E-government: Designing IT Operating Model for Managing IT Services

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Abstract— *Carrying day-by-day tasks for providing IT services can be a nightmare and certainly daunting for everyone. Especially if there are no suitable means that can provide guidance to those who involved in the processes. This research aims to design an IT operating model that can help as a guidance in order to help manage IT services in general. By designing an IT operating model, the expectation is after the design process is finished later on, the IT operating model itself can provide information for those who involved in the processes to have a general understanding about how the services are managed.*

Keywords— *Operating Model, IT Management, IT Operations, IT Services.*

I. INTRODUCTION

Normally, if there is an organization where there is an IT unit exists inside that organization, it is a common thing that the IT services provided will have to rely on that IT unit. Many of other non-IT unit in that organization, not to mention other stakeholders that may exists outside the organization will also become the user of that IT services. The above description is actually exists in the organization based on a real condition in part of a government agency in Indonesia.

In that government agency, there is one IT unit consists of other four subunit where each of the subunit has its own business processes providing different services. The services provided by the IT unit are in the following description : the first subunit is handling applications for external user outside the organization; The second subunit is handling applications for internal user inside the organization; The third subunit is handling databases for all of the applications whom handled by the first and the second subunit. The last subunit is handling the infrastructure for all of the running applications and databases available for users. Below is the summary of the IT unit description in the form of visual representation focusing on the structure in the organization.

Based on figure 1, according to the leveling hierarchy of the structure, the IT unit is located in the operational level which is in the 3rd level hierarchy. The IT unit is not exist in the strategic level. It doesn't have any influences to drive and push strategic decisions within the organization directly. In general, the only thing that the IT unit can done is providing suggestions and advices to the upper level management in term of strategic context.

The IT unit is purely serve as a support for the organization to provide the IT services needed. One of the primary service provided by this IT unit is to maintain the IT system services. In other words, the IT unit is must be able to offer a service provided which consist of some series of processes. Those processes usually starts from building, developing, implementing and maintaining the system powered by IT. The main purpose of the services is that the IT unit can provide support for the continuation of the user's business process using the IT-based system. The scope of the IT-based system where the IT unit responsible for are mainly consists of applications, databases and also infrastructure as the foundation of the running applications and databases respectively.
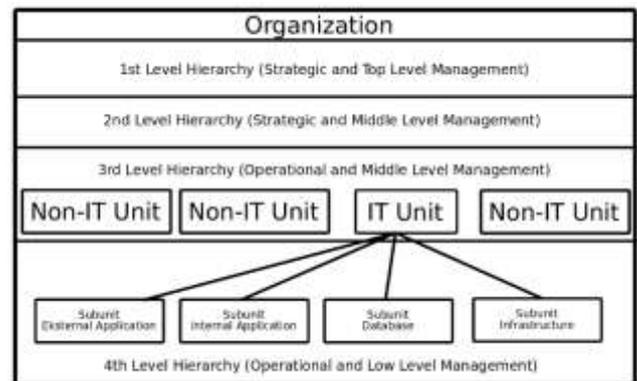

Fig. 1. IT Unit positioning in the organization

The IT unit is able to provide those services normally. Aside from that, the services are already running but those services are provided without any artifacts that can act as a guidance for describing processes to support those services. The IT operating model role in this context, it is considered as an artifact that can provide and give the necessary guidance. It serve its purpose according to its own the definition where an IT operating model is a combination of organizational structure and processes that comprehensively covers the IT department [1]. It spans the whole IT lifecycle from IT strategy, architecture, demand and supply management, project management, infrastructure to support services such as accounting and HR [1].

It is not completely wrong, but if the IT department or the IT unit does not have the rights or the authorities to handle the whole IT lifecycle process, it can only spans through the processes where the IT department or IT unit has the obligation to handle. In this case, the IT unit involves with the processes only in the operational level. That is why the processes are limited only for managing the IT services running. Furthermore, the context of the IT operating model in this research is about managing services

specifically in the operational level. In essence, IT operating model is how the IT organization is set up to serve its users, the business [1].

II. REVIEW OF LITERATURES

Thorogood, Gewald and Brune [1] has been reviewing the term 'IT operating model' as in the initial search through keywords only and searching for any references to "IT operating model" and "operating model" and it did not identify papers [1]. The search is also expanded to include all text in the articles through eight journal ran over a period ranging from 1977 to 2011 [1]. It only identified five papers as shown in the first table:

TABLE I. Literature search for IT Operating Model [1]

Journal	Database	"IT Operating Model"	"Operating Model"
European Journal of Information Systems	Proquest (delayed one year)	0	0
Information Systems Journal	EBSCO-Host Business (from 1998 delayed by 1 year)	0	0
Information Systems Research	Proquest (from 1999; delayed 2 years)	0	0
Journal of AIS	EBSCO Host Business (from 2003)	0	0
Journal of Information Technology	Proquest (from 1996; delayed 1 year)	0	0
Journal of MIS	EBSCO Host Business (from 1984)	0	0
Journal of Strategic Information Systems	Elsevier SD Freedom Collection (from 1995)	0	4
MIS Quarterly	EBSCO Host Business (from 1977)	0	1

In those five papers, only Bose and Luo [2] define an IT operating model as governance and structure focusing on Green IT implementation. The other four only refer to business operating model rather than IT operating model [1]. The first one, Krell and Matook [3] quoted a statement that the lack of clear goals resulted in frequent changes to operating models and confusion among owners and managers [3]. According Thorogood, Gewald and Brune [1], Soh and Sia [4] use operating model to refer to the business operating model inclusively of the IT department and describe how a poor operating model leads to poor alignment. Tallon [4] use the term inside a statement: "in a muddle… [pursuing] hybrid operating models that are neither hen anore nor there, and that consequently cause confusion, tension and loss of energy". The usage of the term itself is indicating on how a firm or a company should focus to have a clear operating model [4].

