

## Information Technology Governance Archetype in an Indonesian University

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### Abstract

Information Technology (IT) governance is used as a structure and control in alignment of IT functions and business goals. One of ABC University's business goal is to achieve World Class University in 2021. This paper presents a study in one of IT governance's component, likely structure of IT decisions right or archetype. It is needed to evaluate right applied archetype to achieve the alignment of business goals on five keys of IT decisions, namely IT principles, IT architecture, IT infrastructure, business application needs, and IT investment. COBIT 4.1 and the research of Weill and Ross (CISR) were used as the framework. The study was conducted by collecting data through observation, questionnaires, and interviews, as well as data analysis based on the existing conditions, and respondents' perception. The analysis shows that there are still weaknesses in the existing IT governance conditions and archetype, so as it's advisable the appropriate improvement recommendations.

**Keywords:** IT governance, archetype, COBIT 4.1, CISR framework, IT alignment

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### 1. Introduction

ABC University is a public university in Indonesia with some goals, one of which is to achieve World Class University title in 2021. ABC University makes use of IT on its business processes [1]. ABC University has three different campus locations with the number of students and staffs are approximately 20.506 and 1.614 in sequence. ABC University has thirteen faculties and is B accredited. ABC University is led by Rector and assisted by four vice Rectors (PR), specifically PR I (Academic), PR II (Finance), PR III (Student and Alumni), and PR IV (Planning, Development, Cooperation, and Information System). ABC University has already had an IT unit under PR IV, however the command line indicates that the unit is operational only in charge of assisting the procurement of IT in university [2]. IT units are not fully entitled to give decisions related to IT in institution.

Information Technology (IT) governance is an integral part of organization which consists of organizational structure as well as leadership of decision-making rights specification, processes and accountability framework at corporate level. The purpose of IT governance is to ensure IT aligned with organization's business goals and to achieve IT desirable behaviour [3-6]. In essence, the main focus of IT governance is not about what decisions were made but who has the right to decide and how that person is responsible for his role [7]. The presence of CIO is one characteristic of a good IT governance archetype. CIO is responsible for the right decision of IT. Generally, CIO's role in IT governance is operational and strategic, and the other role is as being a leader, spokesperson, supervisor, and regulating the resources allocation [8].

COBIT is one of government polices, legislation, and standards [9]. COBIT 4.1 is common to many types of companies and organizations and also can be used to achieve good governance [10]. COBIT 4.1 has 34 general objectives control, 318 detailed control objectives, and 4 domains [4, 11]. COBIT 4.1 provides management with more detailed instructions and more up-to-date information related to IT governance [12].

CISR groups the component of IT governance based on the question 'who' is the decision maker, 'what' is decided, and 'how' is the decision-making [3]. 'who' question describes an IT governance archetypes which consists of Business Monarchy, IT monarchy, federal, IT duopoly, and anarchy. 'what' question describes five keys of IT decisions which consists of IT

principles, IT architecture, IT infrastructures, business application needs, and IT investment [7]. 'how' question describes the decision making mechanism which consists of decision-making structure, alignment process, and personal communication approach [5].

Research on IT governance have been done in some organizations including universities. One of it is about IT governance structure in University of Cincinnati (UC). IT unit's performance was considered less effective to achieve IT needs in all business units, so as the initial step was carried out in the recast of IT governance by putting CIO aligned with vice president on senior management [13]. Acklesh P, Peter G, and Jon H conducted a research about the effectiveness of IT governance structure by using Collaborative Organizational Structure (COS) to manage IT resources [14]. Donald Z and Judith A conducted a research on IT governance structures at the University of California which has decentralization IT governance pattern with many business units and research units. University of California made the office of the CIO, IST restructuring into Service-oriented organization, and also aligning governance with the campus budget [15].

Paul B, May-yin D, and Fiona H conducted a research about factors influencing IT governance. Those factors are a shared understanding of business and IT objectives, active involvement of IT steering committees, a balance of business and IT representatives in IT decisions, comprehensive and well-communicated IT strategies and policies, and plays a role in fostering project success and delivering business value [16]. Ronald Y and Jack M indicated that CIOs, senior management, and business units do not work together in several universities in the United States and Canada. It specifically results that most of the universities were assessed by using the combination archetype of IT duopoly, IT monarchy, and federal [17].

