A Framework for an IT Use Policy Development

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Abstract

This paper presents some aspects related to IT use policy by introducing a comprehensive framework for IT use policy-making and show how this framework aids to classify IT policies accordance with its degree and technology aspect. The rapid development of information technology (IT) has raised challenges for organization particularly in controlling the effective use of IT. To direct and manage the proper use of IT, the organization need a policy that governs the use of IT so organizations can meet their goals. Creating IT policy in a dynamic environment encourage the organization to understand the benefits, limitations, and risks of technology. IT policy must combine business objectives and IT principles to ensure comprehensive and clear coverage relates to responsibility, authority, and compliance, reduce duplication of control, and provide a consistent approach to address the business needs of the organization towards IT. Therefore, it requires the guidance for the organization in designing policies which can address the need of IT control broadly, direct the proper use of IT, and acceptable to all organizational units. Furthermore, we outline the ideas of policy requirement that organization need to cover control toward IT use.

Keywords: information, technology, key decision, hierarchy, level of

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1. Introduction

Information Technology (IT) has an important strategic role in the organization [1]. To achieve a competitive advantage, an organization must improve the performance and quality to align business strategy and IT strategy. Since IT performance and business are closely related, thus enterprises cannot be competitive if their business and IT strategies are not aligned [2]. Alignment leads to the more focused and strategic toward the use of IT, which in turn can lead to increased organizational performance [3]. Business and IT alignment refer to the application of IT in a timely manner and timing, aligned with business strategy, goals and needs [4]. According to Cragg et al., a major issue to be studied is how organizations can make the best use of IT [5]. But in some organizations, the use of IT is still a problem. In the study of small and medium enterprises, there were problems related to the exchange of information both internally between applications and externally with suppliers and customers [6]. In addition, small and medium-sized enterprises have difficulties in integrating IT into their processes [7]. Therefore, it required the planning to direct and regulate the use of IT in business processes to fit with the expected goals. To direct and manage the use of IT is right, organization need a policy that is used as a guide to regulate the procedures for the use of IT which align with business needs.

Creating IT policy in a dynamic environment encourages organizations to fully understand the benefits, limitations, and risks of the emergence of technology [8]. IT policy must be able to combine the needs of business and IT principles to ensure comprehensive and clearly coverage relates to responsibility, authority, and related compliance policies.

This paper presents a framework for IT use policies for the organization focusing on the needs of IT and the levels of abstraction policy. We have combined key decision of IT and policies hierarchy concept into a comprehensive framework that can organization in creating IT use Policy by integrating who have important roles in policy making and aspects related to the content of the policy.

2. Materials and methods

2.1. IT policy analysis

A policy is a high-level statement of enterprise beliefs, goals, and objectives and the general means for their attainment for a specified subject area [9]. To guarantee that all policies are applied to their targets, it is essential to structure these policies [10][11]. To able to direct and manage the proper use of IT, organizations need a policy that governs the use of IT so organizational goals can be achieved.

Policies are the principles that govern the actions and lead to the goals to be achieved [12]. The policy should define the structure, approach and philosophy clearly to map certain aspects of the business. The policies are thus not the processes or the decisions themselves, but the information mechanisms used to make the decisions [13]. According to [8], Since IT is an organizational asset, management expected to make sure that the proper level of control are placed to protect IT management process. The major key of IT decisions are the primary things that organization must consider for manage and regulate the use of IT in the organization [14]. IT decision keys will be the main note for the organization in issuing a policy related to the use of IT. The five major decisions related to the management and use of IT in the organization are [14]:

- IT principles: high-level decisions about the strategic role of IT in the business.
- IT architecture: organizing the logic of data, applications, and infrastructure bundled in a policy, relationship, and technology selection to

gain integration and technical standardization.
- IT infrastructure: centrally coordinated, shared IT services providing the foundation for the enterprise's IT capability and typically created before precise usage needs are known.
- The business application needs: Identify a new way or process of the organization so that there is a meaningful value, and architectural integrity to ensure that the application is built in accordance with the architecture of the company that is integrated and innovated.
- Prioritization and investment: decisions about how much and where to invest in IT.

Developing IT Policies are complicated at the organizational level [15]. The complexity is derived, at least in part, from the increment in the number of stakeholders, organizational goals, life cycle and Good Practices [15][8].

