Information Technology Governance Assessment in Universitas Atma Jaya Yogyakarta using COBIT 5 Framework

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Abstract—The use of Information Technology (IT) in education is a must now and it should bring benefits to education especially in the university level. Good information technology governance is required in the field of education from planning to implementation. This study aims to evaluate how effective and efficient the implementation of information technology governance at the Universitas Atma Jaya Yogyakarta as measured by COBIT 5 Framework.The method used is conducting a survey by distributing questionnaires to UAJY's information system office employees and observing documents that are adjusted to the control objectives in the COBIT 5 Framework. This study uses four control objectives, namely APO (Align, Plan, and Organize), BAI (Build, Acquire, and Implement), and DSS (Monitor, Evaluate, Asses). The first stages of the study was data collection, second was analyzing maturity and gap level, third was analysing and problem finding in the implementation of IT governance and proposing recommendations, and fourth was conclusions and suggestions. The result of this research is that Universitas Atma Jaya Yogyakarta has applied the IT governance at level 3 (Established). It means that at this level the process has been built then implemented in accordance to the defined or predetermined process, and able to achieve the result of the process.

Keywords— Information Technology Governance, COBIT Framework, Control Objective

I. INTRODUCTION

Information Technology (IT) has become essential for every organization to support their business processes, as well as in the field of education. The role of IT, especially in the field of education certainly provides many benefits and convenience so that the goals that have been set can be achieved. Business information systems have been implemented for management operations with the aim of creating a profit for the organization and, inevitably, this applies to the teaching and learning activities [1]. Therefore, as IT's role in supporting educational activities and processes increases, good ITgovernance becomes crucial to maximizing IT's role and achieving predetermined objectives [2]. IT governance is a corporate governance framework that concentrates on the strategic IT resources particularly on its management and assessment. Moreover, the main objectives of IT governance are aimed to ensure that investments in IT resources add value to the corporation by risk reduction.

There are a variety of frameworks that can be used to measure the effectiveness and efficiency of IT governance implementation of an entity such as ITIL (The IT Infrastructure Library), ISO / IEC 17799 (The International Organization for Electisechnical Commission), COSO (Committee of Sponsoring Organization of the Treadway Commission), and COBIT (Control Objectives for Information and related Technology) [3]. This study uses COBIT 5 as a framework to measure how effective and efficient IT governance has been implemented. This study applies COBIT 5 as an IT governance framework because COBIT has more advantages compared to other frameworks. COBIT has a wider and more detailed spectrum range than other framework models. In addition COBIT has a better compromise between horizontal and vertical dimensions than other standards. COBIT 5 is a useful tool for organization. It is a complete framework, which supports enterprises to achieve their objectives. It can be used also as a guidance enterprise to make optimal the use IT [4]. All of them is performed by balancing the realizing benefits, optimizing risk levels and resource use. COBIT 5 is generic and useful for enterprises of all sizes, whether commercial, not-profit or in the public sector [5]. Universities need to improve the performance of their IT, therefore the alignment between Academic Regulations and Information Technology should be done. The measurement of the alignment is important since the objective of Information Technology is to ensure a critical and confidential information. It requires many aspects which are sometimes intangible, thus the measurement is complicated since it involves many aspects which are sometimes intangible [6].

Universitas Atma Jaya Yogyakarta uses IT in the field of education and operational support. Information Technology that holds various operational data of Universitas Atma Jaya Yogyakarta often receives threat of data loss, data destruction, and data theft.With Identification of Information Technology problems Atma Jaya University can measure how mature, effective and efficient all systems that have been used for operations in the University of Atma Jaya Yogyakarta. Prevention to data loss can also be used when information technology is used.

II. RELATED STUDY

A. IT Governance

ITG is a method in the organization which can be applied to improve the use of IT within an organization. It is performed by maximizing its benefit, capitalizing on opportunities, gaining advantage in competition. The directing and controlling of the organization can be carried out since ITG contains a structure of relationships and processes which are required to achieve the goals that are set [7]. Furthermore, it will give more value and keep the balance between risks and returns of IT and processes related to IT. There are five aspects to which the management is concerned in directing and controlling their IT: strategic alignment, value delivery, risk management, resources management and performance management [8].

