EXPLORING COBIT FRAMEWORK FOR INFORMATION TECHNOLOGY GOVERNANCE (ITG) AT MULAWARMAN UNIVERSITY, SAMARINDA, EAST KALIMANTAN, INDONESIA: A DESCRIPTIVE STUDY

HAVILUDDIN[1], PATRICIA ANTHONY[2]
haviluddin@gmail.com, patricia.anthony@gmail.com

ABSTRACT

COBIT (Control Objective for Information and Related Technology) has become one of the most important frameworks for information technology governance (ITG), which provides organizations with a useful guidelines tool to initially evaluate their own ITG systems. COBIT initiates ITG framework and supporting toolset that allows IT managers to join mismatch between control requirements, technical issues and business risks.

The purpose of this study is to look at the phenomenon of the use of IT formalities, audit, responsibility and accountability in the implementation of the COBIT framework to management at Mulawarman State University, Samarinda, East Kalimantan, Indonesia. The targeted population of the research includes the Chancellor's Office, 14 faculties, three bureaus, and the Distance Learning Center.

An experimental survey, using a self-administered questionnaire, will be conducted to achieve the objectives. Questionnaire will be distributed to a sample population and will be collected and analyzed using Statistical Package for Social Science (SPSS) version 16.

This study intends to analyze the constraints in optimizing the utilization of IT resources that are implemented by using the COBIT framework as a standard at the Mulawarman State University.

Keywords: COBIT, information technology, IT Governance, University Mulawarman, experimental study

Introduction

In the era of globalization, an organization is required to use IT. It should be planned, targeted and measured so that the organization will be able to survive in the global competition. Since the utilization of information technology provides an enormous impact on organizational development (Abu-Musa, 2009; Hall, 2011), therefore the use of IT in an organization is an obvious need to align with the strategic direction from the organization (ISACA, 2006).

On the other hand, the existence of information technology to support company's performance is very urgent (Abu-Musa, 2009; Hardy, 2006b; Institute, 2007b). The trend is primarily due to the increasing recognition of the benefits (value) obtained from IT. Therefore, the benefits of IT must be managed properly just like any other corporate assets (Institute, 2007b). Thus, it is necessary to each policy-maker to consider the existence of information technology in an organization in any decision-making.

However, often it is precisely this phenomenon that leads to failure. This failure is mainly caused by the failure of the organization and / or other related parties to pay attention to the IT implementation of all perspectives associated with it (Peterson, 2004). Many organizations do not consider the factors affecting the availability of information technology within an organization whether it is in organizations that are profit or non-profit or public service (Gondodiyoto, 2007).s

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[1] PhD student SKTM, UMS
[2] Supervisor Associate Professor, SKTM, UMS

In general the important factors that affect the optimal implementation of information technology is the availability of infrastructure and human resources (ISACA, 2006; Steuperaert, 2008). In addition, (Bakari, Tarimo, Yngstrom, Magnusson, & Kowalski, 2007) stated that many factors affect the implementation of IT such as "lack of planning, business reengineering, and coordinating the whole process of computerization is the most prominent issues facing the organization". This could result in disconnection between technology and business processes within an organization if not quickly treated.

There are many organizations (profit and non-profit) that uses COBIT framework as a tool for bridging the gap between general management (CEO) and the management of IT in the understanding of IT governance (Bakari, et al., 2007; Council, 2006; ISACA, 2006). However, many of them are experiencing difficulties in the implementation of COBIT. However, this did not deter many organizations to use it, so much so that there is an increase in the awareness for IT management (ISACA, 2006; Steuperaert, 2008).

A study of 50 schools in Hong Kong by (Christopher, 2003) have found difficulties in applying IT in the management. This is consistent with the factors that have been categorized in the areas of: technology, organizational culture, management and corporate strategy. Then, (Council, 2006) has also conducted a research in South Louisiana Community College (SLCC), a college in South Louisiana, USA and have found the constraints on managerial aspects of implementing security systems. Furthermore (Gomes & Ribeiro, 2009), has used COBIT framework to ensure managing and control of IT and IS at higher education institution in Viana do Castelo Polytechnic Institute (IPVC) in Portuguese. In Indonesia, a study was conducted by (Maria & Haryani, 2011) that tried to audit the constraints in the implementation of IT in academic information systems, at Satya Wacana University, an private University in Yogyakarta, Indonesia.