There are several ways to deal with multiple stakeholders and sometimes conflicting interests and goals. According to [8], set policy principles are defined or followed by stakeholder, adhere to or implement such principles.

Stakeholders define and set policy principles, taking into consideration general organizational governance principles and analyzing and identifying internal and external factors (e.g. regulation), business direction, and organizational culture. Goals are statements relating to the policy principles defined previously, that describe the desired outcome. The policy lifecycle combines the policy principles and goals defined previously. A good practice is an additional documentation to support policy effectiveness and efficiency.

The four dimensions (stakeholders, goals, life cycle and best practices) are the enabler of policies frameworks [8].

According to [16], to guarantee that all policies are applied to their targets (provided they are not in conflict with each other), it is essential to structure these policies. Policies should define structures, approaches, and philosophies clearly to map out specific business aspects [17]. Policies can be expressed as a hierarchy in which high-level policy goals can be refined into multiple levels of lower policy and eventually become a set of policy rules [18]. Hierarchy of policy is an important aspect in understanding the level of abstraction in a policy and also represent different views of policy [10].

A policy hierarchy defines the levels within the management environment at which policies are applied (see Figure 1, *infra*), it consists [11]:
- Corporate policies or high-level policies: These policies are directly derived from corporate goals and embody aspects of strategic business management rather than aspects of technology-oriented management.
- Task-oriented policies: Their field of action is sometimes referred to a task or process management, where they define the way how management tools are to be applied and used to achieve the desired behavior of the resources.
- Functional policies: These policies operate at the level of and define the usage of management functions; and
- Low-level policies: these policies operate at the level of managed objects.

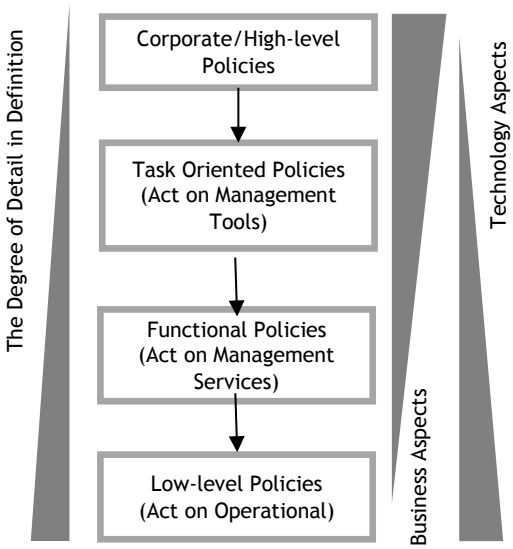

Figure 1. The Policy Hierarchy [11]

The general term "policy" is used to describe a number of different levels of considerations, and it is necessary for attempting to deal with policy issues in a concrete manner to make appropriate distinctions among these different kinds of "policies" [13]. Conceptually, the levels can be considered to be traversed in a hierarchical way, from broad-based directional policy pronouncement, through more focused functional policy formulation, to specific procedural policy execution.

These levels of consideration generate many sub-policies at the various levels of the hierarchy and have a similar concept with the level of abstraction above (see Figure 2) [10].

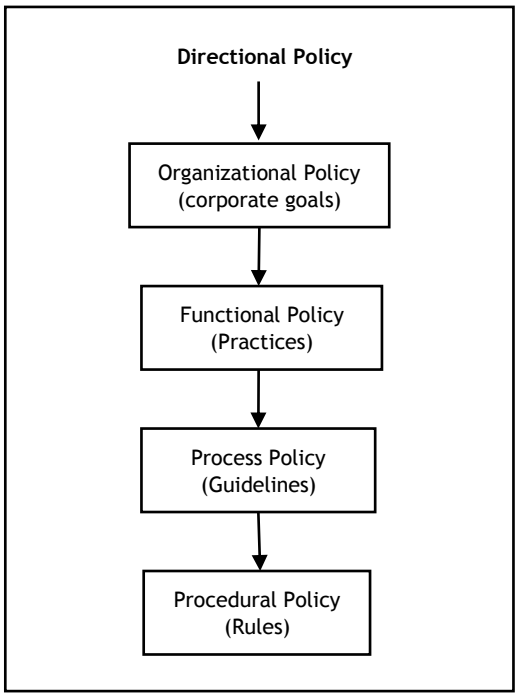

Figure 2. The proliferation of policies [13]

However, developing IT use policies in organizational level is a very complex process. It is difficult because information and information technologies are highly

regulated areas in some countries, and normally there are many stakeholders around these issues [15]. The hierarchy of policy, IT decision key and four dimensions are discussed in the following sections and suggestions for a systematic method of designing IT use policy framework are provided.