The search [1] is extended using alternative terms such as "IT Management", "IT Management Framework", "IT Governance Framework" and "IT Operations". However, on reading the abstracts, no further papers were identified discussing an IT operating model.

The scope of the search is also extended to further IS journals including BISE, MIS Quarterly Executive, Information Technology and Management, and others where it found no suitable papers. It also include the search in AIS electronic library and IEEE explore. Since the output was low, the search widened to incorporate journals closer to practice. Not to mention involving MIT Sloan Management Review, California Management Review and the databases of Science Direct (Elsevier) and Springerlink without success [1].

But Thorogood, Gewald and Brune [1] defines in their paper that IT operating model is the organizational structure and processes through which the IT department delivers its services to the business.

Bateman [6] is doing another literature review by executing a systematic search of relevant journal such as IJOPM, JOM (Journal of Operations Management), and IJPR (International Journal of Production Research) from their start of publication date for the term Operating Model where it reveals few references – IJOPM 6 references, JOM and IJPR 6 using the terminology "Operating Model". The result of the search is only typical mentions where it is casually made without much reference about the exact meaning of the operating model terminology. For an example, Datta and Roy [7] is exploring operations strategy and effective delivery for product/service bundles, operating model is mentioned as part of the "implications of shifting away from a manufacturing oriented operating model". Interestingly, according to Bateman [6], Datta and Roy [7] outline a "service delivery framework" which might have been better termed an Operating Model. In another journal, Silvestro and Lustrato [8] create a question in the form of research questionnaire, "Describe your organizational unit in terms of : … operating model (explanation of service delivery system).

Aside from the terminology searching through several journals, according to Ross [9] and in another reference that is also written by Ross, Weill and Robertson [10], operating model is the necessary level of business process integration and standardization for delivering goods and services to customers. Companies make two important choices in the design of their operations: (1) how standardized their business processes should be across operational units (business units, region, function, market segment) and (2) how integrated their business processes should be across those units. In making these two choices, company management is targeting one of four operating models as shows in figure 2:

Fig. 2. Characteristics of four operating model [9]

The figure above is a straightforward two-dimensional model with four quadrants. Every company should position itself in one of the above quadrants mentioned. The four general types of operating models are [10]:
1. Diversification (low standardization, low integration)

2. Coordination (low standardization, high integration)
3. Replication (high standardization, low integration)
4. Unification (high standardization, high integration)

To best support a company's strategy, Ross [9] recommend that the company define an operating model. Companies adopt an operating model at the enterprise level and may adopt different operating models at the division, business unit, region, or other level [10]. Operating model is often mooted as a bridge between strategy and operations by EY [11] and Bain [12]. The following figure is the description in detail about the position of the operating model based on EY [11]:
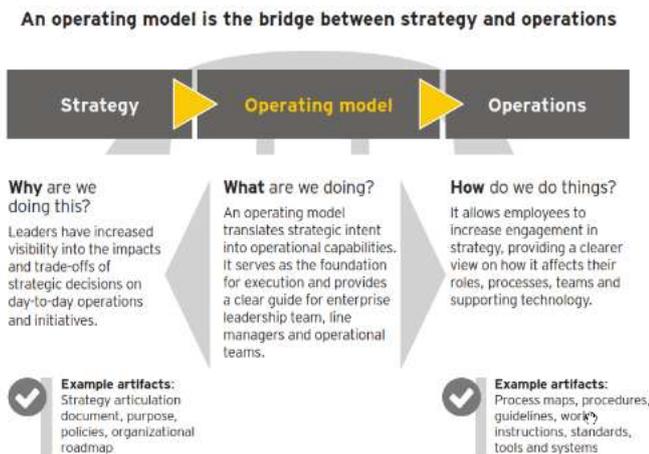
Fig. 3. Operating Model Definition [11]

Further explanation on the operating model positioning is also retrieved from EY [11] in figure 4:
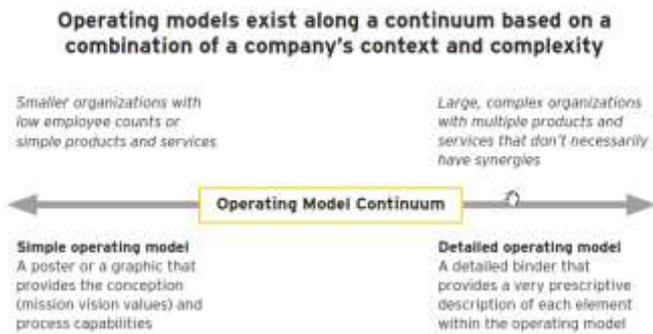

Fig. 4. Operating Model Continuum [11]

According to the figure, the operating model format is more likely depends on the company's context and complexity. There is another term for operating model provided by A. Campbell, M. Gutierrez and M. Lancelot [13] where an operating model is a visual representation (i.e. a model) in the form of a diagram or map or chart or collection of diagrams, maps, tables and charts. It shows elements of the organization, such as activities, people, decision processes, information systems, suppliers, locations, and assets that is important for delivering the organization's value proposition(s) and how these elements combine to successfully deliver the value proposition(s).

Moreover, A. Campbell, M. Gutierrez and M. Lancelot [13] divide the operating model into two types :
1. *High-level operating model*
It focus on the link between strategy and operations and also between business models and operating models.
2. *Detailed operating model*
It focus on the design decisions need to be made for an organization to function with a high-level operating model guiding them.

