

# An Analysis of Information Technology on Data Processing by using Cobit Framework

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**Abstract**—Information technology and processes is inter connected, directing and controlling the company in achieving corporate goals through value-added and balancing the risks and benefits of information technology. This study is aimed to analyze the level of maturity (maturity level) on the data process and produced information technology recommendations that can be made as regards the management of IT to support the academic performance of the service to be better. Maturity level calculation was done by analyzing questionnaires on the state of information technology. The results of this study obtainable that the governance of information technology in data processing in Mataram ASM currently quite good. Current maturity value for the data processing has the value 2.69. This means that the company / organization already has a pattern of repeatedly done in managing the activities related to data management processes. Based on the data analysis, there is an effect on the current conditions and expected conditions can be taken solution or corrective actions to improve IT governance in the process of data management at ASM Mataram gradually.

**Keywords**—Cobit; Data Processing; Information Technology; Level of Maturity; Management Awareness

## I. INTRODUCTION

Information technology is a very important requirement for all enterprise organizations because it is proved to help in improving the effectiveness and efficiency of enterprise business processes as well as colleges. To achieve effectiveness and efficiency in the college needed a good management of information technology so that the technology used to support the organization's success in achieving its objectives. The success of information technology depends on how far the governance of IT is done [1].

Information technology governance structures and processes are an interrelated, directing and controlling the company in achieving corporate goals through value-added and balancing the risks and benefits of information technology [2].

Academy of Secretary dan Management (ASM) Mataram is one of the educational institutions of higher education held in Mataram. The main function is as an organizer college education or academic services. In education or academic services necessary for the use of information technology that is able to support the speed, ease of data processing.

In conducting its main activities, ASM as universities that provide education services that are supported by an academic bureaus namely Administrative Bureau of Academic and Student Affairs (ABASA) that function of providing

administrative services and academic information quickly and accurately. ABASA already supported by IT in data processing, which for the procurement of IT is implemented by a separate division, namely division BPSI. However, research has not been done to measure the maturity level data processing and mapping the information technology process maturity level of the institution cannot be measured, in addition to these problems relating to data processing, how to maintain the completeness, accuracy and availability of data through the efforts of data backup, data storage or deletion of data. Based on those problems, this study is aimed to make a recommendation proper management of information technology so that it can be used as a reference that can be used wearer and can increase the data processing optimally.

In the information technology management of the study using the framework COBIT (Control Objectives for Information and Related Technology), the basic concept of the COBIT is the determination of control on IT based on the information that is required to support the business objectives and the information derived from the combined application of information technology and resource? The benefit of the research is that the information technology management can be used as recommendations for the management of IT to support the academic performance of the service to be better.

## II. REVIEW OF RELATED LITERATURE

### A. Information Technology Governance

IT Governance is a combination of structural mechanisms, processes, and relational applied by the Organization [3]. According to the IT, Governance provides a structure associated with IT processes, IT resources and information to enterprise strategies and objectives [4]. How to integrate IT governance and optimization of the company is through the planning and organization (PO), acquisition and implementation (AI), the delivery and support (DS) and monitoring and evaluation (ME) on the performance of IT.

Generally, IT governance has the following definition "IT governance is responsibility executive and council directors, and consists of leadership, structure organization and processes which ensures that company IT prop and expand strategy organization and purpose "[11].

IT Governance is an integral part of the success of enterprise governance through improvements in effectiveness and efficiency in company processes related. IT governance provides the structure that connects the IT processes, IT

resources and information to enterprise strategies and objectives. Furthermore, IT Governance combines good (best) practice of planning and the IT organization, and implementation development, delivery and support, and monitoring IT performance to ensure that information about the company and related technology to support business objectives.

### B. Control Objectives For Information and Related Technologi (COBIT)

A comprehensive tool for creating the IT Governance in organizations is the use of COBIT (Control Objectives For Information And Related Technology) that bring together the diverse needs of management by bridging the gap between business risks, control needs and technical issues of IT. COBIT provides best business practice reference that covers the entire business process organization and expose the logical structure of activities that can be managed and controlled effectively.

COBIT main goal is to provide clear policy and good practice for IT governance for organizations around the world to help senior management to understand and manage the risks associated with IT. COBIT do so by providing a framework for IT governance and control objectives detailed instructions for management, business process owners, users and auditors.