2.2 Method

The research methodology used in this research is using Design Science Research Methodology (DSRM). The use of this methodology is focused on problem solving and development of an IT artifact [19]. Design-science research must produce a viable artifact in the form of a construct, a model, a method, or an instantiation [20]. Based on the purpose of this research is to produce a framework of IT Use policy which is included in science design paradigm, hence used analysis by utilizing existing concepts in information system framework. The information system framework can be used to facilitate the understanding, implementation, and testing of research in the field of information systems, especially research related to design, science paradigm [21].

Stages of analysis within the design science research include stages of determination of perspective, stages of a knowledge base, and stages of information system research (see Figure 3).

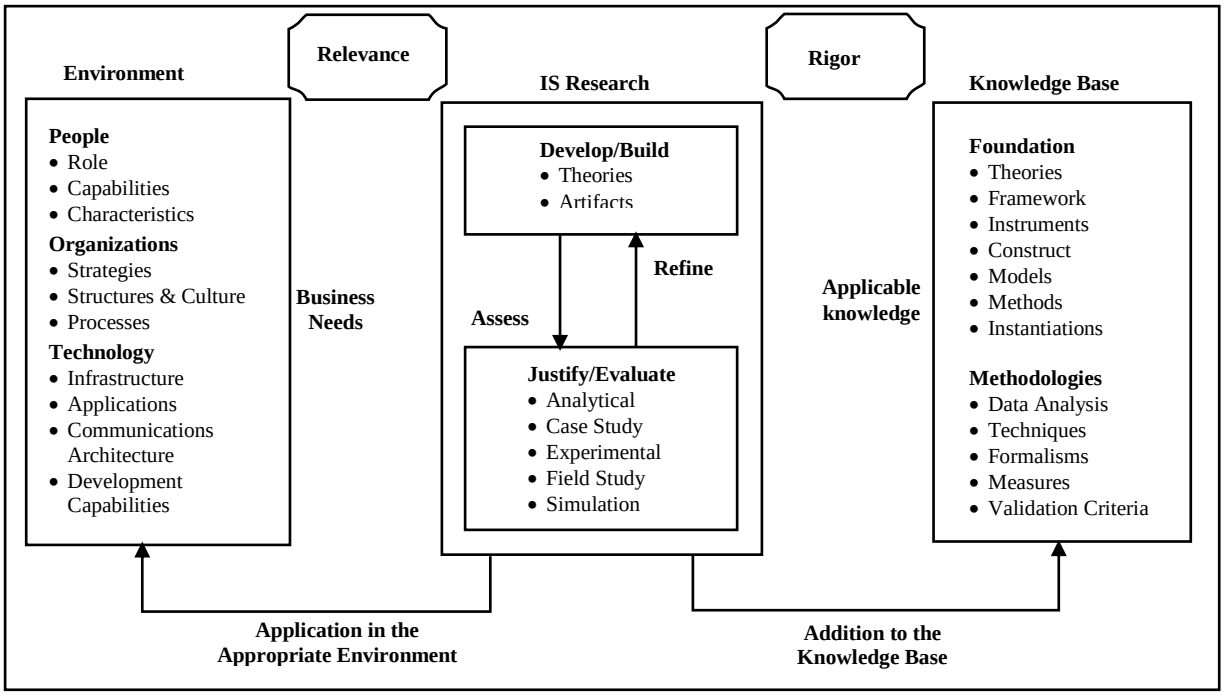

Figure 3. Design science research model [20]

Stages of perspective determination include the problem space where there is an interesting phenomenon (referring to the concept of the environment) [20]. Stages of the knowledge base include the preparation of a collection of influencing knowledge as well as supporting activities in information systems research. The knowledge base includes the foundations and methodology. The foundation includes the results of reference disciplines that provide theoretical foundations, frameworks, tools, constructs, models, methods, and instantiations and then used in developing research phase studies.

