other processes has been determined.
4. Management of quality management has not been determined based on any standard.
5. Resources and information needed to maintain the quality of services are not yet available, regulated, and poorly maintained.
BAI04 Manage Availability and Capacity
1. The infrastructure and work environment needed by the management of the availability and capacity of departments are less identified as part of the standard.
2. There is no sequence and interaction between the

availability management and the capacity of the department with other processes. 3. Management of department availability and capacity has not been fully determined based on a standard. 4. Appropriate data has not been fully retrieved and analyzed as a basis for understanding behavior and has not yet demonstrated the effectiveness and compatibility of the management of department availability and capacity, and no evaluation of improvements can be made. 5. Resources and information needed to manage the availability and capacity of departments are not yet fully available, regulated, and maintained. 6. The infrastructure and work environment needed to manage the availability and capacity of departments is not yet fully available, regulated, and maintained.
DSS03 Manage Problems
1. Not using the appropriate method to monitor the effectiveness and appropriateness of the management of problems in the department. 2. The infrastructure and work environment needed to manage and resolve problems within the department are not yet fully available, regulated, and maintained. 3. Management of problems within the department is not determined based on an appropriate standard. 4. Appropriate data has not been fully collected and analyzed as a basis for understanding behavior and does not demonstrate the effectiveness and appropriateness of problem reporting within the department, and no evaluation of improvements can be made. 5. People who manage problems in the department do not have competence based on education, training, and experience. 6. The roles, responsibilities and authorities needed to manage problems within the department have not been fully assigned and communicated.

C. *Recommendations*

From the audit findings that have been collected there are a number of recommendations that can be given to the Facility Management department to increase the level of IT capabilities to the level expected. Following is table 5 about the recommendations that can be given to Facility Management Department:

Table 5. Audit Recommendations

APO05 Manage Portofolio
1. Defining standards includes the guidance needed to explain important elements that must be included in the portfolio management process. 2. Make a sequence and interaction between portfolio management processes with other business processes. 3. Identify the competencies and tasks required to manage a portfolio. 4. Identify the infrastructure and work environment needed to manage the department's portfolio. 5. Determine the appropriate method for monitoring the effectiveness and suitability of the portfolio management process for the department. 6. The specified portfolio management process must be carried out with an appropriate standard. 7. Must communicate the roles, responsibilities and authority to manage the department's portfolio. 8. The person assigned to manage the portfolio must have competencies based on the level of education, training, and work history according to the standards. 9. Resources and information needed to manage portfolios must be available, allocated, and organized in the department. 10. The infrastructure and work environment needed to manage the portfolio must be available, regulated, and maintained by the department. 11. Take and analyze the data needed to demonstrate the suitability and effectiveness of the portfolio management process, and evaluate the improvement in portfolio management that can be done. 12. Information needs in support of predetermined business objectives have been created in the portfolio. 13. The purpose of measuring the process is taken based on the information needs in portfolio management. 14. Quantitative objectives for portfolio management performance in support of the department's business goals have been made. 15. Measurements and measurement periods are identified and determined with the aim of measuring portfolio quality and quantitative objectives for departmental portfolio management performance. 16. Measurement results are collected, analyzed and reported to see whether the quantitative objectives for department performance have been achieved 17. The measurement results are used to categorize the performance of the department's portfolio management. 18. Analysis and control techniques have been determined and applied to the management and manufacture of departmental portfolios 19. Control limits of variation have been determined for departmental portfolio performance 20. Measurement data are analyzed for special variation cases in departmental portfolios 21. Resolving issues related to special variation cases in the portfolio. 22. Control limits are determined if necessary, following the resolution of issues related to portfolio management.
APO10 Manage Suppliers
1. Defining standards includes guidelines needed to explain important elements that must be incorporated into supplier management. 2. Make a sequence and interaction between supplier management processes with other business processes. 3. Identify the competencies and tasks required to manage suppliers and supplier contracts. 4. Identify the infrastructure and work environment needed to manage suppliers for the department. 5. Determine the appropriate method for monitoring the effectiveness and suitability of the supplier management process for the department. 6. The specified supplier management process must be carried out with an appropriate standard. 7. Must communicate the role, responsibilities and authority to manage suppliers and their contracts.

8. The person assigned to manage suppliers for the department must have competencies based on the level of education, training, and work history according to the standards.
9. Resources and information needed to manage suppliers must be available, allocated, and regulated in the department.
10. The infrastructure and work environment needed to manage suppliers must be available, regulated, and maintained by the department.
11. Take and analyze the data needed to demonstrate the suitability and effectiveness of the supplier management process, and evaluate the improvement in supplier management that can be done.
12. Information needs in support of good relations with predetermined suppliers have been made.
13. The purpose of measuring supplier contract performance is based on the information needs of the department.
14. Quantitative objectives for supplier contract performance in support of relevant business objectives have been made
15. Measurements and measurement periods are identified and determined with the aim of measuring the process and quantitative objectives for supplier performance
16. Measurement results are collected, analyzed, and reported to see whether quantitative objectives for supplier performance and contracts have been achieved
17. The measurement results are used to categorize the performance of the supplier.
18. Analysis and control techniques have been determined and applied
19. Control of variation limits has been determined for supplier performance based on the results of the analysis conducted.
20. Measurement data are analyzed for cases of special variations in supplier performance
21. Resolving issues related to special variation cases on supplier performance
22. Control limits are determined if necessary following the issue resolution