Discussing about the format of the operating model, there is an example of a high-level operating model in the form of operating model canvas using elements with the abbreviation of POLISM (Proposition, Organization, Location, Information, Suppliers and Management System) in figure 5 as follows:
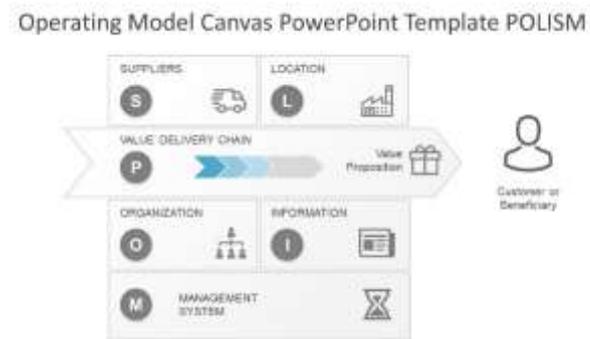

Fig. 5. Operating Model Canvas POLISM Template

All the format of the operating model available is vary between a company or organization with another, it is natural since every company is also unique by themselves. There are different ways of defining the elements that make up an operating model. Bateman [14] is summarizing elements of operating models in table II:

TABLE II. Summary of Operating Model Elements.

	OEE Consulting (2017[?])	Boeing in DuPont (2104)		Campbell et al. (2017) POLISM	Bain in Cooper et al. (2012)	SOMS (2017[?])	EY (2016) Core other
Core elements of Operating model	Service proposition (SP)	Channels		Value propositions		Customer experience (CE)	service delivery
	Journey and process (J&P)	key activities				Delivery (D)	process
	Management framework (MF)	Organisation		Management system	Key strategic metrics	Performance Management and Improvement (PM&I)	performance management
					Accountability		
	Technology and infrastructure (T&I)	business capabilities	key resources	Information	Super-structure	Process context (PC)	IT
	People, culture and organisation (P,C &O)			Organisation		Strategy governance and leadership (S,G&L)	Governance, Org design and structure.
				Suppliers	Governance		
	Location, function and teams (LF&T)	key partnerships		Locations	Behavioural expectation	People capability (PC)	culture and values
					Talent requirements		
Other elements	cost structure					Demand and capacity management (D&CM)	design principles
							risk

Each of the organization, either it is the organizations by themselves or any consultants helping another organizations to implement their operating model most likely will have different and various elements.

III. RESEARCH METHODOLOGY

The methodology for the research is presented as follows and the following in the form of a flow-chart describing the steps of research indicating also the methodology of the research itself:
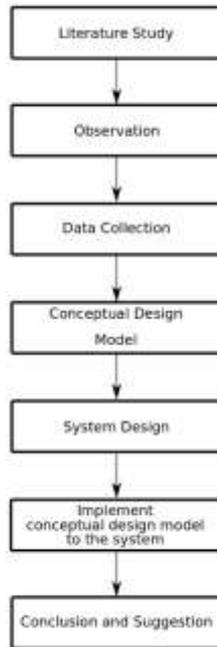

Fig. 6. Methodology of Research Flowchart

Literature Study

First of all, in the first step of the research flowchart, the literature study is performed to find all about IT operating model in general. It is actually quite a useful method to grasp every possible aspects related with the IT operating model.

Observation

After performing literature study, the process continue with an observation of the IT unit in one of the government agency as a case study mentioned in the introduction before.

Data Collection

Along with the observation process, there will be additional data collected in order to create the conceptual model design.

Conceptual Model Design

Using design science paradigm to build operating model as an IT artifact, the design process utilize most of all the material discovered in the literature study and in the observation step.

Implement conceptual design model

After building the conceptual model design, the implementation will be carried out in a system where in this context it is using an open-source application known as iTop.

Conclusion and Suggestion

The implementation will have several conclusions and suggestions further.

Design science research is now an accepted research paradigm in the information system field, aiming at developing purposeful IT artifacts and knowledge about the design of IT artifacts. One of the artifact in this context is the IT operating model.

IV. DESIGNING IT OPERATING MODEL

IT must be adapted to fit with the organization components of structure, people, task, management processes, strategies and technology [15]. If an organization is to reap the full benefits of IT investments, it must design and adjust its structure, tasks, people, culture and management processes to achieve the desired results [14].

Instead of using elements from the available operating model in the table above on the literature study, in this context the chosen elements will be retrieved from another model where there exist similar elements on it.

In the context of selecting the suitable elements for IT operating model, there is an adopted model where it is actually become the main components for the IT operating model. In the mid 1960's, Dr. Harold Leavitt developed a simple organizational model to look at the way organization react during a change. This model identifies four components : People, Tasks, Structure and Technology. Any change in these components will affect all other components [20]. It is one of the rather old and most recognized conceptual views regarding organization represented by what it is called as Leavitt's Diamond (1964). The model is in the form of a system consisting of four entities and it is frequently used as the basis of analyzing the influence of technologies upon changes in organizations [21]. The following is the model proposed by Harold Leavitt:
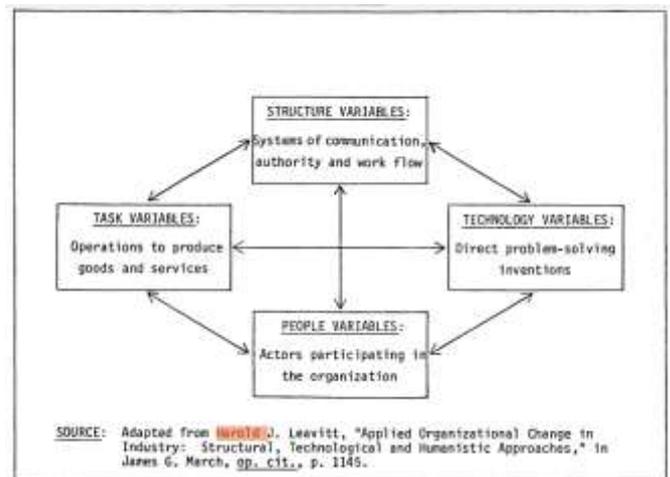