### C. COBIT Management Guidelines

Guidelines for the management of COBIT, which consists of a maturity model, KGI, and KPI, which then provides management with tools to assess and measure the organization's IT environment against 34 identified COBIT IT processes. Currently IT-related risk management is understood as a core part of the organizational arrangements. IT arrangements that are part of the organizational arrangements become more pronounced role in achieving organizational objectives by adding value through balancing risk on the value of IT and its processes.

IT arrangement is an addition element for the success of management organization through increasing the effectiveness and the more efficiency of organization process. IT arrangements provide a structure that is related to the IT process, IT sources, and strategy information and organizations goals. Further, IT arrangements integrate related practices.

### D. COBITS' Framework

COBIT (Control Objectives For Information And Related Technology) is a framework of IT Governance, addressed to the management, staff IT services, control department t, the audit function and more importantly for owners of business processes (business process owner's), to ensure CONFIDENCIALITY, integrity and availability data as well as sensitive and critical information.

The basic concept of the COBIT framework is that the determination of control in IT based information needed to support the business objectives and the information generated from the combined application of IT processes and related resources. In the application of IT management, there are two types of control models, namely the model of business control (controls business model) and IT control models (IT focused

control models), COBIT try to bridge the gap of the two types of controls.

Basically the COBIT framework consists of three levels of control objectives, namely activities and tasks, processes, domains. Activities and tasks are routine activities that have the concept of life cycle, while the task is an activity undertaken separately. Furthermore, activity and task collection is grouped into IT processes that have the same IT management issues are grouped into domains [11].

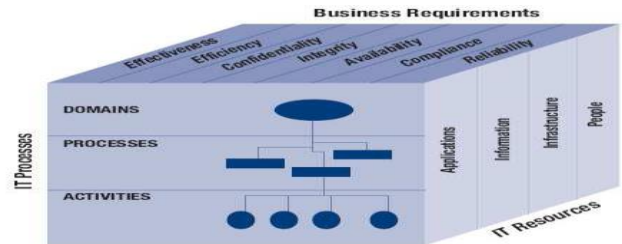


Fig. 1. COBIT cube

COBIT is designed that consists of 34 high-level control objectives that describe the IT process consisting of four domains, namely: Plan and organize, Acquire and Implement, Deliver and Support, and Monitor and Evaluate. The framework consists of the 34 COBIT IT processes divided into 4 management domain [11] namely:

### E. Domain Plan and Organize (PO)

PO domain covers strategy and tactics, and focus on the identification of the way IT can contribute best to achieve organizational goals. Furthermore, the realization of the vision of the strategy needs to be planned, communicated and managed from several perspectives. Finally, good organization.

Domain is an emphasis on the application of IT planning process and its alignment with the objectives to be achieved by the company in general. This domain covers the tactics and strategies, as well as a matter of identifying the best way to deliver IT maximum contribution to the achievement of business objectives. The realization of the strategy needs to be planned, communicated and managed by a variety of different viewpoints. Implementation of the strategy should be accompanied by an adequate infrastructure and could support the company's business activities.

IT processes of PO Domain include:

- PO1 – Define a strategic IT plan.
- PO2 – Define the information architecture.
- PO3 – Determine the technological direction.
- PO4 – Define the IT Processes, Organization and Relationships
- PO5 – Manage the investment.
- PO6 – Communicate management aims and direction.
- PO7 – Manage IT human resources.
- PO8 – Manage quality.

- PO9 – Assess and Manage IT risks.
- PO10 – Manage projects.
- PO8 – Ensure compliance with external requirements.

F. Domain Acquire and Implement (AI)

Domains with an emphasis on the process of selecting the technology to be used and the process of implementation. To realize the IT strategy that has been established must be accompanied by appropriate solutions, IT solutions and then held and implemented and integrated into business processes. IT processes in the domain of AI are:

- AI1 – Identify automated solution.
- AI2 – Acquire and maintain application software.
- AI3 – Acquire and maintain technology infrastructure.
- AI4 – Enable Operation and Use
- AI5 – Procedure IT Resources
- AI6 – Manage change.
- AI7 – Install and accredit Solutions and changes systems.