Therefore, this study intends to analyze the constraints in optimizing the utilization of IT resources that are implemented by using the COBIT framework as a standard at the Mulawarman State University. Constraint is particularly felt by the management in monitoring and evaluation of information technology managing processes that are currently being implemented.

Literature Review
COBIT

COBIT framework provides a wealth of information for the company to achieve its objectives, by way of managing IT resources based on the clustering process (Council, 2006; Institute, 2004; ITGI, 2007). COBIT is created by the Information Systems Audit and Control Association (ISACA) and IT Governance Institute (ITGI) in 1992. COBIT has been published four times. The first version was published in 1996. This is followed in, 1998, 2000, and the fourth in 2005. The fifth version will be launched in 2012 (Abu-Musa, 2009; Hardy, 2006a; ISACA, 2012b; ITGI, 2007; Lainhart, 2012).

The basic of COBIT (Control Objective for Information and Related Technology) framework is to provide a clear policy and good practices in IT governance. It is intended to assist management, auditor, and user to understand and manage the risks associated with IT governance by offering a set processes that are structured to present the necessary information, in order to bridge the gap between business risks, control needs and technical issues (Abu-Musa, 2009; Council, 2006; Gondodiyoto, 2007; ITGI, 2007; Jogiyanto & Abdillah, 2011). Figure 1, shows the basic principles of COBIT.

For the management aspect, COBIT provides a clear direction in terms of providing the values of CSFs (Critical Success Factors), KGIs (Key Goal Indicators), KPIs (Key Performance Indicators) and Maturity Model (0; non-existent, 1; initial / ad -hoc, 2; repeatable but intuitive, 3; defined process, 4; managed and measurable, and 5; optimized) (Institute, 2007a, 2007b, 2008; Singleton, 2011).
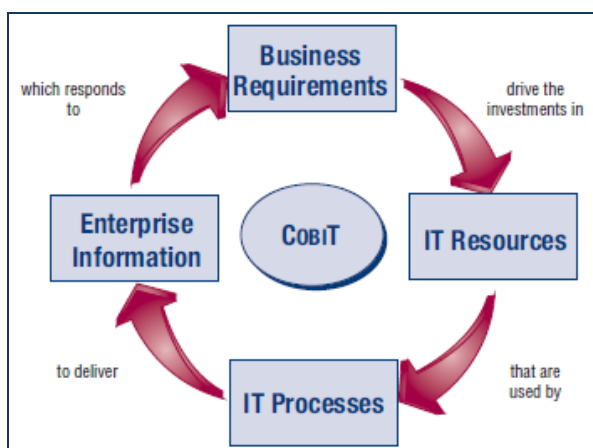
FIGURE 1 THE BASIC PRINCIPLES OF COBIT (ITGI, 2007)

For many organizations, the implementation of COBIT framework starts with knowing the main COBIT characteristics. There are four kinds of COBIT framework characteristics namely focused business-oriented, business process-oriented, based on control-oriented, and controlled by a control-based measurement (Gondodiyoto, 2007; Institute, 2007a, 2008; ITGI, 2007). Characteristics of focused, business-oriented, provide comprehensive guidance for management and business process owners. Business needs are reflected in the need for information. Therefore, the information itself needs to meet certain criteria controls for achieving business objectives. COBIT framework stated the criteria controls as: (1) effectiveness, (2) efficiency, (3) confidentiality, (4) integrity, (5) availability, (6) compliance, and (7) reliability (Institute, 2004; ITGI, 2007).