Fig. 7. Leavitt organizational change framework [20]

Furthermore, the model itself is utilized and it is modified in the form of Organizational Interaction Diamond (OID) model in figure 7 which is based upon the works of Chandler [21], Leavitt and Bahrami [22], and the MIT90's project, Samuel and Scott Morton [23]. Below is the modification of the model:
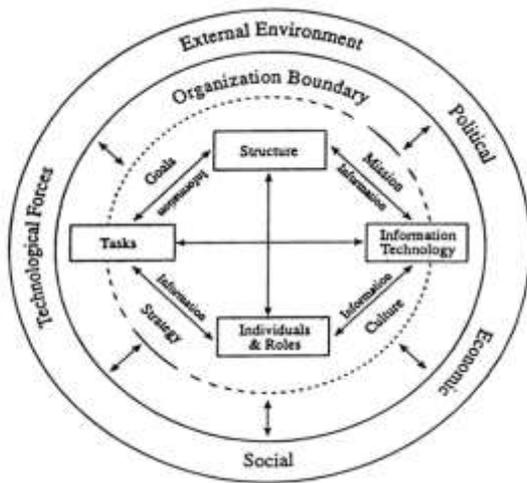
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Fig. 8. Development of operating model [20]

Another form of the model consisting the same elements which is retrieved from MIT90 project is shown in figure 8 where it shows as follows:
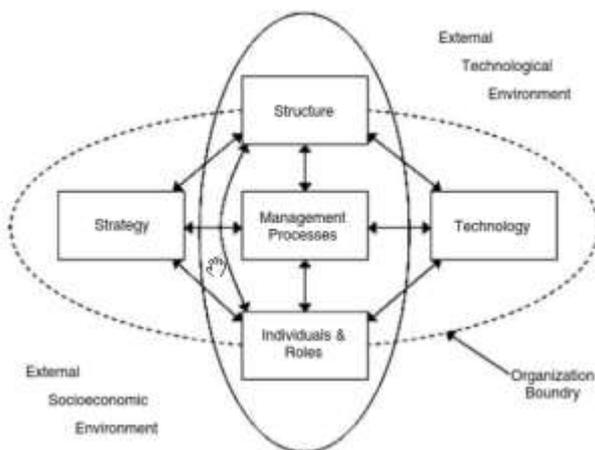

Fig. 9. Leavitt organizational change framework [20]

Based on all of the previous model given, in order to design the operating model, those existing elements will be chosen along with certain consideration and also further adjustment by the condition of the organization itself. The focus is mainly to describe about how the IT unit run the business to provide service, so the operating model will include several related elements that get along with the focus.

Operating model helps define critical organization elements [11]. The first element is the structure. Discussing about the structure of the organization, early empirical research on the relationship between IT and organization structure reveals divergent result that range from creating a more centralized structure [16], to a more decentralized structure [17]. The logic is that specific types of structure fit certain situations, improving organizational performance [1].

Many literatures have been published on the importance of IT aligning with the business ("external alignment") [18]. It is also important within the operating model ("inward alignment"). It means having an IT department whose structure and processes are 'in alignment' or 'fit' improves organizational performance [19]. But in this case, in the introduction part, the organization structure has been identified previously. It is a single unit with four subunit within. So, having the structure element already been defined, the other element will have to be adjusted to the structure accordingly.

The second element is the process. There are two generic top level processes in IT - running the business and changing the business [18]. Whether new communication paths and new ways of working are created depends upon how the components of structure, roles of people, and tasks are designed to tap the potential offered by IT [1].

It has been mentioned before, in this case, since the IT unit is in the operational level, based on the observation which is done on the IT unit itself, it only has specific tasks for running the processes to support business in the organization.

The third element is people. In this context, there is a foundation for choosing this element. Using the theoretical foundation of the Socio-Technical Theory that regards an organization as a socio-technical system built from two correlated systems – social and technical. The technical system is composed of the processes, tasks and technologies needed to transform input into output, whereas the social system is composed of people (their believes, skills, values, knowledge, needs), the relationships between them, remuneration systems and authority structures. [22].

The fourth element is technology. For an in-depth analysis of the relationship between technology and the changes to fundamental institutional structures, there are two known theories about the topic. It is Technological Determinism theory and the Socio-Technical theory [22].

In this case, technology is only one of the components of the socio-technical system, and as long as processes, people, cultures and structures remain at the level of bureaucracy, the potentials of modern technology cannot be exploited. Another advocates of the socio-technical perspective is Fountain [24], who claims that ICT and organizational/institutional factors are reciprocally connected, that each of them may be dependent and an independent variable, as each of them causes the other one. That is also inline with the one proposed according to Harold Leavitt as in the Interactional Organization theory, if one element is changed, the other element will follow.

In accordance with the Socio-Technical theory, public sector organizations are systems of correlated elements that are interdependent, and changes in one of them cause changes in the other. Since the IT unit within the government agency is a public sector organization, this theory can be applied.