G. Deliver and Support (DS)

This domain focuses on the process of IT service and technical support that includes security system, continuity of care, training and education for users, and ongoing data management. DS domain consists of 13 control objectives, namely:

- DS1 Define and manage service levels (assign and manage service levels).
- DS2 Manage third-party services (managing the services of a third party).
- DS3 Manage performance and capacity (set of performance and capacity).
- DS4 Ensure continuous service (guarantee continuity of service).
- DS5 Ensure systems security (guarantee the security of the system).
- DS6 Identify and allocate costs (identifying and allocating costs).
- DS7 Educate and train users (educate and train the user).
- DS8 Manage service desk and incidents (managing service desk and problem).
- DS9 Manage the configuration (configuring).
- DS10 Manage problems (managing problems).
- DS11 Manage Data (organizing data).
- DS12 Manage the physical environment (arranging the physical environment).

- DS13 Manage operations (set operations).

H. Monitor and Evaluate (ME)

This domain focuses on the regulatory process on the organization's entire IT management controls are applied every IT process must be monitored and assessed for feasibility regularly. These domains focus on the problem of controls that are applied within the organization, internal and external examinations. The following IT processes in the domain of monitoring and Evaluate:

- ME1 Monitor and Evaluate IT Performance (monitor and evaluate the performance of IT).
- ME2 Monitor and Evaluate internal control (monitoring and evaluating internal controls).
- ME3 Ensure regulatory compliance (ensuring compliance with the law).
- ME4 Provide IT Governance (providing IT governance).

I. Model Maturity

COBIT has a maturity model to control IT processes using the methods of assessment / scoring so organizations can assess IT processes are incorporated (a scale of 0 to 5). Maturity Models that exist in COBIT can be seen in the following table [11]:

TABLE I. GENERIC MATURITY MODEL

0 - Existent	The company does not care about the importance of information technology to be managed either by the management
1 Initial	Company reactively perform application and implementation of information technology in accordance with the needs of existing sudden, without preceded by prior planning.
2 Repeatable	The Company has a pattern that is repeatedly performed in conducting activities related to the management of information technology governance, but its existence has not been well defined and that is still happening formal inconsistency.
3 Define	The Company has had a formal and written standard operating procedures that have been socialized to all levels of management and employees to be obeyed and worked in daily activities.
4 Manage	The company has had a number of indicators or quantitative measures that serve as targets and objective performance of every application of information technology applications.
5 Optimized	The Company has implemented the information technology governance refers to "best practice"

Non-existent Initial Repeatable Defined Managed Optimised



LEGEND FOR SYMBOLS USED

- Enterprise current status
- Industry average
- Enterprise target

LEGEND FOR RANKINGS USED

- 0—Management processes are not applied at all.
- 1—Processes are *ad hoc* and disorganised.
- 2—Processes follow a regular pattern.
- 3—Processes are documented and communicated.
- 4—Processes are monitored and measured.
- 5—Good practices are followed and automated.

Fig. 2. Maturity Model (ITGI; 2005: p18)

With the maturity level models, the organization will be able to know the position of the current maturity, and continuous and sustainable should strive to increase the level to the highest level so that aspect of the information technology governance can work effectively.

### III. RESEARCH METHODS

The stages are implemented in making information technology governance recommendations as follows:

- The field study in determining the use of information technology is running and collecting the necessary documents, such as vision, mission, objectives, strategies and institutional structure.
- Analyzing the data relating to data processing.
- Making a priority scale questionnaire which is responsible for data processing and BPSI responsible for IT management at ASM Mataram.
- After creating a questionnaire, analyze the data results of the questionnaire results of direct observation and calculation of priorities each control objective.
- Objective data analysis and control of the level of compliance that gained DCO (Detail Control Objectivities) and level of maturity, as well as the gap analysis and research implications.

### IV. RESULT OF THE STUDY

#### a) Data Analysis

In this study, the data can be processed from the questionnaires by respondents are filled according to the data by means of questionnaires, while data is not in accordance with the instructions questionnaires will not be processed further.

Based on the questionnaire that was distributed to respondents selected for filling out the questionnaire in this study were 14 respondents. Respondents were selected that has the ability to assess the current use of IT related to process the data and recapitulated processed for the calculation of the degree of fulfillment Detailed Control Objectives (DCO) and maturity level in ASM Mataram obtained from the calculation results of questionnaires I Management Awareness, while the level of maturity (maturity level) obtainable based on calculations questionnaire II maturity level. The software used for data processing by using Microsoft Excel software.

The identification of respondents is done by consistently referring to diagrams responsible, accountable, consulted and / or informed (RACI).