The author will focus on hierarchy policy concept combine with IT decision key according to some related research of the policy framework and then evaluate it. Then, the author will make a modeling process, determining the element of the framework, and combine key decision of IT and policies hierarchy concept into a comprehensive framework.

3. Results

3.1 Determining component of it use policy framework

In the previous section, we showed that whether the level of abstraction or level of consideration of policies is very important in organization scope. It can help the organization to distinguish the degree of precision which policy represents, the manners in which they are communicated, and the extent to which they can be accommodated by automation [13]. The levels of abstraction represent the transformation process of a policy definition is a process of stepwise refinement, moving from high-level policy definitions down to low-level policy definitions which can be more easily automated and applied to the managed environment. Level of abstraction is a way of splitting the vast number of policies into smaller groups of different levels of abstraction, which can be further processed in distinct steps and transformed into applicable low-level policies [10]. Besides, level of consideration can be considered to be traversed in a hierarchical way, from broad-based directional policy pronouncement, through more focused functional policy formulation, to specific procedural policy execution [13].

In terms of IT, the policy should cover all aspects of the IT organization (include software acquisition and development, security disaster, to operational management). IT is linked to other key enterprise assets (i.e. financial, human, intellectual property, physical and relationships) [14]. IT policies help organizations to properly articulate the organization's desired behavior, mitigate risk and contribute to achieving the organization's goals [8].

To encouraging desirable behaviors in the use of IT, the organization must assign responsibility for desired outcomes and assess how well they achieve them. As described in the previous section, there are five major decisions related to the management and use of IT in the organization have used this study. Organizations will be involved in IT decision-making with different viewpoints in determining accountability and communicate in the decision-making process. Each decision can be made by corporate, business unit, or functional managers—or some combination. When developing organizational policy, the framework can be used to highlight certain aspects that probably be ignored [22].

The IT use policy framework combines the framework of IT governance to map five major decision of IT and the concept of a policies hierarchy as illustrated in Figure 4.

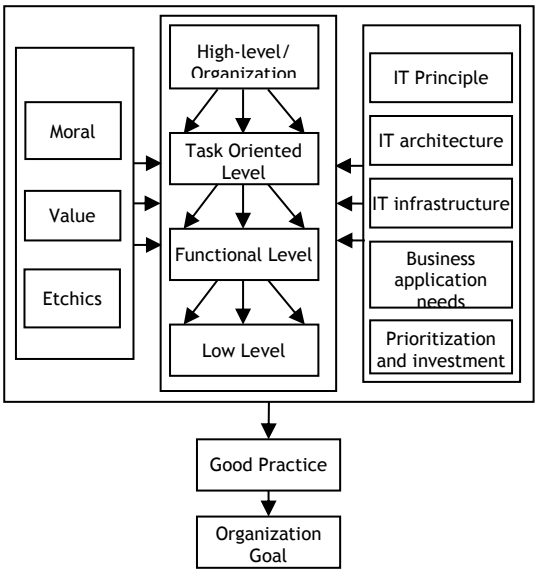

Figure 4. IT Policy Framework Design

The five key IT decisions are the main things that need to be considered by the organization to manage the use of IT. The framework will have the element which outlined five aspects of IT decision relate to three questions include: what policies should be made to realize the alignment of IT, it includes what the policy is specifically going to address and the scope to broaden or narrow either the topic or the audience. Who has the right to make policy, it includes stakeholders who define and set policy principles and others who responsible for what. Finally, about how these policies are created, it includes the consequences of a noncompliant situation toward policy, how policies are implemented and managed.

All decisions that affect organization governance and operations should be driven by those values. The insertion of ethics has been particularly useful in the field of information technology because the law has not evolved or matured to a stage sufficient to address all of the potential violation [23]. Although ethics is sometimes described as a "moral philosophy," morality extends the concept to include judgment of the goodness or badness of human action and character in the organization. A good practice is to create additional documentation to support policy effectiveness and efficiency. Thus, the desired behavior of the organization will be formed so the benefits of the use of information technology can optimally achieve by the organization.

