The Effect of Information Technology Investment Governance on Information Technology Performance and Organizational Performance: a Case Study

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Abstract: *The increase in information technology (IT) investment and organizational competition are the reasons for the evaluation of investment decisions in the IT field. The evaluation that needs to be done is to set priorities for IT investments, given the limited resources and human resources. The determination of IT investment priorities must be carefully considered by managing effective IT investments to provide positive results for the organization. The purpose of this research is to investigate IT investment governance and to investigate how to determine and govern IT investment projects' priorities in improving IT performance and organizational performance at one of the largest universities in Indonesia. The method used in this research is a qualitative method. Data collection techniques in this study are interviews and document reviews, and the NVIVO application is used to analyze the data. The results of the study show that IT investment governance at the university is still in the process of development, but has been implemented quite good. This is indicated by the existence of functional structures, processes, and relational mechanisms that are following several policies and regulations applied at the university. Although it has been carried out quite well, IT investment governance cannot be said to be effective because it still has weaknesses, namely that the university still does not have a clear IT governance standard or framework.*

Keywords: *Information Technology Investment, IT Investment Governance, Information Technology Performance, Organizational Performance, NVIVO.*

Abstrak: *Peningkatan investasi teknologi informasi (TI) dan kompetisi organisasi adalah alasan untuk evaluasi keputusan investasi di bidang TI. Evaluasi yang perlu dilakukan adalah menetapkan prioritas untuk investasi TI, mengingat keterbatasan sumber daya dan sumber daya manusia. Penentuan prioritas investasi TI harus dipertimbangkan dengan hati-hati dengan mengelola investasi TI yang efektif untuk memberikan hasil positif bagi organisasi. Tujuan dari penelitian ini adalah untuk menyelidiki tata kelola investasi TI dan untuk menyelidiki bagaimana menentukan dan mengatur prioritas proyek-proyek investasi TI dalam meningkatkan kinerja TI dan kinerja organisasi di salah satu universitas terbesar di Indonesia. Metode yang*

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digunakan dalam penelitian ini adalah metode kualitatif. Teknik pengumpulan data dalam penelitian ini adalah wawancara dan review dokumen. Analisis data penelitian ini menggunakan aplikasi NVIVO. Hasil penelitian menunjukkan bahwa tata kelola investasi TI di universitas masih dalam proses pengembangan, tetapi telah dilaksanakan dengan cukup baik. Ini ditunjukkan oleh adanya struktur, proses, dan mekanisme relasional yang baik yang mengikuti beberapa kebijakan dan peraturan yang berlaku di universitas. Meskipun telah dilakukan dengan cukup baik, tata kelola investasi TI tidak dapat dikatakan efektif karena masih memiliki kelemahan, yaitu bahwa universitas masih belum memiliki standar atau kerangka kerja tata kelola TI yang jelas.

Kata kunci: *Investasi Teknologi Informasi, Tata Kelola Investasi TI, Kinerja Teknologi Informasi, Kinerja Organisasi, NVIVO.*

1. Introduction

Information technology (IT) has become a necessity and requirement for organizations in carrying out their activities. IT has become an enabler for the organization to achieve organizational goals. IT presence becomes essential for the organization. Gartner Worldwide, IT Spending Forecast, reported that worldwide dollar-valued IT spending growth in 2018 had been revised to total \$3.7 trillion, an increase of 6.2% from 2017, up 1.8% from the prior quarter (Gartner, 2018). However, constant-currency growth slightly declined to 3.0%. A survey by the Society for Information Management found that corporations allocated on averages 6.08% of revenues, a total of \$217 billion IT spending (Kappelman et al., 2018).

To achieve organizational goals, IT in an organization is not enough if it is only regulated, but IT must be managed professionally. Professional IT management is called IT governance (Hartono and Abdillah, 2011). There is a difference between IT management and IT governance, according to Weill and Ross (2004) governance determines who makes the decisions. Management is the process of making and implementing decisions. For example, governance determines who holds the decision rights for how much the enterprise invests in IT. Thus, both organizational forms must

establish good governance in IT to obtain more effective use of IT (Ali and Green, 2007).