This paper is focused on providing recommendations to the existing IT governance condition and archetype that can be applied to get the best practices and improve the performance of IT at ABC University. The recommendation is also adapting the success stories of previous studies that have not been applied to universities in Indonesia.

## 2. Research Method

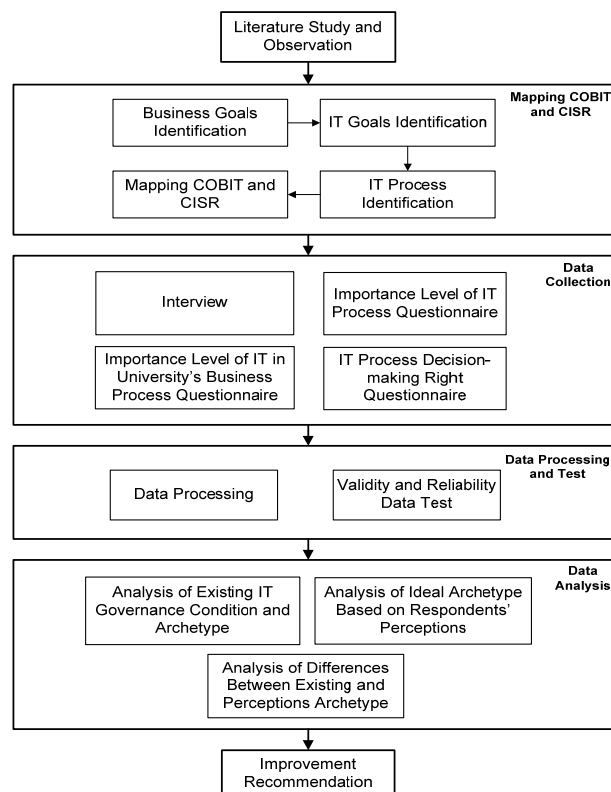


Figure 1. Research Methodology

### 2.1. Literature Study and Observation

Literature study was done to get the theory and methods that supports this study. Observation was done by studying the university's documents in order to know the background, business goals, strategic objectives, organizational chart as well as IT unit structure [2].

### 2.2. Mapping COBIT 4.1 and CISR

The initial stage was mapping business goals of ABC University to COBIT 4.1. Mapping was done by business goals identification, IT goals identification, and IT process identification [4, 11]. The next step was mapping the acquired IT process to CISR. IT processes that will be used as questionnaire's items are those that intersects with CISR according to Table 1 [18].

Table 1. Mapping COBIT and CISR

COBIT (IT Process)	CISR Framework				
	IT Principles	IT Architecture	IT Infrastructure	Business Application	IT Investment
PO1	■	■	■	■	■
PO2		■			
PO3			■		
PO4					
PO5					■
PO6					
PO7					
PO8					
PO9					
PO10					
AI1				■	
AI2				■	
AI3			■		
AI4					
AI5					
AI6				■	
AI7				■	
DS1					
DS2					
DS3			■		
DS4			■		
DS5			■		
DS6			■		
DS7			■		
DS8			■		
DS9			■		
DS10			■		
DS11			■		
DS12			■		
DS13			■		
ME1					
ME2					
ME3					
ME4					

Direct intersects are indicated by black cells and indirect intersects are indicated by grey cells.

### 2.3. Data Collection

Data was collected through questionnaires survey and interviews. Questionnaires were given to respondents consisted of three types, namely importance level of IT process questionnaire which derived from the previous mapping, importance level of IT in university's business process questionnaire, and IT process decision-making right questionnaire. Questionnaires' respondents were senior management (Rector and Vice Rector), head of IT unit, head of business units, deans, and head of departments who were considered to understand about IT and business process in ABC University.

Questionnaires of Importance level of IT processes and Importance level of IT in university's business process were used to measure respondents' perceptions about the

importance of IT in ABC University. Measurement scores on the questionnaire used five-points Likert Scale which consists of strongly unimportant, not important, not sure, important and very important [10, 19].