Roles are defined in the diagram RACI main stakeholders (key stakeholders that are directly related to the processing of such data, hereinafter interpreted (mapped in the functional structure in ASM Mataram that shown in the table below.

TABLE II. RESPONDENTS AT ASM MATARAM

No.	Functional Structure Of Cobit		Functional Structure Of Asm Mataram	Number
1	Chief Information Officer	CIO	Head of Planning and Information Systems (BPSI)	1
2	Business Process Owner	BPO	Director ASM Mataram	1
3	Chief Architect	CA	<ul style="list-style-type: none"> <li>• Admin BPSI</li> <li>• Head of Laboratory</li> </ul>	1 1
4	Head Operations	HO	<ul style="list-style-type: none"> <li>• Program Chairman tуди</li> <li>• Secretary Studies Program</li> </ul>	1 1
5	Head Development	HD	Assistant Director for Academic Affairs	1
6	Head of IT Administration	HITA	<ul style="list-style-type: none"> <li>• Head of Academic Administration Bureau (BAAK)</li> <li>• Head of General Administration Bureau (BAU)</li> <li>• Head Bureau of Financial Administration (BAKeu)</li> </ul>	1 1 1
7	Compliance, Audit, Risk and Security	CARS	<ul style="list-style-type: none"> <li>• Lecturer</li> <li>• Chairman of the Quality Assurance Agency</li> </ul>	3 1
<b>Number</b>				<b>14</b>

#### b) Scale Manufacturing Techniques

The questionnaire in this study treated with the calculation of the degree of fulfillment Detailed Control Objectives (DCO) and Maturity Level. to be able to clearly describe the results of a study of the performance data processing on the fulfillment of criteria-criteria in the processing of existing data in the DCO, the mapping of the responses to questionnaires with values that reflect the performance of the quantitative level of performance, as shown in the table below.

TABLE III. VALUE LEVELS

No.	Answer	Value	Information
1	L (Low)	1.00	Less
2	M (Medium)	2.00	Moderate
3	H (High)	3.00	Good

While the value for the level of maturity of each attribute that contributes directly to the level of maturity for the overall data processing is the value of maturity model can be seen in the following table:

TABLE IV. VALUE MATURITY LEVEL

No.	Answer	Value	Information
1	a	0,00	Non -Existent 0 (None)
2	b	1.00	1 Initial / Ad Hoc
3	c	2.00	2 Repeatable but intuitive
4	d	3.00	3 Defined Process
5	e	4.00	4 Managed and Measurable (Set)
6	f	5.00	5 Optimized

While the scale of the manufacturing index for the level of maturity model mapping contained in the following table.

TABLE V. ROUNDING SCALE INDEX

Rounding scale	Level of Maturity Model
4.51 to 5.00	5 - optimized
3.51 to 4.50	4 - Set
2.51 to 3.50	3 - Defined
1.51 to 2.50	2 - Repeatable
0.51 to 1.50	1 - Initialization
0.00 to 0.50	0 - No

c) The Result of Questionnaire I Management Awareness

Based on the identification of risk analysis carried out on collecting data on the results of questionnaires that have been carried out, the number of respondents as many as 14 respondents, obtained the answers as much as the number of questionnaires that have been distributed to the respondents. From the respondents, it is made a recapitulation that describes the tendency of the level of compliance, performance, or achievements that are now in ASM Mataram against some object questions, both the fulfillment of the DCO and other indicators related to the processing of data, in general, can be seen in the following table:

Recapitulation of respondents' answers to questionnaires Management Awareness.

TABLE VI. MANAGEMENT AWARENESS

No.	Objects Question	Distribution of Answers		
		L (%)	M (%)	H (%)
1	Business requirements for data management	7.14	78.57	14.29
2	Storage Settings	14.29	57.14	28.57
3	Media Library	7.14	50.00	42.86
4	Data deletion / Disposal	7.14	78.57	14.29
5	Backup and Restore	21.43	71.43	7.14
6	Data management security needs	21.43	57.14	21.43
7	Tests on the backup media	28.57	50.00	21.43
8	Speed restoration process	14.29	57.14	28.57
9	The success of the restoration process	21.43	57.14	21.43
10	Security of sensitive data after the deleted	14.29	28.57	57.14
11	Incident handling storage capacity	14.29	57.14	28.57
12	The reliability of the system because the recovery process	0.00	57.14	42.86
13	User satisfaction over the availability of data	0.00	64.29	35.71
14	Compliance with the legal aspects / rules	28.57	35.71	35.71
Total		14.29	57.14	28.57

From the results of the recapitulation, can be delivered the following matters:

- Respondents who expressed the opinion that the performance data management processes are still low or less (Low) of 14:29% of respondents.
- 57.14 Respondents who expressed opinions, opinions that the level of performance in the data processing need to be improved or Medium (M).