Effective IT governance requires an analysis of who makes decisions and how decisions are made based on five IT domains: principles, infrastructure, architecture, application needs, and IT investment and prioritization (Weill and Woodham, 2002). This study focuses on the IT investment governance. According to Ali et al. (2015), while the growth in the number of IT investments remains strong, research in the IT investment field is limited, resulting in suboptimal practical guidance on effectively governing IT investments. IT investment and prioritization cover the entire IT investment decision-making process. This includes the priority in which IT investments must be focused on and explain the procedures for IT project proposals, justification, approval, and accountability (Weill and Woodham, 2002).

The increase in IT investment and organizational competition are the reasons for the evaluation of investment decisions in the IT field. The evaluation is not only about determining the type of investment that can be done but, more importantly, how an organization can determine investment priorities given the limited resources and human resources (Wirawan et al., 2014). Organizations must decide which technology investments to fund, and organizations tend to find it difficult to determine which factors are most important. Organizational leaders must have fiscal responsibility, strategic direction, and availability of resources when prioritizing IT investment projects (Denbo and Guthrie, 2003). Also, senior managers in many organizations complain about how difficult it is to evaluate IT investments and to gauge the value that they create (Dai et al., 2007). Significant uncertainties related to decision making and the determination of IT investments are one of the problems that are still worried by top management (Kauffman et al., 2015).

Determination of investment priorities is critical to do because some organizations build information technology by making substantial IT investments. However, often the organization does not receive investment returns as expected (IT

paradox). When these organizations have spent large and expensive expenditures on information technology investments, but in practice, these investments are not successful, this will be very detrimental to an organization. As a result, this large expenditure has caused managerial concerns about the value of IT business (Yao et al., 2010). Thus, IT investment and prioritization are needed to minimize this occurrence. The establishment of IT investment and prioritization allows an organization to be able to invest effectively (Denbo and Guthrie, 2003).

Clemons and Weber (1990) argue that management must strive to determine projects that are appropriate and aligned with the goals of the organization. These projects are considered essential for organizations to maintain the competitive position of the organization. Thus, management decision making is increasingly focused on the selection of information technology investments that are aligned with the overall organizational strategy. Organizations need to determine which projects must be invested to meet organizational goals. Planning and prioritizing IT investment projects need to be considered to improve IT performance and organizational performance.

The purpose of this research is to investigate IT investment governance and to investigate how to determine and govern investment project priority in the field of information technology in improving IT performance and organizational performance at one of the largest universities in Indonesia. This university is one of the educational organizations or institutions that rely on information technology to carry out various activities. As a research university, this university gives great attention to research activities that are realized by encouraging lecturers and students to conduct and develop various researches and by establishing study centers related to various scientific fields. Various kinds of IT investments and projects are needed to support these activities. Using agency theory as its theoretical foundation, this paper posits that IT investment priorities must be carefully considered by implementing effective IT investment governance to provide positive results for the organization.

The results of the study show that IT investment governance at the university is still in the process of development but has been implemented quite well. This is indicated by the existence of good structures, processes, and relational mechanisms that are following several policies and regulations applied at the university. Although it has been carried out quite well, IT investment governance cannot be said to be effective because it still has weaknesses, namely that the university still does not have a clear IT governance standard or framework. Thus, there are still difficulties in handling problems in each unit at the university. The contribution of this research is to add insight into the influence of IT investment governance on information technology performance, and organizational performance. The organization can focus on the instruments and the measurement items of IT investment governance to be able to assess its current practice. The second contribution is expected to provide benefits and useful input for the organization in evaluating the IT investment governance so that organizational performance will improve and help the organization to increase the likelihood of maximizing value from its IT investments.

The details of this study are as follows: first, this study presents a literature review of IT investment governance, IT performance, and organizational performance. Furthermore, based on the existing literature findings, this study proposes a theoretical model that illustrates the relationship between IT investment governance, IT performance, and organizational performance. This research is a case study research on IT investment governance at one of the largest universities in Indonesia. The last part of this study summarizes the qualitative findings, limitations, criticisms, and suggestions for further research.

2. Theoretical Framework

2.1. Agency Theory

IT governance is concerned with aligning IT with an organization's vision, mission, and corporate strategy, thus achieving a link between IT and the business (Karen, 2007). There still exist many problems that need to be addressed before IT governance will become effective in fulfilling its intended purpose (Posthumus and

Von Solms, 2008). Some boards are not aware of IT spending issues and IT strategies. Very few understand the extent to which their organizations operationally depend on IT systems or the extent to which IT participates in shaping business strategies. Lack of oversight from the board can pose several risks that will harm the organization (Karen, 2007). One theory that might be used potentially is agency theory. Agency theory can be used to achieve this by offering a simple proven theoretical framework that merges the interests of management and the board to ensure that IT fully supports the organization's strategic direction (Posthumus and Von Solms, 2008).