In business process-oriented, COBIT framework defines generic process model into four domains: (1) PO-plan and organize, (2) AI-acquire and implement, (3) DS-deliver and support, and (4) ME-monitor and evaluate (Institute, 2004; ITGI, 2007). Figure 2 – shows the domains of COBIT.
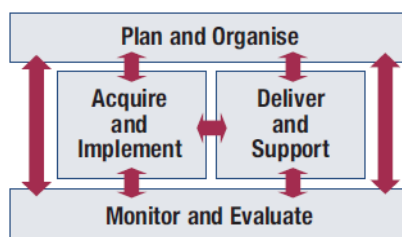

FIGURE 2 THE DOMAINS OF COBIT (ITGI, 2007)

In control-oriented, the COBIT framework, control is defined as policies procedures, practices and organizational structures designed to provide an acceptable assurance that business objectives will be achieved and unexpected events can be prevented or identified and repaired. The control objectives in COBIT framework is a minimum requirement for effective control of each IT process (Institute, 2004; ITGI, 2007).

In a control-based measurement, every organization needs to know what should be measured and how measurements are taken, in order to obtain the status of its performance level. COBIT framework provides guidance in the control of: (1) maturity models; enable benchmarking and identification capabilities that need improvement, (2) performance measurement/objectives and performance measures for IT processes, showing how processes meet business goals and IT goals and

used for performance measurement internal processes, and (3) activity goals; enabling effective process performance (Institute, 2004; ITGI, 2007).

In the achievement of business requirements, COBIT processes IT resources. COBIT identifies and defines the resource requirements of information technology (IT resources) such as application, information, infrastructure, and people (ITGI, 2003, 2007). Figure 3, shows COBIT framework.
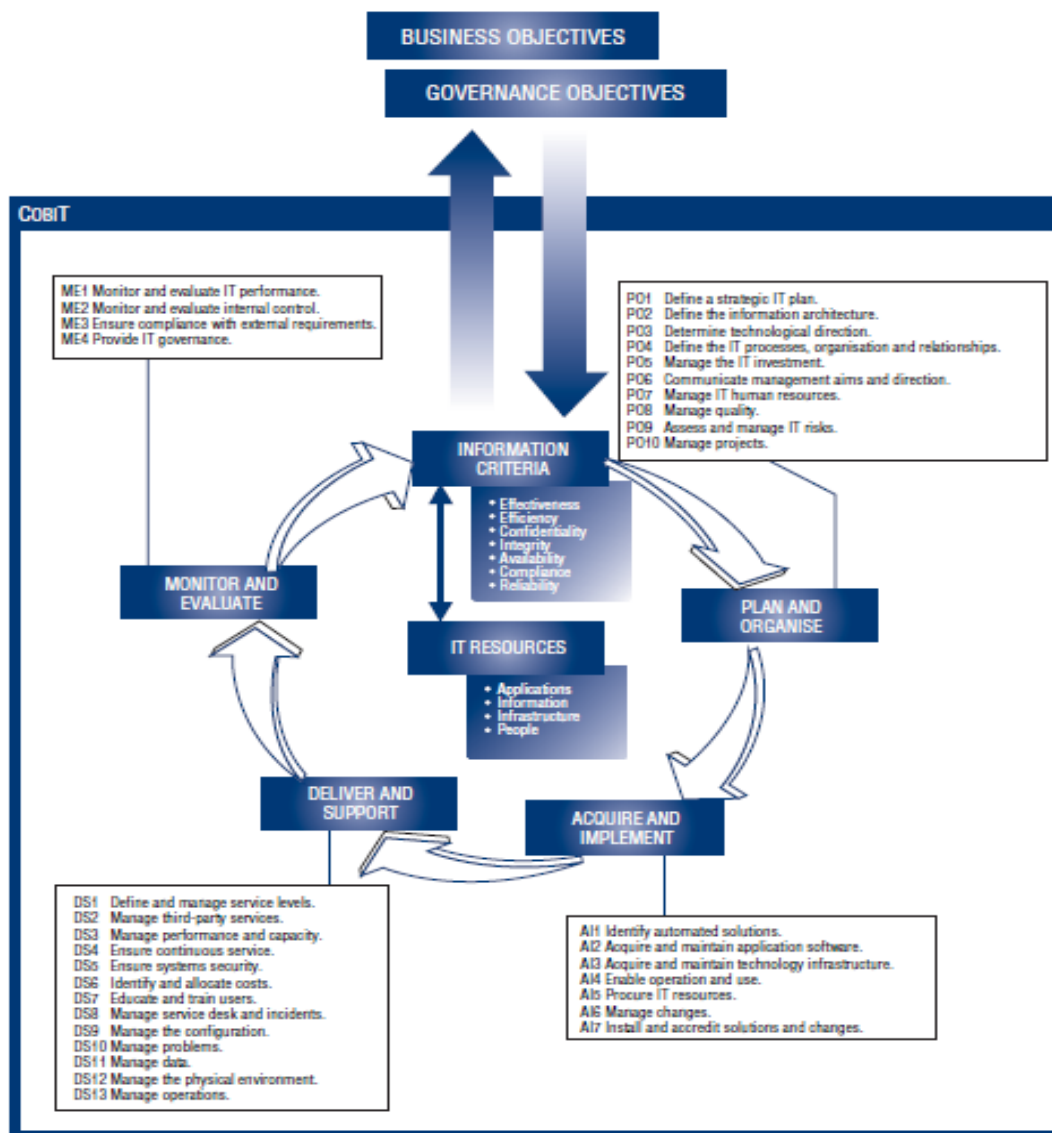
FIGURE 3 COBIT FRAMEWORK (ITGI, 2007)