There are various kinds of form of operating model. While an operating model is not the strategy itself, it does help refine and reinforce it. Similarly, while it is not the

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operational instructions, it does help guide them. Many executives think it is just a bunch of boxes and lines connected to each other, while others see it as a detailed prescriptive guide. Ultimately, the form of an operating model is actually depends. It depends on the size of the organization, the maturity and the complexity of it, and outcomes to achieve [17].

The form of the operating model has also been introduced in by A. Campbell, M. Gutierrez and M. Lancelot [13]. It is a visual representation (i.e. a model) in the form of a diagram or map or chart or collection of diagrams, maps, tables and charts. It can be divided into a high-level operating model and a detailed operating model. The high-level operating model can be only a one page operating model called operating model canvas or several pages with description of each elements of operating model canvas in details. On the other hand, a detailed operating model can be hundreds or even thousands of pages consists of design decisions in details to provide a clear guidance. The main objection is the focus on the design decisions need to be made for an organization to function with a high-level operating model guiding them. It focus on the link between strategy and operations between business models and operating models [13].

The operating model is designed in the form of a canvas for the high-level scope, but in this canvas, it only use the selected elements such as structure, people, task and technology. The following is the design of the IT operating model canvas using those selected elements adopting the existing operating model canvas with less elements:
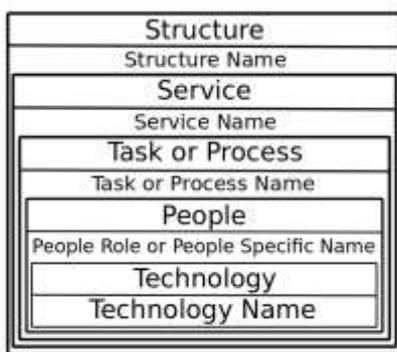

Fig. 10. High Level IT Operating Model

The above design is intended for further usage in the current case study because there are no well-documented information for all of the services provided. The documentation include list of services and it also include list of the processes supporting the service. Another important item is the people responsible for executing those processes. Moreover, it is actually important to have an additional information about whether those processes will use specific technology or not. An operating model will be an alternative to provide a rigid information on those elements. Furthermore, in this research, the main purpose is to build an operating model so that the IT operating model will serve in the context of managing IT services.

Back to the structure of the organization presented before in the introduction part where there are four level of hierarchy of structure in the organization. Defining the IT services can be a very strategic decision where it is made within the first and the second level in the organization. Eventually, the third level in the hierarchy of the organization will be able to coordinate the processes executed by the fourth level unit.

In order to provide the services required, furthermore not to mention for instance in this case study, most of them have to deal with the responsibility for carrying daily tasks involving the IT operational activities in a specific government agency. It is also depend on wherever it is located and also what type of the organization is that organization or unit is. The following figure is the focus of each of the structure or hierarchy in the organization itself:

Fig. 11. Focus of each structure in the hierarchy of the organization

The processes will be managed in the 4th level hierarchy as part of operational tasks by someone that can be called as an IT managers in the subunit. But for the whole sequences of processes which is interconnected between one subunit with another, it will be managed along in the 3rd level hierarchy with a certain strategic approach so that the services provided by executing processes within each subunit can be coordinated and aligned. The following is the focus of the coordination and alignment for those processes executed to provide services in the 3rd and 4th level hierarchy:
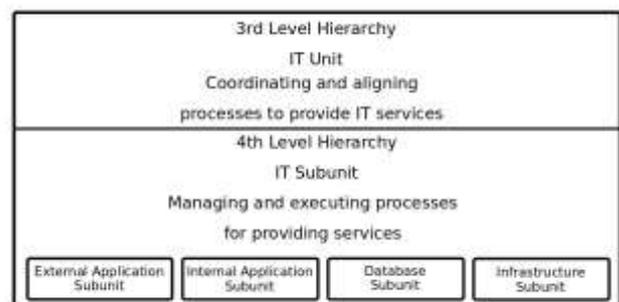

Fig. 12. Hierarchy structure of the case study in 3rd and 4th level

The processes is managed by someone who is normally called as IT managers or even CIO(s). In this article's context, those processes are managed by the head of the IT unit and by the head of the IT Subunit. They are actually responsible for those processes in order to provide the respective services. Generally, managing those processes

and also managing the people involved in it will be very hard if there are no specific documentation containing standard information procedure. The main reason is that every business process has their own characteristics and it is going to be difficult for maintaining the processes by using common sense, experience or even tacit knowledge of the people carrying out to execute it. In the future, it will cause several problems when the processes only depend on specific person.

Obviously, the problems exist in the IT processes and operations possibly because there are no rigid, strict and firm standard operations about who is doing what and what are the processes executed and carried out in order to solve those problems. By defining an IT operating model, important aspects or elements relates to the IT processes related with the operations will be mapped.

The operating model is "a choice about what strategies are going to be supported", "a commitment to a way for doing business" [1]. The strategy for further support is defined in the form of two key dimensions for defining the operating models itself.

The existence or the main purpose for an operating model to exist at the end is for delivering goods and services to customers. In order to achieve it, there has to be a certain level of integration and standardization in the business process.

So, the following is the step for mapping the organization which in this context, it is the IT unit using the IT operating model with the selected main element. Another thing which is a proper thing to be considered are the following aspects:

- Reviewing the organization.

It is a step to observe and review what kind of organization does the IT unit really is. One unit with four subunit below.

- Reviewing the operating model.

It is a mechanism for reviewing the operating model with the selected elements.

- Designing the operating model

It is the operating model design step after reviewing the elements and the type of the operating model it will be.

