MATURITY LEVEL OF INFORMATION TECHNOLOGY USING COBIT FRAMEWORK 4.1 (CASE STUDY: CLOUD COMPUTING SERVICE PROVIDER)

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Abstract

The level of information technology integration will have a dramatic effect on how the organization defines its mission, achieve its strategic goals and communicate its vision to improve its performance. With the acceleration in achieving the stated goals, governance of information technology in an entity is good information technology governance. This is because there is not only harmony in the vision, mission and goals but also alignment in information technology activities and business activities. COBIT has a very broad scope and not all organizations have an overall process. Each institution has a wide range and reach of useful information technology. Not all steps in COBIT can be applied, only certain parts are needed by the institution. The total detailed control objectives used are 38 detailed controls carried out by the IT Project division and 40 details of controls carried out by the IT Support division. The results of this study are the analysis of the current maturity level and expected from the sub domains of PO4, PO7, DS1, DS5 and DS7, the average total maturity level is 2.7 and the expected maturity level is 3.76. Recommendations and conclusions are expected to develop information technology governance processes in the form of providing better and more efficient cloud computing services to support businesses in PT Eikon Technology Surabaya.

Keywords: Information Technology ,Governance, COBIT

INTRODUCTION

There are so many problems where the expected solution with IT, not in accordance with the company's business goals so that there is a gap. Information Technology governance (TKTI) or also commonly known as IT Governance, is one important aspect of the overall governance of a company. This, information technology governance also determines the level of organizational integration and control over IT investment. Integration in this case is alignment and compatibility between IT and other business activities, such as institutions, human resources (HR), finance, marketing and operations. This makes control of investment well organized and planned. In addition, the intrinsic value of IT must be fully included in every aspect of the business, not just the IT function. IT intrinsic values will affect hardware (hardware), software (software) and mind devices (brainware).

The level of IT integration will have a dramatic influence on how the organization defines its mission, achieving strategic goals and communicating its vision to improve its performance. With the acceleration in achieving the stated goals, it shows that IT governance in an entity is good IT governance. This is because not only is there harmony in the vision, mission and goals but also the alignment in IT activities and business activities. Therefore, IT conformity with the organization for business advantage can work well, IT usage enabling organizations to maximize benefits and increase opportunities, accountability for using IT resources, and management in accordance with IT-related risks so that all aspects can be maximized well by the company [1].

One of the most significant drivers of strategic change in the world is technological innovation. In particular, the application of innovative information technology radically changes the basis of business competition. At present, the benefits of using it are not only related to making business processes and tasks more efficient. On the contrary, it also allows the creation of products, services, distribution channels, and relationships with customers, suppliers and other stakeholders. almost intertwined with almost all aspects of modern organizations, their business networks, and their overall environment [2].

ITGI (IT Governance Institute) states that IT Governance integrates and installs good practice to ensure that IT supports business goals. IT Governance allows companies competitive advantage [3].

Currently the technology is growing rapidly and has a very important role in the progress of an agency engaged in business, one of which is cloud technology. According to Wikipedia, Cloud computing (English: cloud computing) is a combination of the use of computer technology ('computing') and Internet-based development ('cloud'). Clouds (clouds) are metaphors of the internet, as are clouds that are often depicted in computer network diagrams. As the cloud in the computer network diagram, cloud (cloud) in cloud computing is also an abstraction of the complex infrastructure that hid [4]. Cloud computing is a computational method in which information technology-related capabilities are presented as a service, so that users can access it over the Internet ("in the cloud") without knowing what is inside, expert with it, or having control over the infrastructure technology that helps. According to a 2008 paper published by IEEE Internet Computing Cloud computing is a paradigm in which information is permanently stored on servers on the internet and temporarily stored on client computers including desktops, tablet computers, notebooks, wall computers, handhelds , sensors, monitors and others [5].

PT. Eikon Technology is a consulting company in the field of information technology, outsourcing, and personal development company founded in 2007. Since then, Eikon has become a Google Enterprise Partner and is an expert in cloud service providers. As a business professional, PT. Eikon recognizes that business rules and practices must determine how technology solutions are used.

In terms of providing cloud computing services, PT. Eikon Technology is employed by two company divisions namely IT Support and Project division. Until now there are still many companies that use cloud computing services provided by PT. Eikon Technology as resellers or cloud service providers from leading

companies such as Google and Microsoft. From here it will be checked how PT. Eikon Technology in maximizing the provision of cloud computing services carried out by the IT Support and Project division to advance the company's business is examined using the COBIT Framework 4.1. The results of using COBIT to see deficiencies that occur when providing cloud computing services. From this, recommendations for improvement or additional services will be generated that will advance the company's business in the field of cloud services.