B. COBITs

Internal control COBIT is defined as "… the policies, procedures, practices and organizational structures designed to provide reasonable assurance that business objectives will be achieved and undesired events will be prevented or detected and corrected". Therefore, the COBIT framework is popular in the modern organization. Commonly it is perfomed to evaluate IT control systems by managers, internal auditors, and external auditors [9][10].

The COBIT 5 contains a process capability model, based on the internationally recognized ISO/IEC 15504. It is a Software Engineering—Process Assessment standard. According to the characteristics, the objectives of process assessment and process improvement support can be achieved. It contains a measurerement the performance of any of the governance (EDM-based) processes or management (PBRM-based) processes [11]. Furthermore, it permits areas for improvement to be identified [8]..

C. Capability Level

Capability Level in COBIT refers to ISO/IEC 15504, which acts as a standard assessment process software engineering. The foundations of performance measurement rely on the achievement measurement and its processes. Therefore, the processes are only part of the governance and management enablers. Shortly, COBIT 5 process capability approach contains six levels of capability. The levels include a process can achieve and contain an 'incomplete process' designation especialy when the practices do not achieve the intended purpose of the process:

- 0 Incomplete process— At this level, the goal of the process is only a few or even nothing. It could happen when the process fail or it is not applied.

- 1 Performed process (one attribute) — This level represents that the goal of the process purposes is reached when the process is implemented.

- 2 Managed process (two attributes) — This level represents that the process is not only implemented but also managed. It means that the processes are planned, monitored and adjusted. Therefore, the outputs are appropriately established, controlled and maintained.

- 3 Established process (two attributes) — The previous level is applied according a defined process that permit the achievement of the process outcomes. This level contains process attributes i.e. "Process Definition" and "Process Deployment".

- 4 Predictable process (two attributes) — This level represents that processes are implemented within a defined boundary, that enables the achievement of the processes outcomes. This level has "Process Management" and "Process Control" as process attributes.

- 5 Optimising process (two attributes)—The previously described predictable process is continuously improved to meet relevant current and projected business goals.

III. METHOD

A. Stage of Literature study

There are three stages in the literature study such as literature review, mapping of literature review, and making data matrix and questionnaire based on COBIT Framework. The review stage of the library aims to find references in accordance with the Identification of information technology issues and the COBIT 5 framework [8]. Furthermore, the literature review mapping was conducted to look for gaps in previous studies on the identification of information technology problems using the COBIT framework to be applied as a research topic and to test the authenticity of the research to conduct. The last step is to get the data to be analyzed based on the selected domains contained in COBIT Framework [10][11].

B. Stage of Evaluation Model

The evaluation model in this study makes use the COBIT 5 framework, as it provides more detailed instructions needed by the user as a reference and easy in IT operations [8]. The domains in this thread are APO01, APO02, APO03, APO11, APO12, MEA01, MEA02, MEA03, BAI01, BAI03, DSS01, DSS02, and DSS03. The selection of domains based on the author's analysis indicates that the domain is related to the issues contained in UAJY's IT governance management.

C. Stage of Data Collection

Before the research is conducted respondents, research instruments and data collection techniques are determined. Collecting data is done by 3 different methods, among others:

- Survey

  The questionnaire in this study was designed to determine the level of information governance maturity in the management of IT governance in UAJY, by looking at the responses of IT managers and decision makers. Coefficient based on capability level in COBIT 5 framework

- Interviews

  Data collection in this research is through interviews conducted in an informal atmosphere to the respondents.

- Document Studies

  Document studies in this research were conducted to support, complement, confirm, and explore the data of survey results, and interviews for the results of research becomes clear and complete.

D. Stage of Evaluation Model

At the stage of data analysis there are 3 processes undertaken during the study:

- Analysis of current maturity level (as-is)

  This process was conducted to assess the maturity level of information governance on the activities of APO01, APO02, APO03, APO11, APO12, MEA01, MEA02, MEA03, BAI01, BAI03, DSS01, DSS02, and DSS03. At this stage an assessment of each activity is made based on the results of the questionnaire.

- Analysis of expected maturity (to-be)

  The maturity level does not only aim to measure how the company has met the standard requirements in managing good information technology, but the level of maturity can also be used to improve the management of information technology processes and identify priority scale in improving the services performed. The authors determine the level of maturity through data collection with questionnaires directly given to employees, document studies related to control objective that used in this research, and direct interviews.