- Respondents who expressed the opinion that the current data management practices already well underway and the relative has met the expectations of as much as 28.57 respondent.

In accordance with the reference to the recapitulation table answers the questionnaire respondents Management Awareness, can be obtained on the fulfillment of the performance value of the DCO quantitatively as follows:

TABLE VII. DETAILED PERFORMANCE LEVEL CONTROL OBJECTIVES (DCO)

No.	Objects Question	Performance Value
1	Business requirements for data management	2.07
2	Storage Settings	2.14
3	Media Library	2.36
4	Data deletion / Disposal	2.07
5	Backup and Restore	1.86
6	Data management security needs	2.00
	Average	2.08

Based on the performance level table Detailed Control Objectives (DCO) can be concluded that the degree of fulfillment of the DCO in the processing of the data is good enough but needs to be improved, with the average value of the performance of the data processing is 2:08, can be seen in the following diagram:

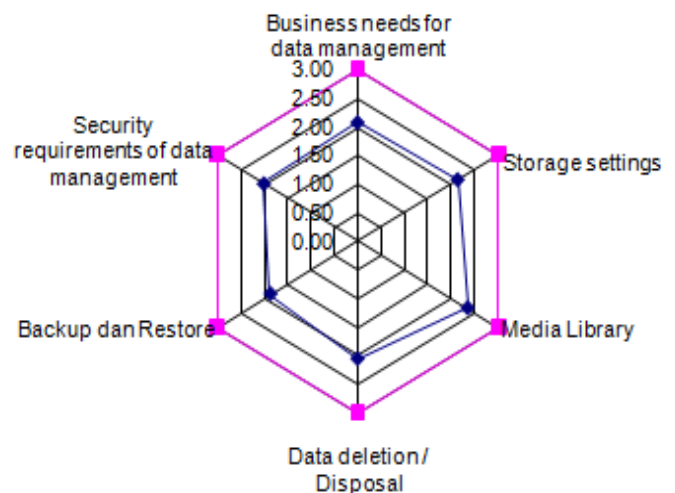


Fig. 3. Representation Diagram Level Compliance DCO

d) Maturity Level II Questionnaire Result

Based on the results of the survey questionnaire II maturity level in obtainable answers to the questionnaire as many as the number of questionnaires were distributed to the respondents, the results of respondents' answers are then made recapitulation in the table and is expressed in the following graph:

Table Summary of the distribution of answers to the questionnaire II Maturity Level

TABLE VIII. MATURITY LEVEL II

No	Attribute	Status	Distribution of Answers					
			a (%)	b (%)	c (%)	d (%)	e (%)	f (%)
1	Air conditioning	as is	0.00	14.3	35.7	14.3	21.4	14.3
		to be	0.00	0.00	7.14	28.5	14.3	50.0
2	PSP	as is	7.14	21.4	21.4	21.4	14.29	14.3
		to be	0.00	0.00	14.3	0.00	35.71	50.0
3	TA	as is	7.14	28.5	14.3	28.5	14.3	7.14
		to be	0.00	0.00	0.00	21.4	0.00	78.5
4	SE	as is	0.00	14.3	42.8	14.3	21.43	7.14
		to be	0.00	0.00	7.14	7.14	28.57	57.1
5	RA	as is	0.00	14.3	28.5	14.3	14.29	28.5
		to be	0.00	0.00	0.00	7.14	35.71	57.14
6	GSM	as is	0.00	14.3	35.7	35.7	7.14	7.14
		to be	0.00	7.14	0.00	7.14	42.86	42.8
As Is			2.38	17.8	29.7	21.4	15.48	13.1
To Be			0.00	1.19	4.76	11.9	26.19	55.95