FRAMEWORK COBIT 4.1

COBIT is a guideline for Information Technology governance or can also be referred to as a support toolset that can be used to bridge the gap between the need and how the technical implementation of meeting these needs in an organization. COBIT allows the development of clear and very good policies used for IT control throughout the organization, helping to improve quality and value and simplify the implementation of an organization's process flow from the IT application side. COBIT is process oriented, where COBIT is practically a standard guide to help manage an organization to achieve its goals by utilizing IT. Figure 1 shows that the previous framework, domains are identified by using the management structure to be used in the organization's daily activities.
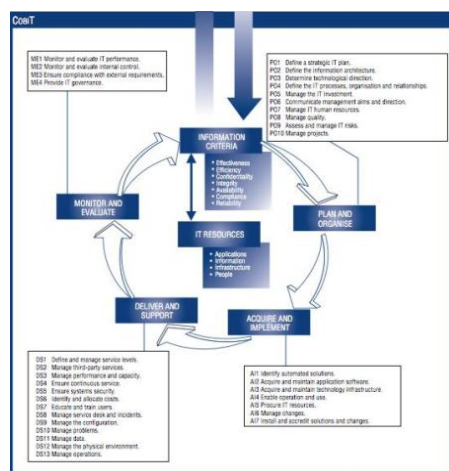

Figure 1. COBIT Framework [5]

1. Planning and Organization (PO)
   This domain includes strategies and tactics, and attention to the identification of how IT can maximally contribute to the achievement of business objectives. In addition, the realization of the strategic vision needs to be planned, communicated and managed for different perspectives. Finally, a good organization and technological infrastructure must be put in the proper place.

2. Acquisition and Implementation (AI)
   To realize IT strategy, IT solutions need to be identified, developed or acquired, and implemented, and integrated into business processes. In addition, changes and maintenance of existing systems must be included in this domain to ensure that the life cycle will continue for this system.

3. Delivery and Support (DS)
   This domain provides the main focus on the delivery / delivery aspects of IT. This domain covers areas such as the operation of applications in the IT system and the results, and also, the support process that enables the operation of the IT system effectively and efficiently. This support process includes security issues / issues as well as training.

4. Monitoring and Evaluation (ME)
   All IT processes need to be assessed regularly over time to maintain quality and compliance with control requirements. This domain refers to the need for management oversight of control processes within the organization as well as independent assessments by both internal and external auditors or derived from alternative sources.

Measurement of the maturity level is set at COBIT for management level and enables managers to know how the IT processes and processes in the organization can be identified at what level of management. The maturity model of COBIT is a tool used to measure how well IT management processes relate to internal IT controls that are also related to the organization's business objectives [6]. The level of information technology management capability on the maturity scale is divided into 6 levels, namely [7]:

1) Level o (non-existent)

The company does not know at all the process of information technology in its company.

2) Level 1 (initial level)

At this level, organizations generally do not provide a stable environment to develop a new product. System development is highly dependent on one individual as an individual skill and is not yet fully recognized as a company's needs.

3) Level 2 (repeatable level)

At this level, policies to regulate the development of a project and procedures for implementing the policy have been established.

4) Level 3 (Defined level)

At this level, the standard process in developing a new product is documented, this process is based on an integrated product development process.

5) Level 4 (managed level)

At this level, the organization creates a matrix for a product, process and result measurement. The project has control over products and processes to reduce process performance variations so that there are acceptable limits.

6) Level 5 (optimized level)

At this level, the entire organization is focused on continuous improvement processes. Information technology has been used integrated for the automation of work processes within the company, improve the quality, effectiveness, and adaptability of the company.

The Control Objectives for Information and related Technology (COBIT) is one of the standards in IT governance developed to help companies control business needs that cover all information technology activities and emphasize what must be effectively resolved and controlled [8].

Figure 2 show that data collection methods the steps of data collection are as follows:

1. Observation

Is a data collection method that is done by observing directly the activities undertaken in place of research to get a picture relevant to the problem and purpose of research. Data collection was conducted at the Islamic PT. Eikon Technology, as seen how e-learning implementation so as to find the actual situation in the field.

2. Questionnaire

Questionnaires were conducted by distributing questionnaires to be distributed to a number of respondents. The respondents who are targeted in the process Analysis of PT. Eikon Technology.

3. Interview

Is a process of obtaining information by means of question and answer face to face between the interviewer with the respondent or the person interviewed, with or without using interview guidelines. Interviews were conducted with the aim of obtaining information as supporting the results of the questionnaire. Interviews were used to capture more information about the problem under study that was not netted through the questionnaire.