- Mapping the operating model

It is mapping the output of reviewing the organization to the designed operating model

- Mapping to the implementation

It is an example of mapping the operating model to the implementation context using iTop as the tool helper.

Reviewing the organization

Operating model can be implemented in every level[8]. But in this case, since the object is the IT Unit, we are going to implement it in the IT unit level. The following is the description of the unit which has already been described and presented in the introduction part in the form of narrations. The following are the highlights of the organization's characteristics:

1. It is an IT unit exists within an organization. That organization is a government agency.

2. It is an IT unit where the main activity of the unit is in the operational processes. Mainly active in that kind of processes because the IT unit exists in the third level hierarchy of the organization in term of the structure.
3. The IT unit consists of four subunits.
4. Each of the subunits have different and its own business processes.
5. Every subunit has to manage several different business processes running.
6. There are some processes which is independent from other processes.
7. There are some processes connected with another processes and since those processes are connected, sometimes the next process available will have to depend on the previous processes.
8. Among the connected processes, those processes can be managed across subunit.

According to the descriptions above, the unit described will have the main focus of providing IT system services where the processes for providing those services are distributed in several subunit. Furthermore, by examining the description of the IT unit mentioned, especially in term of its business processes characteristics and by referring to the operating model quadrant, the IT unit have the suitable operating model using the coordination type. The next question is how to implement the operating model with the coordination type by selecting the proper elements.

By observing the organization directly, there will be a clear understanding about how the processes are being carried out. After examining the processes, the proper mapping for all services to the IT operating model canvas.

Reviewing the IT operating model

The following is the design of the IT operating model using the elements exist or retrieved from Harold Leavitt theory. All of the details on the form of the IT operating model and also the selected elements for it, all of those have been discussed in the previous section. Those are elements are structure, technology, people and task.

Designing the IT operating model

Using the same concept for operating model where it is available in a high-level and also detailed operating model, the following is the high-level operating model built according to the assessment from the third level hierarchy which is the IT unit itself:
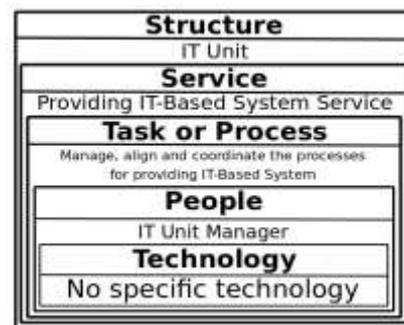

Fig. 13. Mapping IT Operating Model for 3rd level hierarchy IT Unit

Mapping the operating model

Following to the additional mapping for the 3rd level hierarchy, below is the mapping for the 4th level hierarchy and for each of the subunit. The first one is the external application subunit:
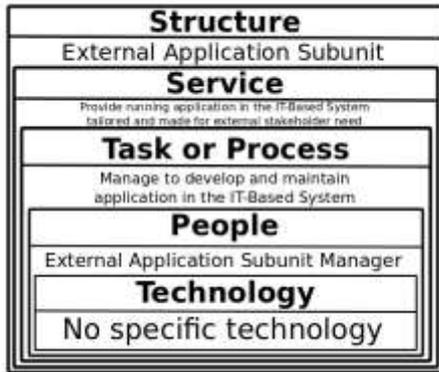

Fig. 14. Mapping to the IT Operating Model for 3rd level hierarchy External Application Subunit

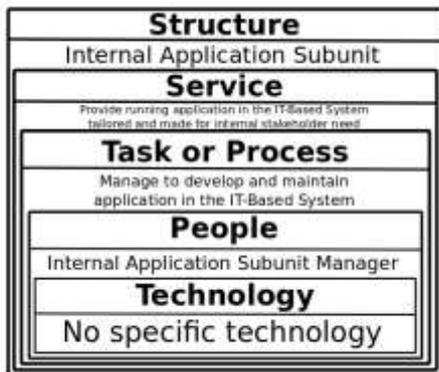The next one is the mapping specifically for the internal application subunit:

Fig. 15. Mapping to the IT Operating Model for 4th level hierarchy Internal Application Subunit

The next one is the mapping for the IT operating model specifically for the database subunit:
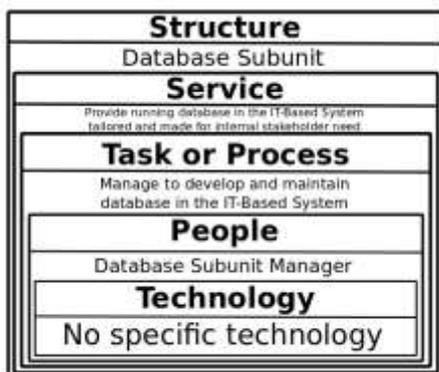
Fig. 16. Mapping to the IT Operating Model for 4th level hierarchy Database Subunit

And for high level IT operating model in the last one is the mapping for the infrastructure unit :

Fig. 17. Mapping to the IT Operating Model for 4th level hierarchy Infrastructure Subunit