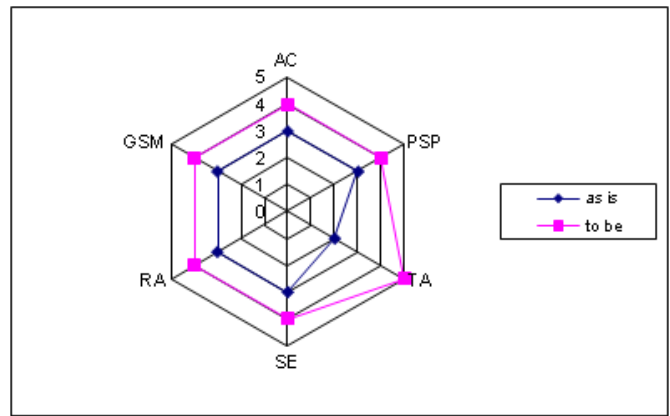


Fig. 5. Value and Process Maturity Level DS11

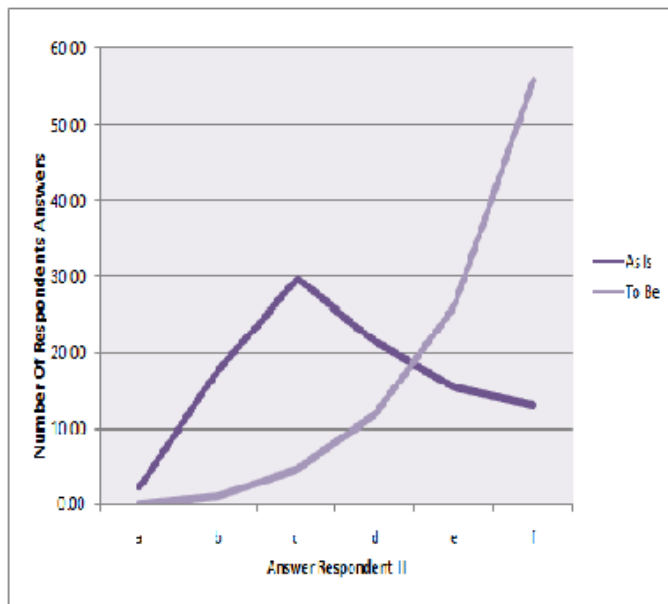


Fig. 4. Representasi Distribution Maturity Level II questionnaire answers

Based on the analysis of the current maturity level (as is) and the expected level of maturity, there are attributes air-conditioning, PSP, SE, RA and GSM refers to the level 4 and TA refers to level 5, as shown in the table and graph below:

TABLE IX. VALUE AND PROCESS MATURITY LEVEL

No.	Attribute	Value Maturity		Maturity Level	
		as is	to be	as is	to be
1	Air conditioning	2.86	4.07	3	4
2	PSP	2.57	4.21	3	4
3	TA	2.36	4.57	2	5
4	SE	2.64	4.36	3	4
5	RA	3.14	4.50	3	4
6	GSM	2.57	4.14	3	4
Average		2.69	4.31	2.8	4.2

V. CONCLUSION AND SUGGESTION

a) The Conclusions of the Study are:

- The software used for data processing by using Microsoft Excel software.
- The identification of respondents is done by consistently referring to diagrams responsible, accountable, consulted and / or informed (RACI).
- Based on the results of the questionnaire I Management Awareness in which the degree of fulfillment of the DCO in the process of data management with an average value of performance on data management processes is 2.08. These results are based on the 3 scale is 1 as the condition of "low", 2 as a condition of "being" and 3 as conditions are "good".
- Current maturity value for the data processing has the value 2.69. It means that the company / organization has a pattern of repeatedly done in managing the activities related to data management processes.
- Maturity Level II questionnaire results both for current conditions and expected conditions can be taken solution or corrective actions to improve IT governance in the process of data management at ASM Mataram gradually into 3 groups, namely the corrective action corrective actions to achieve maturity level 4 and level of maturity 5.
- Repairs carried out based on priority, starting from the lowest level of maturity that auxiliary devices and automation (TA), skills and expertise (SE), internal and external accountability (RA), standards and procedures (PSP), goal setting and measurement (GSM) and awareness and communication (AC).

b) The Suggestions of the Study are:

- ASM Mataram

To reach a level of maturity at 5, hard work and committed to work together is required to realize the corrective actions recommended in this study.

- Other researchers

A gradual evaluation is needed after corrective action in accordance with the recommendations for the improvements of this study.

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