3.2 Matrix of IT Policy Framework

The concept of policies hierarchy can help organizations easily classify policy accordance with the level of abstraction. Each policy element will include the scope of the program; that is, where it will reach and what information is included in this policy [9]. Finally, the policy will establish who is responsible for what. But in this framework, we will focus on the first component which relates to What IT policy needs to be made that we adopt from Peter & Ross which is to determine who should make, and be held accountable for, at each decision area.

Secondly, we map out each decision area on the policy hierarchy to classify the policy accordance with four levels of abstraction. The five decisions and four level of abstraction provide the columns and rows as a matrix which we refer to as the proposed framework for IT use policy. The matrix that we refer to IT policy framework allows the organization to specify analysis and communicate where IT policies are made accordance with five major decisions related to the management and use of IT and classified by 4 level of abstraction as illustrated in **Error! Reference source not found.**.

Table 1. IT use policy framework

IT Use Policy Framework					
Level of abstraction	**IT Prin-ciples**	**IT Infra-structure**	**IT Architec-ture**	**Business application need**	**IT Invest-ment**
High-level					
Task-oriented					
Functional Level					
Low-level					

That five-major decision, refer to focuses of IT-related policy, are reflected in the framework as a column. The matrix shows the different focus of IT use policy and different views on policies that we called as policy perspective.

The IT use policy framework is a 4x5 matrix that represents the intersection of two dimensions. In the first dimension, the framework describes it as a column consisting of four policy perspectives. Each perspective is shown by the level of abstraction in the hierarchy. The policy hierarchy shows a process of policy definition transformation that includes a gradual improvement from high-level policy definitions to the lowest level (managed objects) that can be automated and applied more easily to managed environments. level policy. Four levels of policy are:

- Corporate (high-level policy), the policy is derived from corporate objectives so that it covers more aspects of strategic business management than technology-oriented management aspects.
- Task-oriented Policies (act on management tools), the policy refers to the task or process management in which they determine the way in which the management tools are applied and used to achieve the desired behavior of the resources.
- Functional Policies (act on management services), policies that operate at the operational level and explain the use of management functions. The point of view of policymakers at the level of management functions and management services.

- Low-level policy (act on managed objects), policies that run at the level of managed objects (managed objects).

For the second dimension, each policy perspective/level requires a different policy focus on IT usage needs. These five focuses represent the scope of IT. For each cell in the matrix, it is an intersection between the policy level/perspective and the policy focus. Each cell is unique in accordance with the policy perspective and its policy focus.

4. Discussion

This section presents descriptive data for the major research variables followed by an analysis of the existing policies related to IT use, the important process provided by IT, and IT risk. This research was conducted in organizations engaged in courier and logistics in Bandung, Indonesia. Data were collected using a structured questionnaire administered to 38 respondents. Respondents are VP (Vice President) of the organization.

4.1 Existing Policies

Based on the existing policies related to the use of IT in the current organization, an analysis of the grouping based on two viewpoints of the level of abstraction of IT policies and the IT key major are performed. Analysis of grouping policies undertaken to provide an overview for organizations on which policies are contained in the organizational level (high-level policy) that can be derived from policies with a level of abstraction that is underneath it, and the policy which ones are at the lowest level (managed object). Therefore, the organization can develop this existing policy systematically.

Viewed from the perspective of the IT major key, the existing policy in this organization generally aims to control and regulate the organization's IT architecture (Table).

Table 2. Analysis of existing policy grouping

Existing Policies	Level of Abstraction	IT Major Key
2007.kd52-dirut-0907	high-level	IT Architecture
2011.se51	task oriented	IT Architecture
2011.se97	task oriented	IT Architecture
2012.kd20	functional oriented	IT Architecture
2011.se53	low-level	IT Architecture
2012.se86	low-level	IT Architecture
2012.se95	functional oriented	IT Architecture
2012.se96	functional oriented	IT Architecture
2012.se102	low-level	IT Architecture

In addition, the identification of IT process management needs indicates that the organization needs the IT processes can be conducted to support the achievement of organizational goals. Thereby, the organization needs to develop whether the existing or new policies that cover the needs of the whole organization. Meanwhile, from the perspective policy hierarchy, most of the existing policy of the organization is at the functional level and low-level policy. This indicates that the current policies are still based on the needs of the use of IT operations. This may lead the organization to have difficulty in controlling the use of IT from the organizational level to the operational level. Thus, it is necessary to have established basic policy guidelines/regulations of IT management that thoroughly enforced across organizational units.