The next one is the high-level IT operating model for breaking down process to several specific processes where the processes itself is handled by different subunit as shown in the following image:
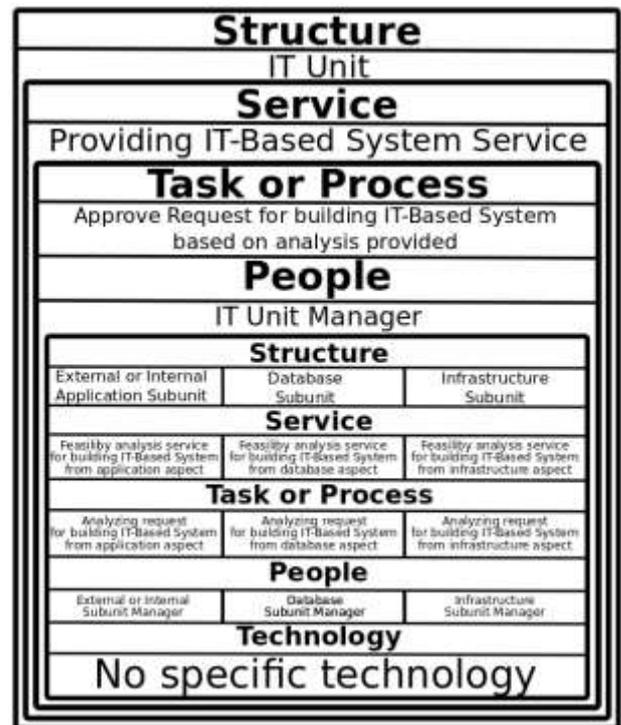

Fig. 18. Mapping to the IT Operating Model for 4th level hierarchy Database Subunit

The above diagram is specifically a service for providing an IT-Based system service. One of the process done by the 3rd level hierarchy which is controlled by an IT unit manager is approving request for building the IT-based system after analyzing it. The processes will be broken down into several services which are controlled by each of the subunit respectively. The external or internal application subunit will

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analyze the request from the application aspect, the database subunit will analyze the request form the database aspect and the infrastructure subunit will analyze the request from the infrastructure aspect (e.g. network connection, server, storage device).

The above high-level diagram can be broken down into the smallest part of process which in the end it will be handled personally by someone which is not in the structure of organization as a manager of those processes but it is an actual person who is executing the processes such as system analyst, programmer, network or server administrator, etc. But the above process is still in the analysis phase in the context of the analysis and design of information system widely known. The available phases for the processes are taken most of them from several references on system analysis and design. One of them is where building an information system using the SDLC (System Development Life Cycle) follows a similar set of four fundamental phases: planning, analysis, design and implementation [25].

In order to integrate all the process as the IT operating model should be, the following is the mapping for the IT operating model, in the detailed-level where there is an useful diagram for describing the flow of processes. That diagram is the cross-functional.

The following is an example of a cross-functional diagram using the information retrieved from the organization's assessment process. The service is IT System service containing several phase of processes as follows:
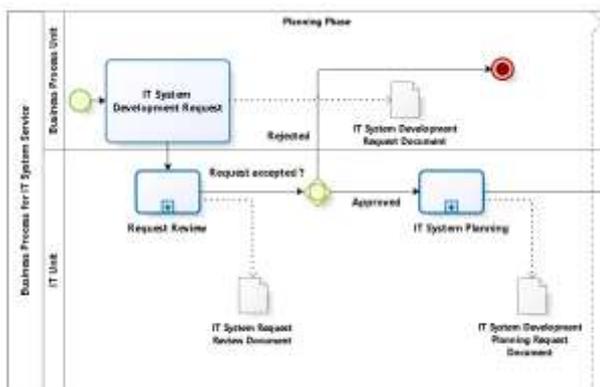
1. Planning Phase

Fig. 19. Planning Phase for IT System Service in Cross-Functional Diagram

This is the first phase where it consists of several processes.

2. Analysis, Design and Development Phase

This is the second and also the third phase which is the analysis and design phase. The development phase is basically another step of processes where it is actually indicating the status of the system itself.
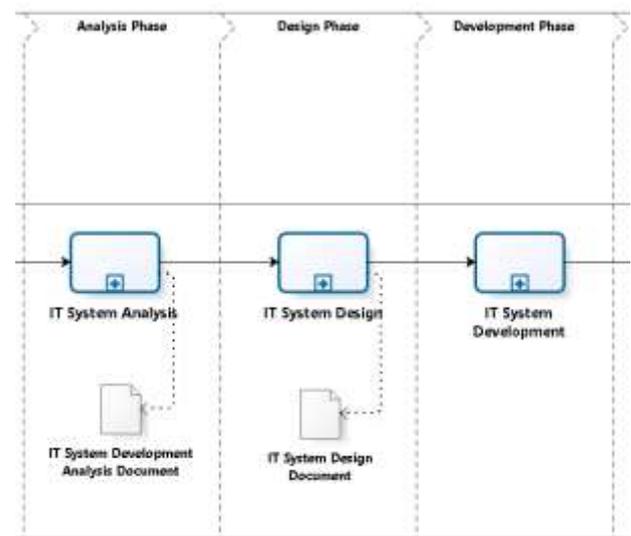

Fig. 20. Analysis, Design and Development Phase for IT System Service in Cross-Functional Diagram

3. System Integration Test Phase, User Acceptance Test Phase, Implementation Phase and Maintenance Phase

The fourth phase is the last phase which is the implementation phase. It is actually consists of several additional phase such as System Integration test Phase, User Acceptance Test Phase. Basically, the last two phase mentioned is a testing processes which is considered as part of the implementation phase. The last additional phase is the maintenance phase which is excluded from the SDLC (System Development Life Cycle) but it turns out that this phase is also an important phase for preserving the IT-based system so that it can run properly and it serve its purpose for the user need.
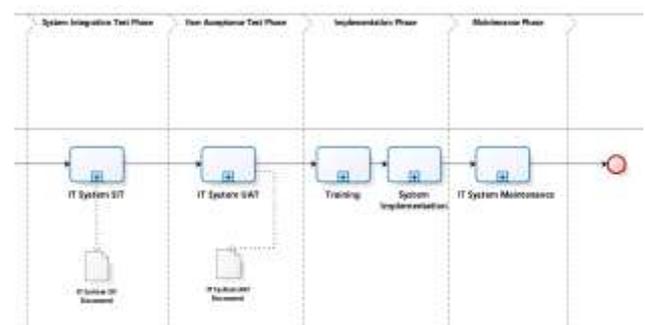