APO11 Manage Quality

1. Defining standards includes the guidance needed to explain important elements that must be included in the quality management process of the services provided by the department.
2. Make a sequence and interaction between the quality management process department services with other business processes.
3. Identify the competencies and tasks required to manage the quality of department services.
4. Identify the infrastructure and work environment needed to manage the quality of services provided by the department.
5. Determine the appropriate method for monitoring the effectiveness and suitability of the service quality management process and department performance.
6. The process of managing the quality of service of a predetermined department must be run with an appropriate standard.
7. Must communicate the roles, responsibilities and authority to manage the quality of the department.
8. The person assigned to manage the service quality of the department must have competency based on the level of education, training, and work history in accordance with the standards.
9. Resources and information needed to manage the quality of the department must be available, allocated, and regulated within the department.
10. The infrastructure and work environment needed to manage the quality of this department must be available, regulated, and maintained.
11. Take and analyze the data needed to demonstrate the suitability and effectiveness of the department's quality management, and conduct an evaluation of the department's quality improvement that can be done.
12. Information needs in support of the quality of service that has been determined previously has been made.
13. The purpose of measuring service quality is based on the information requirements obtained.
14. Quantitative objectives for departmental performance in supporting relevant business objectives have been made
15. Measurements and measurement periods are identified and determined with the aim of measuring service quality and quantitative objectives for the department's performance in providing services to its clients.
16. Measurement results are collected, analyzed and reported to see whether the quantitative objectives for department performance have been achieved.
17. The measurement results are used to categorize the performance of this department.
18. Analysis and control techniques have been determined and applied to measure the performance of this department.
19. Variation control limits have been set for the service performance that the department provides its clients.
20. Measurement data are analyzed for special variation cases.
21. Resolving issues related to special variation cases.
22. Control limits are determined if necessary following the resolution of the issues that occur in the provision of services to clients from this department.

BAI04 Manage Availability and Capacity

1. Defining standards includes the guidance needed to explain important elements that must be incorporated into the management process of the department's availability and capacity.
2. Make a sequence and interaction between the availability management process and the department's capacity with other business processes.
3. Identify the competencies and tasks needed to manage the department's capacity.
4. Identify the infrastructure and work environment needed to manage the department's portfolio.
5. Determine the appropriate method for monitoring the effectiveness and suitability of the portfolio management process for the department.
6. The departmental capacity management process that has been determined must be carried out with an appropriate standard.
7. Must communicate the role, responsibilities and authority to manage the capacity of the department.
8. The person assigned to manage the availability and capacity of the department must have competencies based on the level of education, training, and work

history in accordance with the standards.

9. Resources and information needed to manage the availability and capacity of departments must be available, allocated, and regulated.
10. The infrastructure and work environment needed to manage the department's capacity must be available, regulated, and maintained.
11. Take and analyze the data needed to demonstrate the suitability and effectiveness of the department's capacity management process, and evaluate what capacity building can be done.
12. Information needs in support of the management of predetermined departmental capacities have been made.
13. The purpose of measuring departmental service capacity is based on information needs
14. Quantitative objectives for the performance of divisions within the department in supporting relevant capacity management have been made
15. Measurements and measurement periods are identified and determined with the aim of measuring processes and quantitative objectives for the performance of capacity utilization
16. Measurement results are collected, analyzed, and reported to see whether quantitative objectives for the performance of capacity utilization have been achieved
17. The measurement results are used to categorize the performance of the capacity utilization of each division in the department.
18. Analysis and control techniques have been determined and applied
19. Variation control limits have been set for capacity usage performance
20. Measurement data are analyzed for special variation cases
21. Resolving issues related to special variation cases
22. Control limits are determined if necessary following the issue resolution

DSS03 Manage Problems

1. Defining standards includes guidance needed to explain important elements that must be incorporated into the process of managing problems that occur within the department.
2. Make a sequence and interaction between the problem management process within the department with other business processes.
3. Identify the competencies and tasks needed to solve problems in the department.
4. Identify the infrastructure and work environment needed to solve problems in the department.
5. Determine the appropriate method for monitoring the effectiveness and suitability of the problem management process within the department.
6. The problem management process in a given department must be carried out with an appropriate standard.
7. Must communicate the roles, responsibilities and authority to manage problems within the department.
8. The person assigned to manage problems that occur within the department must have competencies based on the level of education, training, and work history that conforms to the standards.
9. Resources and information needed to manage problems within the department must be available, allocated, and regulated.
10. The infrastructure and work environment needed to manage departmental issues must be available, regulated, and maintained.
11. Take and analyze the data needed to demonstrate the suitability and effectiveness of problem solving in the department, and conduct an evaluation of the improvement in problem management that can be done.
12. Information needs in support of managing problems that occur within the department have been created.
13. The purpose of measuring the problem management is taken based on information needs
14. Quantitative objectives for departmental performance in managing and resolving problems that occur have been made
15. Measurements and measurement periods are identified and determined with the aim of measuring problem management and quantitative objectives for departmental performance in managing and resolving problems that occur.
16. Measurement results are collected, analyzed, and reported to see whether quantitative objectives for departmental performance have been achieved in managing and solving problems.
17. The measurement results are used to categorize the performance of departments in managing and solving problems that occur.
18. Analysis and control techniques have been determined and applied
19. Limitations on variations have been determined for the department's performance in solving problems
20. Measurement data are analyzed for special variation cases
21. Resolving issues related to special variation cases
22. Control limits are determined if necessary, following the issue resolution

V. CONCLUSIONS

The following is the conclusion of the audit activitiy:

1. All domains tested, namely APO05, APO10, APO11, BAI04, and DSS03 only reached level 2 of the Facility Management department's expectation of level 4. The domains tested were only carried out mostly by the department so recommendations were made in order to reach the expected target level.
2. Recommendations given to the Facility Management department are based on each domain chosen and tested in this audit activity. Recommendations were made so that the department would immediately make improvements so that the next audit activity could get the level expected earlier.

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