- Gap Analysis

  After the maturity level of information technology governance for the current (as-is) and maturity levels of information technology governance are expected to be obtained, the authors conduct a gap analysis (gap analysis) on the maturity level.

- Recommendations Identification

  Recommendations for improvement are derived from the results of the gap analysis. Obtaining the recommendation is expected to provide maximum results in the management of information technology at the University

E. Report Creation and conclusion

The conclusion of the research results is the answer of the formulation of the existing problems of problem identification of information technology with the framework of COBIT for evaluation of Information Technology management at Universitas Atma Jaya Yogyakarta. Further research suggestions are also presented for the development of further research and improvement of the Information Technology.

IV. RESULTS AND DISCUSSION

The assessment of process capability is using Process Assesment Model (PAM). This research employs process domain from cobit framework. The following describes the control objectives used in the study and the results generated during the study.

- Domain Align, Plan, and Organise (APO)

  The result for APO domain, that is use 5 control objectives consist of APO01, APO02, APO03, APO11, and APO12, produce mean value at level 3.

  1. APO01: Providing a consistent management approach to achieve a good IT governance including organizational structure, roles and responsibilities, management processes, reliable and sustainable activities, and competencies and skills.

  2. APO02: Ensuring IT strategic plan is in accordance with its business objectives, and it has clearly communicated its business objectives and can be responsible.

  3. APO03: Viewing the implementation to build information technology, data architecture, and operational objectives of information technology owned company.

  4. APO11: Ensuring delivery of solutions and services consistently to meet the needs of the stakeholders and to improve the company quality.

  5. APO12: Integrating IT risk management with overall ERM, and balancing the costs and benefits of enterprise risk management related to IT governance.

- Domain Build, Acquire and Implement (BAI)

  The result for BAI domain, that uses two control objectives consist of BAI01 and BAI03, reduces the mean value at level 3.

  1. BAI01: Ensuring the value and quality of the project deliverables and maximizing its contribution to the service and services portfolio.

  2. BAI03: Ensuring efficient solution in terms of time and cost to support the company's strategic and operational objectives.

- Domain Deliver, Service, and Support (DSS)

  The result for DSS domain, that is use three control objectives consisting of DSS01, DSS02 and DSS03 producing the mean value at level 3.

  1. DSS01: Ensuring conformity of IT operational service results with predetermined plans.

  2. DSS02: Increasing productivity and minimizing risk of problems / disruptions, through quick handling.

3. DSS03: Increasing availability, improving service levels, reducing costs, and improving customer convenience and satisfaction by reducing the number of operational problems.

- Domain Monitor, Evalute, and Assess(MEA)

  The result for MEA domain, that uses three control objectives consisting of MAE01, MEA02 and MEA03 producing the mean value at level 3.

  1. MEA01: Improving performance to support the achievement of business goals.

  2. MEA02: Achieving the transparency about the adequacy of the internal control system for key stakeholders, thereby providing confidence in operations, achieving corporate objectives and adequate understanding of residual risks.

  3. MEA03: Ensuring that the company complies with all applicable external requirements.

Maturity level measurement results show that the questionnaire answers from the respondents lead to the maturity level of 2-4. Index maturity (IM) value for each object of research result is calculated by formula:

$$IM = \frac{\sum (number\,of\,answers\,X\,maturity\,level)}{number\,of\,\,question\,X\,number\,of\,respondents} \quad (1)$$

With index range of maturity rating 0 - 0.50 = incomplete process, 0.51 - 1.50 = performed Process, 1.51 - 2.50 = Managed Process, 2.51 - 3.50 = Established Process, 3.51 - 4.50 = Predictable Process, and 4.51 - 5.00 = Optimizing Process. Determination of maturity level is calculated based on the results of the questionnaire analysis, which then synchronized by studying the existing supporting documents. The maturity level of each domain is derived from the questionnaire analysis, compared to each document, to establish the suitability between the maturities levels treated with the contents of documents owned by UAJY. In this way the results are obtained by the analysis of the current maturity level.

After the validation of document analysis is performed; the calculation result of maturity level of information technology governance process at Atma Jaya Yogyakarta University currently obtains an average of 3.28. From this value, it can be summarized that the level of the management of information technology of Atma Jaya Yogyakarta University is about 3 (Established). It means that the process within the university has been built and then implemented in accordance with the process that has been defined or predetermined. Furthermore, the implementation is able to achieve the results of the process.