`In the current stage of technology analysis, the level of maturity of information technology infrastructure (as is), researchers assess each model of the maturity attribute for the process being assessed. Assessment of the current maturity level (as-is) is obtained based on the achievement of the current level of information technology maturity based on written data such as Quality Objectives Reports, Strategic Plan Reports for ICT Development, Information Technology Blueprint. Assessment of the expected level of maturity (to-be) aims to provide references for the development of information technology governance in the institution.

The principle of image retrieval is the feature of a number of objects have been stored in the database, then when an image is used as a query material, the feature will be calculated after the pre-processing and segmentation [2]. Features obtained compared to the features of all objects contained in the database, through the calculation of the distance of the feature [2]. The result of this distance is often referred to as a score or ranking [2].
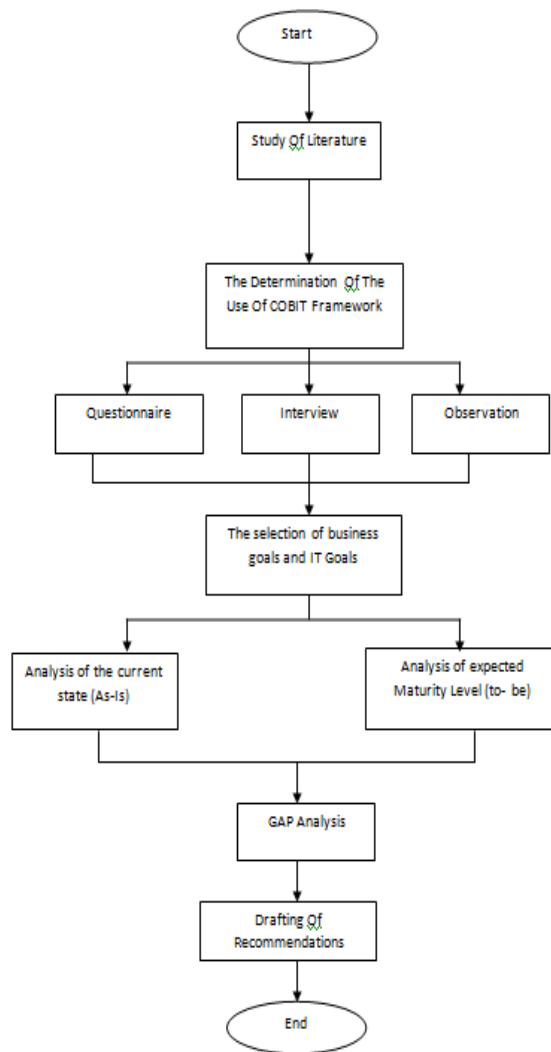
Figure 2. Stages Research

RESULT AND DISCUSSION

Detail control used is a control used from the IT Process, which is a control tool that exist in the sub-domain or IT Process. Based on research conducted by both divisions, there are a total of 38 control details performed by the IT Project division and 40 control details performed by the IT Support division.

It is known that the provision of cloud computing services by both divisions, IT Project and IT Support division can be seen through the calculation of the current maturity level in the PO4, PO7, DS1, DS5 and DS7 sub domains that will represent the current and future maturity levels / is expected on the PO and DS domain, which is the domain that discusses delivery and service. For the calculation can be seen in Table 1 and Table 2.

Table 1. The average value of current and expected maturity levels in the PO domain

No	Domain (Plan and Organization)	Average	
	Sub-Domain	As-Is	To-Be
1.	PO4 (Determining and defining the process of information technology, organization and Correspondence)	2.5	3.5
2.	PO7 (Managing human resources for information technology)	2.4	3.6
	Average	**2.45**	**3.55**

Table 2. The average value of current and expected maturity levels in the DS domain

No	Domain (Plan and Organization)	Average	
	Sub-Domain	As-Is	To-Be
1.	DS1 (Define and Manage	2.4	3.2
2.	DS5 (Ensure System Security)	2.9	3.9
3.	DS7 (Educate and train Users)	3.3	4.6
	Average	**2.86**	**3.9**

From Table 1 can be seen that the value of Domain PO (Plan and Organization) obtained by summing the average value of current maturity on sub domains PO4 and PO7. Referring to the table level of maturity, it can be concluded that the domain PO (Plan and Organization) which discusses planning and organization of Cloud Computing, using the COBIT 4.1 framework, based on the maturity level table, the average maturity level of the PO domain is 2.45 in the maturity index between 1.51 - 2.50 at level 2 (defined level) and the expected maturity level average value is 3.55 is in the index of maturity between 3.50 - 4.49 is at level 4 (managed level).