IT process decision-making right questionnaire was used to obtain the respondents' perceptions about who is in charge of making decision about IT processes in ABC University. This questionnaire's option was adapted from the decision-making mechanism matrix [3] and result of IT process from mapping COBIT 4.1 and CISR [20].

The interview method used semi-structured interview with IT unit as the interviewee. Semi-structured interview is effective to obtain a wide information [21]. Questions list were adapted from working report by Weill and Ross at some companies. Meanwhile, the questions rose related to IT five keys decisions [22].

#### 2.4. Data Processing and Test

Data processing was performed to obtain the questionnaire result which has been answered by the respondents. Data processing was done by calculating Likert Scale and calculating the percentage of answers. Validity and reliability test of respondents' answers also performed at this stage. Testing the data validity used criteria or empirical validity method whereas reliability test used non split technique with alpha coefficient [23].

#### 2.5. Data Analysis

Data analysis was done by three parts, namely existing IT governance condition and archetype analysis, respondents' perceptions analysis, as well difference between existing and perceptions analysis. The interview result with IT unit was used as existing IT governance condition and archetype analysis. Respondents illustrated about an ideal archetype that is suitable to be applied at ABC University and the IT importance level at university according to their perceptions. The presentation of these analysis were described in decision-making matrix [3, 7].

#### 2.6. Improvement Recommendation

A further recommendation was given in accordance with gap analysis between existing and ideal archetype. Some of improvement recommendations and proposed archetype were adapted from several companies and other institutions' IT governance best practice and success stories [13-17].

### 3. Results and Discussion

#### 3.1. Result of Mapping COBIT 4.1 and CISR

The result of mapping business goals to COBIT 4.1 and CISR is 20 IT processes at 3 domains. Mapping result of ABC University's business goals to COBIT 4.1 and CISR are shown at Table 2. Those results are used as statements item on IT process importance level and IT process decision-making right questionnaire.

Table 2. IT Process from Mapping COBIT 4.1 and CISR

Domain	IT Process
PO	PO1, PO2, PO3, PO4, PO5, PO6
AI	AI1, AI2, AI3, AI6, AI7
DS	DS3, DS4, DS5, DS6, DS8, DS9, DS10, DS11, DS12

#### 3.2. Result of Data Processing and Test

Data processed were from the questionnaires' responses of 55 respondents or 90,2% from the population (senior management, IT unit, business units, faculties, departments) in ABC University. Those results are shown on Figure 2 and 3.

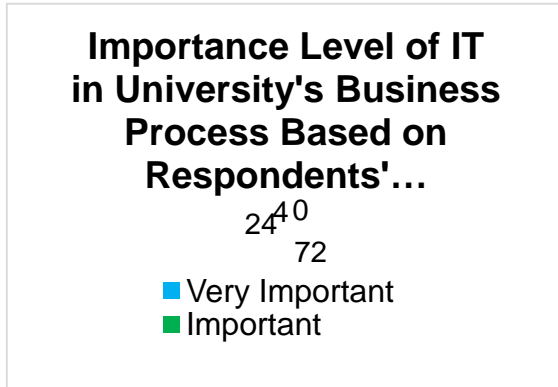


Figure 2. Importance Level of IT in University's Business Process Based on Respondents' Response

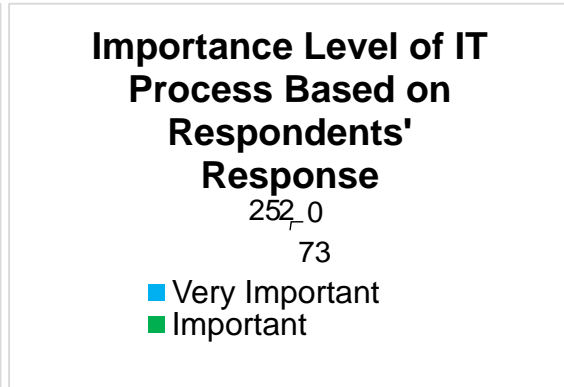


Figure 3. Importance Level of IT Process Based on Respondents' Response

Blue and green area on Figure 2 and 3 above shows that IT process is really important to be applied and also ABC University needs IT on its business process. In addition all respondents' responses are valid and reliable, so those data could be proceed to the analysis.