Previous Research

The COBIT framework is used to solve problems in the educational organization as carried out by the (Council, 2006). The researcher used COBIT framework 3nd edition to answer the problems of security systems at domain-DS5 Ensure Systems Security by defining KGIs (Key Goals Indicators) and KPIs (Key Performance Indicators) to evaluate the development and implementation of policies, procedures and controls. The results indicate that COBIT framework was suitable for use in the SLCC's (South Louisiana Community College) environment. SLCC is a college in South Louisiana, USA.

Research was also conducted by (Gomes & Ribeiro, 2009), using the COBIT framework to manage and control IT and IS at higher education institution in Viana do Castelo Polytechnic Institute (IPVC) in Portuguese, especially in the academic services. In managing IT, IPVC acts as a coordinator in providing IT services. IPVC provide services to schools and unit called "organic unit", consisting of five teaching-oriented schools and one unit of social-oriented service to students. The results of the study significantly improved the quality of academic services such as ease of registration for students in five schools.

Furthermore (Maria & Haryani, 2011) used COBIT framework to solve problems of academic information systems, at Satya Wacana University which is, a private university in Yogyakarta. She also used COBIT framework for constraint problems by using the CSFs (Critical Success Factors) to get performance measurement process. The results of this study produced a model of academic information systems audit that consists of a general audit of the model, skeleton model of the audit, and audit measures.

In the field of services, a study conducted by (Bakari, et al., 2007) revealed that there are constraints in the gap between the general management and information technology and communications technicians at five government organizations in Tanzania. These organizations are engaged the service provider. This study has found that the main problem of perception is in the application of IT, where the system security issues are related the technical domain and not the business domain. The results of this study was used to change the perception of the general management and technicians towards IT by raising "awareness" to bridge these gaps.

In the health sector, in Japan, (Kajimoto, 2012) conducted a study at Takeda General Hospital, Aizu-Wakamatsu, Fukushima Prefecture. The hospital has had difficulty in managing the operational risks that has resulted in the IT risk management to fail. He used COBIT framework to solve the problems of the hospital management. The personal data that is critical and governed by the law relating to medical care record protection, and medical care record-related systems (network) could not be connected (only a closed network is permitted). Using COBIT framework, data utilization between departments within the hospital management was improved.

Implementing COBIT framework for Information Technology Governance (ITG) for Higher Education Institutions

In Indonesia, although information technology (IT) has been used in the operations, the results are not as expected, due to many constraints, especially in government agencies (nasional.skalanews.com, 2011). The constraints include the inability to take advantage of the new technologies because of limited human resources, the use of obsolete technology and lack of good IT management. The Ministry of Education and Cultural Affairs has stated that the root of the problem in the IT education is due to the low utilization and dissemination of IT so that the necessary breakthrough in promoting the use of IT in educational institutions (Kemendiknas, 2010) is inevitable.