From Table 2 can be seen that the value of Domain DS (Delivery and Support) obtained by summing the average value of current maturity on sub domains DS1, DS5, and DS7 then divided by 3. Referring to Table 4, level of maturity, it can be concluded that the domain DS (Delivery and Support) which discusses delivery and support, using the COBIT 4.1 framework, based on the maturity level table, the average maturity level of the DS domain is 2.86 in the maturity index between 2.50 - 3.49 at level 3 (defined level) and the expected maturity level average value is 3.9 is in the index of maturity between 3.50 - 4.49 is at level 4 (managed level).

Table 3. Current and future maturity levels of PO (Planning and Organize) and DS (Delivery and Support) domains

Sub Domain	Description	The Average Level Of Maturity		As - Is	To - Be
		As - Is	To - Be		
PO4	Determining and defining the process of information technology, organization and Correspondence	2.5	3.5	Defined Level	Managed Level
PO7	Managing human resources for information technology	2.4	3.6	Repeatable Level	Managed Level
DS1	Define and Manage service levels	2.4	3.2	Repeatable Level	Defined Level
DS5	Ensure System Security	2.9	3.9	Defined Level	Manage Level
DS7	Educate and train Users	3.3	4.6	Defined Level	Optimized Level
	Average	**2.7**	**3.76**	**Defined Level**	**Managed Level**

On average the maturity level representing all sub domains used is PO4 regarding the determination and definition of information technology process, organization and relatedness, PO7 regarding managing human resources for information technology, DS1 on defining service level management, DS5 on ensuring system security, and DS7 on user education and training, the average current maturity level for the overall sub domain is 2.7 and the average maturity level to come is 3.76.

Based on the maturity level table, the figure is in the maturity index between 2.50 - 3.49 which is at level 3 (defined level) for the total current maturity level and for the total expected/upcoming maturity level is at index 3.50 - 4.49 which is located at level 4 (managed level). Therefore, it can be concluded that the current condition of the company in order to provide cloud computing services made by the division of IT Project and IT Support division has been included in the category that has been defined well in terms of working procedures in both divisions. At the time of providing cloud computing services by IT Support and IT Project divisions, the procedures for cloud computing services have been well implemented by employees of both divisions. The procedure has been standardized and well documented by the company to maintain the service process undertaken by both divisions in order to have a good continuity in general in the employee handbook.

To maintain the quality, the company's employees are also provided with the necessary training, and the education provided to customers to provide understanding to customers to benefit from the cloud computing services that have been used optimally. However, there are still a few shortcomings such as the lack of human resources in the IT Support division and its own procedures only as an outline for employees, so there is no clear procedure that limits the work between IT Support and IT Project divisions. There has been a slight communication error but it can be solved very well. So every employee in the division has been responsible with their respective roles, but for the installation procedure of cloud computing services for the two divisions is still lacking, because it is still based on experience.

Referring to current and upcoming maturity levels, it is necessary to improve and develop appropriate processes for customized cloud computing services on sub domain PO4, PO7, DS1, DS5, and DS7. These improvements and developments may refer to the recommendations and conclusions that have been made and divided into phases I of phase I for 2017, Phase II for 2018, Phase III for the year 2019, and Phase IV for 2020. All facts based on field and conditions expected by the company. Therefore, the stages are the steps that are the development of the conditions expected to provide cloud computing services in PT.Eikon Technology can run optimally and efficiently.

For control process objectives that are not used by both divisions are IT Support and IT Project division, PO4.2 about IT strategy committee, PO4.3 on IT steering committee, PO7.5 on dependency with individual (used in IT Support division) DS1.5 on service level monitoring and reporting (used in the IT Support division), DS5.1 on IT security management (used in the IT Project division), and DS7.3 on receiving training evaluation.

CONCLUSION

PT. Eikon Technology in providing cloud computing services is done by each division of IT Support and IT Project is good enough because, overall get the average current maturity level is reaching number 2.7 which includes from 5 sub domains namely PO4 regarding the determination and pengenisian process information technology, organization and connectivity, PO7 on managing human resources for information technology, DS1 on defining and managing service level, DS5 ie ensuring system security, and DS7 on educating and training users. So, this study focuses on PO (Planning and Settings) and DS domain (Shipping and Support). This maturity level is based on the COBIT Framework maturity level table, the figure is in the maturity index between 2.50 - 3.49 located at level 3 (the level specified), therefore, the current average maturity level indicates that the process the provision of cloud computing services provided by the company is still in the standard stage or standard process in developing new products.

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