**3.3. Analysis of Existing IT Governance Condition and Archetype**

The data analyzed were from the result of interview with IT unit at ABC University. Questions posed were related to five keys decisions about IT. According to the interviewee, IT principles are decided by a committee team which consists of senior management, head of IT unit, and head of business units. All of their statements are used as organization's strategy plan according to the needs of each unit.

According to the interviewee, IT unit has a grand design of architecture that would be used by the organization. This decision-making about grand design was decided together by PR IV and IT unit. The grand design includes an overview of IT architecture to the level of faculties and even departments. However the distance and the different of campus location became the reasons why IT unit could not cover all of the IT needs in each department. This is also due to the limitations of devices and funds. Rector's statement that "This university would be like an information archipelago and unites to the same goal", explained that data weren't yet integrated in ABC University. However, IT unit has been already providing the data warehouse to accomodate all data.

IT unit has staffs for maintenance, but only for the service which was held by IT unit. If the business unit held IT by its own, than the responsibility doesn't lies in the IT unit. This shows that business unit has its own freedom to decide its IT and could lead to more unintegrated informations. The interviewee also suggested that each of business unit has its own IT staffs to perform maintenance on their own without waiting for IT unit, because IT unit only have a little number of human resources to deal with all of the maintenances in university.

Domain Archetype	IT Principles	IT Architecture	IT Infrastructure	Business Application Needs	IT Investment and Prioritization
Business Monarchy					
IT Monarchy					
Feudal					
IT Duopoly		Senior Management & IT Unit	Senior Management & IT Unit	IT Unit & Business Unit	Senior Management & IT Unit
Federal	Committee Team (Senior Management, IT Unit, Business Unit)				

Figure 4. Existing IT Decision-making Right Matrix Based on Interview Result

According to the interviewee, IT investment has not been done in ABC University. However, if there is an offer of cooperation from another parties, then the decision-making right go to senior management and the head of IT unit. Result of the interview is shown in existing decision-making right matrix at ABC University in Figure 4.

Figure 4 above shows that existing archetype at ABC University is the combination of federal and IT duopoly. Federal type is used to make a decision about IT principles. IT principles was decided together by committee team. IT duopoly is used to decide IT architecture, IT infrastructure, business application needs, and IT investment. One of decision-making example is that IT unit and business unit decide about IT infrastructure and application based on business unit's needs, because business unit is the one who knows about their need specifically.

**3.4. Analysis of Ideal Archetype Based on Respondents' Perceptions**

This analysis is based on the result of IT process decision-making right questionnaire. The result of the respondents' responses is shown in ideal decision-making right matrix based on respondents' perception at ABC University in Figure 5.

Domain Archetype	IT Principles	IT Architecture	IT Infrastructure	Business Application Needs	IT Investment and Prioritization
Business Monarchy	Senior Management				Senior Management
IT Monarchy		IT Unit	IT Unit	IT Unit	
Feudal					
IT Duopoly					
Federal					

Figure 5. Ideal IT Decision-making Right Matrix Based on Respondents' Perception

Figure 5 shows that the ideal types based on the respondents' perceptions are business monarchy type on IT principles and IT investment, IT monarchy on IT architecture, IT infrastructure, and business application procurement.

**3.5. Analysis of Differences between Existing and Perception Archetype**

The result of the analysis shows that there is a big difference between existing and perceptions archetype. Table 3 provides the differences of both.

Table 3. Differences between Existing and Respondents' Perceptions Archetype

IT Decisions	Existing Archetype	Respondents' Perception Archetype
IT Principles	Federal	Business Monarchy
IT Architecture	IT Duopoly	IT Monarchy
IT Infrastructure	IT Duopoly	IT Monarchy
Business Application Needs	IT Duopoly	IT Monarchy
IT Investment	IT Duopoly	Business Monarchy

A big difference is shown from the table above. As we can see according to respondents' perception, IT principles should be decided by senior management. The reason is that senior management is considered to be better on understanding strategic objectives widely and also allows decisions made to be business-enabling. The Role of IT unit is only making those strategic decisions into more operational decisions like IT architecture and infrastructure.