In 2011, a total of seven state universities in Indonesia were awarded funding for IT activities through the Ministry of National Education Republic of Indonesia (now renamed the Ministry of Education and Culture of the Republic of Indonesia) to enhance the ability of IT resources owned, such as IT infrastructure (hardware, software and networking). The funding was provided to encourage the development of ICT for the utilization of e-learning and e-administration (Kemendiknas, 2010). Among the seven universities, University Mulawarman Samarinda in East Kalimantan, was also funded (Kemendiknas, 2010). For University Mulawarman, funding is used to support the operations of IT utilization in order to become a World Class University (Mulawarman, 2011).

A study that was conducted within the scope of the Higher Education (Maria & Haryani, 2011) suggested that universities in Indonesia do not have a specific model-based framework for building and evaluating IT utilization. Therefore, the Ministry of National Education encourages efforts to achieve the governance system including a monitoring and evaluation, reporting that is reliable, effective and efficient in the field of IT. Therefore, the Ministry of Education encourages efforts to achieve governance system. The effort consists of (1) monitoring and evaluation, (2) reporting that reliable, (3) effective, and (4) efficient in the field of IT (Kemendiknas, 2010; Steuperaert, 2008).

First, monitoring and evaluation is intended to facilitate the control of IT utilization in the corresponding academic activities. Second, reliable reporting is intended to be able to provide reports of academic activities quickly. Third, effective use of IT in accordance with academic requirements. Fourth, efficient utilization of IT in terms of funding.

Research Methodology

This study will look at the phenomenon of the utilization IT in University Mulawarman from the context of formalities, audit, responsibility and accountability in the implementation of COBIT. In this context, the population in this study consists of the key management in the chancellor's office including (chancellor, vice chancellor of academic, financial vice chancellor, vice chancellor of student affairs and vice chancellor of planning, collaboration and information management systems), 14 faculties, three Bureaus (bureau planning, collaboration and MIS, academic and student affairs bureau, and bureau of financial), and the Distance Learning Center.

This study will use a descriptive study to look at a real phenomenon in IT the utilization and then exploration to develop a model for monitoring and evaluation. This study outlines the stages that will be systematically followed:
1. Diagnosis: identifying the condition to make observations, questionnaires, interview the relevant units;
2. Action planning: analyzing the data that was obtained at the diagnosis stage by using Statistical Package for Social Science (SPSS) version 16;
3. Action taking: developing a model of audit monitoring and evaluation, and implement it; and
4. Documentation and Recommendations: preparing documentation of the model developed and several recommendations for monitoring and evaluating.

Proposed COBIT framework components to be used

To implement IT governance, organizations need to perform its own diagnosis on what needs to be done. Diagnosis is needed to streamline IT governance and identify opportunities for improvement. The diagnostic tool selected in this study is the COBIT framework. This diagnostic tool is selected because it provides a flexible space to apply to the organization, whether it is profit and non-profit organizations (Institute, 2007a; Steuperaert, 2008). In addition, COBIT also has diagnostic capacity for processes and IT operations, controls, metrics and auditing (Bakari, et al., 2007; Institute, 2007a; ISACA, 2012a; Kajimoto, 2012).

The important thing to consider when using the COBIT framework is the ability to bridge the gap between management (CEO) and management in relation to IT so that objectives can be achieved (Institute, 2007a; ISACA, 2012a). The components of COBIT to be used in this study at Mulawarman State University is shown in Figure 4.

COBIT provides a monitoring domain and evaluate (ME). ME domain is divided into four process descriptions (1) ME1-monitoring and evaluate IT performance, (2) monitor and evaluate internal control, (3) Ensure compliance with external requirements, and (4) Provide IT governance. Audit process at the University Mulawarman is defined in ME domain with the description process, ME1-monitoring process and evaluate IT performance. The determination of ME domain and ME1 process descriptions are based on the obstacles encountered in the examination at University Mulawarman.