Based on the analysis of IT major decision viewpoint, generally, the existing policy covers the process of standardization and integration, also the rules that led to the use of IT, including technology, data, applications, etc. This show that currently organization focus on IT architecture.

Table shows the distribution of the Existing Policies in the period going from 2007 to 2012 in the organization classify by level of abstraction.

Table 3. Existing Policies in the organization

Year	Existing Policies	Level of Abstraction
2007	2007.kd52-dirut-0907	high-level
2011	2011.se51	task oriented
2011	2011.se97	task oriented
2012	2012.kd20	functional oriented
2011	2011.se53	low-level
2012	2012.se86	low-level
2012	2012.se95	functional oriented
2012	2012.se96	functional oriented
2012	2012.se102	low-level

According to hierarchy policy viewpoint, in developing policies, the organization has implemented the concept of transformation policy, which there is a refinement policy process that moves from high-level policy to low-level policy. It means that the organization also apply the concept of hierarchy in the definition of policies. However, due to operational requirements so the organization also produces low-level policies which aren't derived from the previous level of policy. But evidently, those policies that supported the further policy were defined at the functional level.

The existing policy seen by date of its appearance indicates that there is a link among the policies over the years.

Table shows that in 2007 the organization creates policies that are at the top level (high-level policy) related to the standardization based on information technology. In 2011, the organization creates policies related to the implementation of an integrated helpdesk is at the level of process management.

Table 4. Existing policies based on time emergence and Hierarchy policy

	2007	2011	2012
High-level	2007.kd52-dirut-0907		
Task-oriented		2011.se51	
		2011.se97	
Functional oriented			2012.kd20
			2012.se95
			2012.se96
Low-level		2011.se53	2012.se102
			2012.se86

If we studied more in-depth, the second policy is more technical than the first policy and refers to the standardization efforts. This shows that the policy issued in 2011 derived from policies issued in 2007. Meanwhile, the other policies that issued in 2011 are at the lowest level (low-level policy), which is password security on the company's technology system. If examined any further, this policy is a very technical and is intended to support the organization's security efforts. While in terms of content, this policy is not derived from previous policy. It shows that

this policy appears to operational needs of the organization at that time.

However, in 2012 the organization issued a policy for the implementation of information security systems that are at the functional level (functional policy). This policy basically has a relationship with the previous policy, which is policy is derived from the previous policy in 2007 and 2011 to support the implementation of an integrated helpdesk by implementing information security systems. But there is an interesting relationship between the policies that issued in 2011 and 2012. The low-level policy in 2011, which is password security on the company's technology systems as if it is a policy that is derived from the functional level of the policy in 2012.

According to the analysis above, it was found that generally in the making of policy, the organization uses the concept of transformation policy, where there is refinement process moving from the high-level policy to low-level policy periodically. This means the organization applies the concept of hierarchy in the definition of policies. Due to operational needs, it caused by the organization also makes low-level policies which are not derived from the previous policy level. However, the policy is supported by the next policy defined at the functional level. It shows that in defining policies, the organization applying the combination of top-down and bottom-up viewpoint, where the organization did transformation process toward policy-making from high-level to a low-level policy, also the opposite, from low-level to the high-level policy.

4.2 IT Importance

According to the data results that shown in **Error! Not a valid bookmark self-reference.**, there are 69 % of respondents stated that the organization is really needed to manage IT processes in the organization. 26 % stated that organization just need, 5 % stated applicable, 0.4 % and 0 % state it so unnecessary.

Table 5. Percentage of IT Importance

Criteria	Percentage
Really Need	69 %
Just need	26 %
Applicable	5,0 %
No Need	0,4 %
Very Not Need	0,0 %

This indicates that the management of IT processes in the organization currently has a small portion that can be applied, so the organization needs to manage IT processes appropriately. A high need to manage IT processes can encourage organizations to make sure that appropriate level of IT risk control in place. It aims to reduce unexpected toward the use of IT in any IT processes which can harm the organization.