In order to find the improvement gap analysis is performed. The target of IT management maturity is determined based on the internal environment in the university. The relationship among process domains studied, current and expected maturity levels can be seen in the Table 1.

Table 1. Relationship Domain Process with Level of maturity

Domain Process	Maturity Currently	Gap	Document Validation	Condition
APO01	3.875	0.125	Enable	Predictable
APO02	3.40	0.61	Enable	Established
APO03	3.60	0.40	Enable	Predictable
APO11	3.25	0.75	Enable	Established
APO12	2.72	0.18	Enable	Established
BAI01	3.10	0.90	Enable	Established
BAI03	3.06	0.94	Enable	Established
DSS01	3.46	0.54	Enable	Established
DSS02	3.67	0.33	Enable	Predictable
DSS03	3.69	0.31	Enable	Predictable
MEA01	2.81	1.19	Enable	Established
MEA02	3.10	0.90	Enable	Established
MEA03	2.95	1.06	Enable	Established
Mean	3.28	0.72		

Based on the evaluation results conducted in UAJY, the findings values can be paired into each of the COBIT 5 domains, the results are analyzed by the finding

- Finding on APO domain process

  1. Some lecturers do not use existing lecture sites, so students are difficult to access the course materials.

  2. There is no innovation of developing framework in accordance with the current development of IT.

  3. Some departments do not have a website-based SI that is given KSI to announce important messages such as KRS schedule, academic guidance schedule, so that students need to come to campus just to be informed of the schedule of KRS or schedule of academic guidance.

  4. There is no measurement/analysis of information systems architecture after the information system is implemented

  5. The quality of the internet Wi-Fi network is poor in certain areas of UAJY environment such as the basement or certain campus areas.

  6. Update data storage and security procedures are not available or in accordance with existing IT developments

- Finding on BAI domain process

  The application development is taken only when there are complaints, evaluations and user requests and KSI would respond to the construction of complaint subscription applications, as well as improve the application through reported complaints

- Problems found on DSS domain process

  1. KSI records every maintenance action of the system information, server maintenance, and server control.

  2. There is no integrated customer complaint system in other parts offices and departments,

3. Many UAJY students pay less attention to the announcement of changes in the use of IT from KSI through the internal announcement TV monitors in each department.

- Problems found on MEA domain process

  1. KSI reports on the development of information and communication technology in UAJY as a reference for monitoring, evaluating, and assessing internal information system in UAJY,

  2. KSI evaluates the performance of KSI and records every evaluation performed by KSI,

  3. UAJY students still use cracked software, whereas UAJY licenses software for free.

Recommendations for improvement

- Inviting KSI staff to innovate and develop the establishment of a framework relevant to the latest IT development,

- Providing an interesting promotion to increase lecturers' awareness to utilize the existing sites to ease UAJY students to access their course materials.

- KSI evaluates to measure and analyze the extent to which the effectiveness of the existing information system architecture.

- KSI provides enhanced security and internet coverage in the UAJY campus environment.

- KSI is ready to update the UAJY's risk-pooling and data-escrowing guidelines and information systems to avoid data loss, or threats that can hurt the information/data security, IT accessibility in UAJY, and IT use activities in UAJY.

- Monitoring and developing information systems and applications within a certain period and regularly recording errors and warning ever happened to develop existing information systems without waiting for complaints reported

- KSI white box tests to some of the students after improving the application of the reported bits in order to minimize complaints in the future.

- KSi performs server measurement and Network devices to find out how tough the server and computer network devices that help improve system information performance and minimize disturbance / problems,

- KSI prepares an information system for other bodies and departments in the UAJY to handle complaints in accordance with the respective departmental offices,

- KSI makes a container for complaint subscribers on top of the existing IT management and lecturer performance.

- KSI should make each evaluation promptly to see its IT performance

- KSI regularly reports on technological and communications developments in UAJY to top executives in UAJY

- KSI conducts an interesting socialization to enable UAJY students, staff, lecturers to use free software license facilities

V. CONCLUSION

The result of this observation is performed based on questionnaires, interviews, and documents are analyzed particularly in APO01, APO02, APO03, BAI01, BAI03, DSS01, DSS02, DSS03, MEA01, MEA02, and MEA03 domains. Usingthe observation the result of the maturity level of information technology governance in academic information system service at Atma Jaya University of Yogyakarta is 3.28, which means that information technology management is already Established.

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