In general, ME1 requires the monitoring process. This monitoring process includes (1) monitoring of performance indicators, (2) monitoring reports, and (3) respond to and act upon deviations. Monitoring is required to ensure that the actions taken by the manager are in accordance with instructions and established policies.

The ME1 process also has linkages with other IT processes defined by COBIT. The purpose of the linkage process in ME1 is to get the optimal results of the audit accordance with the organization's needs. The linkage ME 1 process at the university Mulawarman consists of input and output processes. The ME1 input process consists of thirteen process inputs (1) PO9 - Access and manage IT risks, (2) AI2 - Acquire and maintain application software, (3) AI3 - Acquire and maintain technology

infrastructure, (4) AI6 - Manage change, (5) DS1 - Define and manage service level, (6) DS3 - Define and manage performance and capacity, (7) DS4 - Ensure continuous service, (8) DS5 - Ensure systems security, (9) DS7 - Educate and train users, (10) DS8 - Manage service desk and incidents, (11) DS10 - Manage problems, (12) DS11 - Manage data, and (13) DS13 - Manage operation. Furthermore, the output consists of two process outputs (1) PO2 - Define the IT processes, organization and relationship, and (2) PO1 - Define a strategic IT plan.
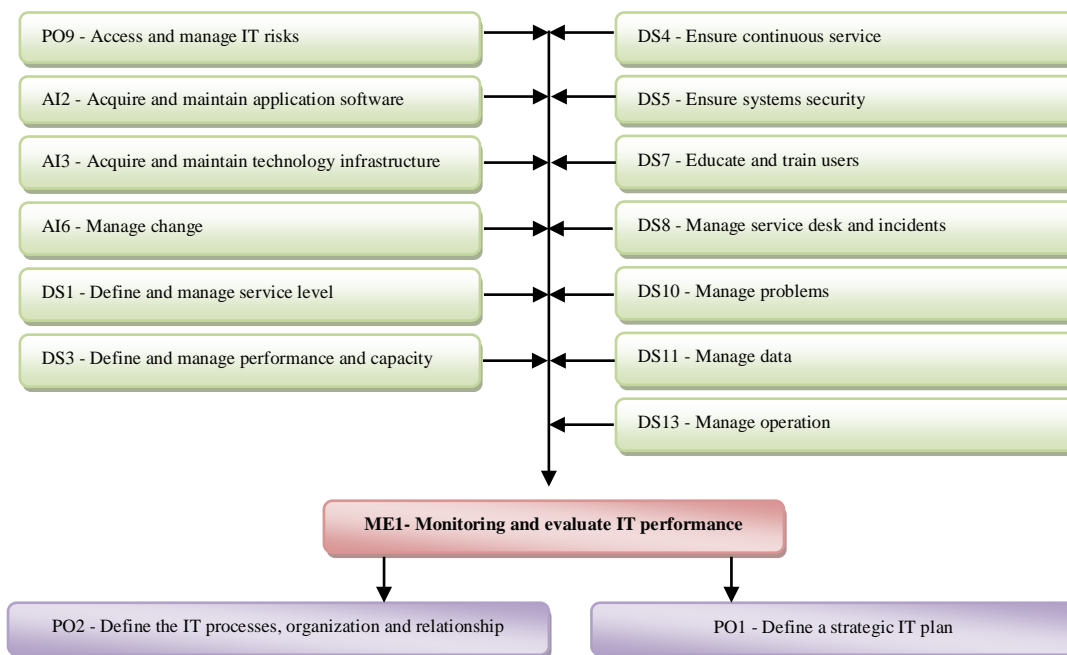
FIGURE 4 DESIGN MONITORING AND EVALUATE OF IT PERFORMANCE FOR GOVERNMENT HIGHER EDUCATION

Discussion

To conduct an audit, an organization is required to identify the problem (ISACA, 2012a, 2012b). The determination of the identification consists of determining (1) the purpose of audit, (2) the limits of audit, and (3) the objectives of audit. The determination of identification at the university Mulawarman consists of (1) the purpose of audit, to monitor and evaluate IT performance through the application of the COBIT framework is mainly related to the domain detailing the purpose of audit, (2) the limits of audit, to provide insight to the management of (2.a) provides IT process performance indicators are a good, according with the character of the university through the adoption of KGIs (Key Goal Indicators) and KPIs (Key Performance Indicators), (2.b) provides guidance in the implementation, in order to perform control of IT processes to achieve success CSFs (Critical Success Factors), and (3) the objectives of audit, section or unit associated with IT implementation.