In the process of Plan and Organise (PO), the percentage of the process that really needs to be managed well is in the process of PO1, which is 89.5 %. Meanwhile, this process should be managed by the IT management unit with a percentage of 73.7 %. While other IT processes that very need to be managed with the lowest percentage is AI1 process, which amounted to 18.4 %.

4.3 IT Risk

Risk control over IT process includes the organization's efforts in ensuring that the use of IT in every IT process goes well, avoid risks and can contribute to achieving organizational goals.

According to the results of data results, it shows that 14.2 % of respondents stated that they doubted for the existing risk control, 10.85 % stated that in part of control are exist and not documented, 35.73 % stated that in part of controls are exist and documented, 22.33 % said that the whole control exists and in part documented, and 16.83 % said all controls exist and documented (see Table).

Table 6. Percentage of IT Risk Control

Criteria	Percentage
Doubted	14%
Part of control existed, not documented	11%
Part of control existed, documented	36%
All control existed, documented partially	22%
All control existed, documented	17%

This shows that in general, most of the risk control of IT processes in the organization is exist and documented. Thus, according to IT importance result, it shows that the need of managing IT process in the organization is very high. It means the organization still need to increase the efforts to control the risk of IT processes because of the high-level of IT process management needs. The organization also need to improve IT use policy to control the use of IT in every process.

According to existing policy analysis, Policies which created each year has relevance and is a refinement of previous policy. But evidently, those policies are supported by the next policy that defined at functional level policy. This indicates that in defining policies, organizational X applied a mix of top-down and bottom-up viewpoint, where the organization did transformation process of high-level policy to a low-level, and vice versa. However, due to operational needs so that the organization also produces low-level policies that are not derived from previous policy. Whereas, viewed from viewpoint of the IT key major, the existing policies that are in the IT architecture decisions which include the process of standardization and integration and the rules that lead to the use of IT, including technology, data, applications, etc.

In relation to the current need for IT management, most participants stated that the organization needs to manage IT processes within the organization. This is evidenced by the high value of the criteria of "very need" to any IT process those asked in the questionnaire. This shows that there is a great need for organizations to manage the use of IT as outlined in the basic policies related to the use of IT. Based control efforts risks of IT processes in the organization, was obtained that the organization has defined control efforts in each process. However, control efforts have not been implemented optimally for the organization because not used certain guidelines in the implementation yet. So that enforcement of risk control has not been done completely.

5. Conclusions

In this paper, the framework of IT Use Policy for the organization has been developed. IT use policy framework in this study are considering three aspects, which consist:

1) analysis of existing policy from the viewpoint of policy hierarchy and the major key of IT decision,
2) analysis of organization needs toward IT management,

3) analysis of the effort of to control the risks of IT processes in the organization.

The study also provides insights into the role of the organization needs to IT management for IT use policy, which is higher need of the organization toward IT process will impact to the higher need of control. Besides, the study found that collaboration between IT decision key and the policy hierarchy can produce IT use policy which can cover the needs of the organization over IT and the business also can avoid duplication of control because the policy has been classified accordance with the level abstraction of policy hierarchy. The framework provides an overview for the organization to manage IT usage policies with a systematic top-down approach, which is policy generated by the transformation process of high-level policy to the low-level policy. But in practice, it was found that in meeting operational needs, the organization made a policy with a combination of the top-down approach and the bottom-up. Therefore, the IT usage policy framework should provide the balance objective between meeting the strategic needs which are seen from the perspective of the organization and technical need which is seen from the operational perspective.

This study produces a conceptual framework for developing IT use policy in the organization. Data were collected using structured interview and questionnaire with 38 VP in the organization. The data indicated that the need for the organization over management on IT is very high. The effort of the organization in provides risk control of IT process showed that part of control existed and documented. Using qualitative analysis has found that the existing policy relates to IT use in the organization need to be improved. The study presents a guide for the organization by applying IT use policy framework to design policy related to IT use. This can be concluded that IT use policy framework can contribute to the organization as guidance to manage, regulate and define policies related to the use of IT organizations, it also can direct the use of IT to the organization's goals.

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Biography

Sofia Umaroh was born in Bandung (Indonesia), on November 5, 1990.
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