Fig. 21. System Integration Test, User Acceptance Test, Implementation and Maintenance Phase for IT System Service in Cross-Functional Diagram

Each phase has its own sub-process in a more detail cross-functional diagram. Below is an example of the request review sub-process in the planning phase:
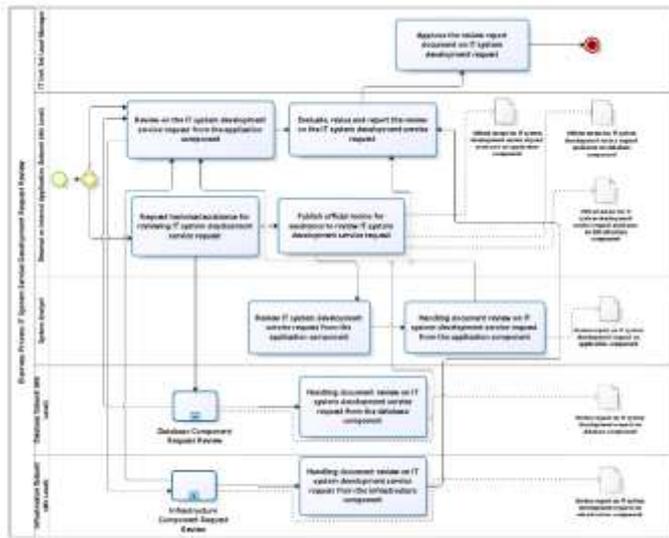
Fig. 22. System Integration Test, User Acceptance Test, Implementation and Maintenance Phase for IT System Service in Cross-Functional Diagram

The above diagram is a description of sub-processes of a service for providing IT-based system. The main process of those sub-processes is the request review where it is actually a process available in the planning phase of system development life cycle. The sub-processes involves almost all of the subunit depends on the user or the stakeholder of the application whether it is for an internal or external need. In the diagram there are five lanes for each of them are the IT unit head manager, Application subunit manager, system analyst, database subunit and also infrastructure subunit.

In each of the lane, there may be another detailed sub-process further. For example in the database subunit and infrastructure subunit to analyze or review the request for building the IT-based system in the database and infrastructure point of view respectively.

Mapping to the implementation

After defining the diagram to describe the detailed level, further implementation can also be carried out by mapping the information within the diagram to a software for managing services which in this case, it is using an open-source software named iTop.

The following is the example for mapping the service provided by the 3rd level hierarchy of the government agency, the IT unit. Specifically, the service itself consists of several phase where in each phase there is broken down into several phase and the example of the phase is in the analysis phase. The mapping process also consists of several steps adjusting to the available elements in the IT operating model.

The mapping process to the open-source software named iTop follows the elements available in the IT operating model. First of all, map the structure to the organization menu as follows:

Fig. 23. Organization List Page in iTop

The following is the mapping of another element in IT operating model which is the people element:

Fig. 24. People List Page in iTop

The next element is the processes considered as actual activities executed for providing services. Those processes can be represented in the form of services as follows:

Fig. 25. Service List Page in iTop

The processes which are important to be executed can be referred in the cross-functional diagram shown previously. And the last element, the technology for supporting the processes can be mentioned if there is a certain one utilized in order to complete the process. In the iTop open-source software, there is a page which is providing list of asset which is mainly a technology utilized in order to perform or to establish a service. The following is the image of that page:

Fig. 26. CI (Configuration Item) List Page in iTop

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Every item in the list represent technology which can be included in order to perform the processes for providing the respective service.

V. Conclusion and Recommendations

The following are the conclusion and the recommendations from the research steps taken:

1. Every organization has its own structure which also in turns it is also has its own specific IT unit. The structure of the organization and also its IT unit will decide what kind of service provided and also in the end it will also decide what kind of processes will be established.
2. Every IT unit has its own specific services. The services provided will depend on the responsibility given to that IT unit in the organization.
3. Every services given by the IT unit will also have specific processes for further execution. It can be a simple process or even several process either simultaneously or in a certain order and sequence.
4. Every process must have someone to take the role and the responsibility for finishing the process.
5. In order to run the process more effective and efficient, every one can also rely on specific technology to improve the process.
6. All of the element consisting of structure, services consisting of processes, people and also technology can be considered as a main element of an IT operating model.
7. Depend on the level of the IT operating model in the context of the design, sometimes in the high level IT operating model, it doesn't need to include a certain element. For an example, the technology element in the 3rd level hierarchy in the IT unit where the main process is actually only managing, aligning and coordinating the processes.
8. On the contrary, in the detailed level of an IT operating model in the context of design can include another different element if there is a need for that. In the previous example, a cross-functional diagram describes the interrelation of processes between several subunit. But still, it cannot describe the technology element.
9. In conclusion, the element and also the term of high-level and detailed version of an IT operating model depends on the organization specifically the IT unit in that organization. In the end, the answer relies on the question of what is the main purpose for designing an operating model. In this context, it has a strong direction on making the IT operating model as a service delivery tool for describing each element. The sole purpose is using the IT operating model in this context is that it can help everyone involved providing service a clear guidance about who is doing the process, what process to do and what can be used to complete the process.

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