As mentioned above, the selection of IT audit framework in the university Mulawarman using COBIT framework. Therefore, the audit work is also adapted to the stage in the research methodology while adopting COBIT guidelines.

Early stage, in conducting the audit is to investigate how effectively IT has been used at the university of Mulawarman in carrying out the academic activities. The current IT infrastructure, hardware and software and their status at the University Mulawarman are shown in Table 1.

TABLE 1. MULAWARMAN UNIVERSITY OF IT INFRASTRUCTURE

Infrastructures	Quality	Condition
Hardware/Networking		
Internet Network	30 Mbps	Good
Wire line	Fiber optic Hybrid bus-star	Good
Wireless LAN	2,4 GHz 802.11 b/g	Good
Server	10 Units	Good
	Assemblies (6 Units)	Good
	IBMx3105 (3 Units)	Good
	HP Proliant DL180G6 (1 Unit)	Good
Software		
Academic systems	Web based	Running
- Enrollment	Web based	Running
- Registration	Web based	Running
- KRS/KHS	Web based	Running
- SNMPTN/SMMPTN	Web based	Running
- E-Learning	Web based	Running
- Billing SPP	Web based	Running
- Evaluasi Diri PS (EPSBED)	Visual and Desktop	Running
- Web-mail	Web based	Running
- Media Streaming	Web based	Running
Employee Department Systems		
- Beban Kerja Dosen	Web based	Running
- PDPT (link to Ministry of Education)	Web based	Running
Library System		
- Digital Library/WinIsys	Visual and Desktop	Running
Financial System		
- LPSE (SPSE)	Web based	Running
ICT Systems		
- Repository	Web based	Running
- POSS, NOC, Transfer of Technology, SIM, Helpdesk	Web based	Running
Technicians		
- Hardware/Networking	Core personnel (5 persons)	Active
- Software	Core personnel (5 persons)	Active
Government Regulations		
- Education Ministry Regulations		
- Communication and Information Regulations		
University Regulation		
- Blue Print IT 2010-2014		Ready implement

Based on the initial identification, the University has available IT infrastructure. For example, even though the academic system is running well and is accessible winside and outside Mulawarman University area, the bandwidth is still an issue for the 35,000 students, 928 lecturers and 404 administrative staff. This problem must be forwarded to the University management to add additional bandwidth. Based on the regulation established by the Ministry of Education and Culture, the quota per student is 1:10 Kbps (Kemendiknas, 2010).

Further observations will be conducted to analyze the causes or factors that influence this problem. The analysis involves a component/domain that has been set, thirteen process inputs and two process outputs and establishing detailed control objectives (DCO) components of each domains. The DCO criteria will be developed to compile object questions in a questionnaire. The questionnaire will be developed for two models of the audit area (1) model of management awareness, to assess the transparency and understanding of IT cost management, benefits, strategy, policies and service levels in accordance, and (2) maturity model, to assess the process of monitor and evaluate IT is currently (*as-is*) and the expected conditions (*to-be*).

The DCO conducted will provide questions that are more focused, in accommodating the management needs. The management needs consists of (1) awareness of the potential risk of IT management which is not done effectively, (2) to understand the indications of control weaknesses and threats in the IT management processes and their impact, (3) to identify corrective measures, and (4) to provide an overview of the strategy effectively.

Conclusion and Future Work
This study intends to analyze the constraints in optimizing the utilization IT resources that are being implemented at Mulawarman State University using a standard framework. This study focuses on monitoring and evaluating information technology management processes, so that the utilization IT is effective and efficient.

By using the COBIT framework, a model of IT governance at Mulawarman State University can be developed. Thus, it can provide a good understanding of the current situation of the IT utilization and implementation at the university.

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