However, business monarchy on IT principles could lead to a more centralized IT governance pattern, while centralized type is not suitable to be applied at an organization that has many business units like ABC University.

IT monarchy type was chosen by respondents to decide about IT architecture and infrastructure. IT unit is considered to be expert and better on understanding IT needs in organization. It's not suitable to apply IT duopoly type because it will slow down the speed and the effectiveness of IT decision-making. In addition business monarchy was chosen to be applied at IT investment decision because senior management is considered to know better about the budget priority to cover all needs of university including IT.

### 3.6. Proposed Archetype and Improvement Recommendation

Based on the analysis above, ABC University has considered IT as an important part of achieving business goals, proofed by the presence of IT unit and the high number of IT importance level. However the problem is there is no CIO or IT professional exist in senior management (corporate level) level. Eventhough PR IV (Planning, Development, Cooperation, and Information System) also handles information system, it was considered to be not focused enough on IT. This could delay the communication to all business units about IT desirable behavior and IT decisions that have been made. It also can make misperception about IT unit is being unresponsive.

The improvement recommendation is to put CIO aligned with senior management. However, if it's not possible to do so, education and extensive training process of IT governance can be done in senior management level as the ITIL standard, so that IT can be well-communicated to all units. Moreover, CIO as the senior management representative can be directly involved in IT projects, so as the senior management's oversight is still running.

The proposed of IT governance archetype is IT duopoly on IT principles and business application procurement, IT monarchy on IT architecture and IT infrastructure, and business monarchy on IT investments and prioritization. This proposed archetype is adapted from previous top governance archetype studies in another companies and universities. The adaption also was done by observing ABC University's concern to grow and evolve for achieving World Class University in 2021. The matrix of proposed IT governance archetype is shown in Figure 6.

Domain Archetype	IT Principles	IT Architecture	IT Infrastructure	Business Application Needs	IT Investment and Prioritization
Business Monarchy					Senior Management
IT Monarchy		IT Unit	IT Unit		
Feudal					
IT Duopoly	Senior Management & IT Unit			IT Unit & Business Unit	
Federal					

Figure 6. Matrix of Proposed IT Governance Archetype for ABC University

### 3.7. Result Comparison between other Universities

The research which conducted by Ronald Y in some universities in United States of America and Canada indicated that most respondents agreed if IT Governance is very effective to improve the alignment between IT functions and business goals [17]. Meanwhile, this research also indicated that IT is really important and critical to business process eventhough the implementation has not been perfect yet because there is no CIO at senior management level.

A research which conducted by Aradea, Asep I, and Reza El A in one of institution in Indonesia showed that IT is a separate part of its business proses. IT Governance archetype that used by Institution X was Business Monarchy on IT principles and IT investment, Federal on IT architecture and business application needs, and Feudal on IT infrastructure. The recommendation that given by Aradea was to implement IT duopoly for IT architecture and IT infrastructure and also to establish IT unit at Institution X [24]. Meanwhile, this research indicated that ABC University has already looked IT as part of its process business and also as a support to achieve organizations business goals. ABC University already had IT unit, so the selection of appropriate archetype which already mentioned previously in proposed archetype and improvement recommendation can improve the alignment between IT and business goals.

#### 4. Conclusion

The result shows that there are 20 IT processes on 3 domains corresponding to COBIT and CISR mapping in ABC University. IT process importance level is about 97% which is very high and also used to achieve short-term and long-term business goals. This research has successfully analyzed and proposed an ideal IT governance archetype to ABC University. One of the recommendations is to put CIO aligned with senior management, which is really challenging because most of the universities in Indonesia have not assigned CIO on senior management level. This research is expected to be a reference for future research on IT governance archetype especially at universities in Indonesia. Future studies are expected to be able to use more than two frameworks other than those used in this study.

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