Agency theory describes the relationship of a contract whereby one or more people (principals) employ another (agent) to provide a service and then delegate decision-making authority to the agent (Jensen and Meckling, 1976). Posthumus and Von Solms (2008) state that agency theory may be applied to IT where the board (i.e., the principal) delegates responsibilities for IT to management (i.e., the agent). Their relationship, as put it, can be explained through the metaphor of a contract, which, in this case, could be linked to a policy issued by the board that governs the use of IT within an organization. This policy would then is implemented by middle management through the development of procedures that explain how to comply with the policy. However, the problem that still often occurs is that there is a conflict between the principal and the agent.

The conflict between the principal and agent that often occurs is how to align conflicting goals between the principal and the agent, and how to ensure that the agent does the work that is following what is expected by the principal (Jensen and Meckling, 1976). The problem occurs because many board boards are in the dark about IT-related issues, they may not be able to verify that the IT-related decisions and actions of management effectively portray the best interests of the organization (Posthumus and Von Solms, 2008).

In this case, the principal cannot verify that the agent has behaved appropriately or not. The principal may not be able to ensure that IT is effectively aligned and in line with the objectives of the organization, thus requiring a monitor from the principal. The concepts of monitoring and measuring play significant roles in helping the board

to attain the necessary much-needed information to direct and control effectively and reduce conflict of interest in the sense that IT may not be aligned with organizational strategy. Therefore, the board should monitor the actions and decisions of management and intervene, where necessary, to maintain alignment (Posthumus and Von Solms, 2008). Monitoring and measuring provide a board with information about what is currently taking place regarding its IT strategic direction in the organization. This information also enables the board to become comprehensive regarding its ownership and management's responsibilities to keep IT aligned with the organization's goals (Posthumus and Von Solms, 2008). The IT Governance Institute (ITGI) has voiced the need for both board and executive management involvement as essential to the achievement of alignment, and further asserts that through the involvement of all levels of leadership, the IT organization can better execute the organization's strategies and objectives (ITGI, 2008).

2.2. *Information Technology Performance*

Information technology has now become a commodity because it is widely available in the market. According to Tonelli et al. (2017), information technology performance can be defined as the ability to direct organizational information technology resources by looking at the following factors: (i) the strategic alignment between IT and business (Nfuka and Rusu, 2011; Van Grembergen and De Haes, 2008; Weill and Ross, 2004); (ii) IT value delivery (Nfuka and Rusu, 2011; Van Grembergen and De Haes, 2008; Weill and Ross, 2004); (iii) resource optimization in delivering IT services (ISACA, 2013); (iv) IT cost-effectiveness (Pang, 2014; Weill and Ross, 2004); (v) business flexibility through IT (Weill and Ross, 2004); and (vi) qualifications of IT and business staff for the proper exercise of IT responsibilities (Van Grembergen and De Haes, 2008; Weill and Ross, 2004).

Based on the IT Governance Institute (ITGI), effective IT performance requires a process of monitoring and assessment. All IT processes need to be assessed to ensure quality and compliance with organizational needs (ITGI, 2008). The purpose of doing this is to monitor and assess the IT performance following the needs of the

organization concerning transparency, IT investment, benefits, strategies, policies, and stages of service so that it is aligned with the needs of IT governance (Amali, 2013). Organizations need to determine which projects must be invested to meet organizational goals. Planning and prioritizing IT investment projects need to be considered to improve IT performance and organizational performance (Clemons and Weber, 1990).

Tonelli found that there is a positive relationship between relational mechanisms and IT performance. This supports the idea that information technology must also perform well in public sector organizations, which will require knowledge sharing and synergy between IT staff and other members of public organizations (Van Grembergen and De Haes, 2009). The results also show that the promotion of mechanisms that enable synergy and mutual understanding between IT functions and senior management is key to organizational and IT performance (Tonelli et al., 2017).

2.3. Organizational Performance

An educational institution such as a state university, is one of the public organizations. Public organizations have a specific purpose, characteristics, structure and process, and environment that distinguishes them from private organizations. The objectives of public organizations influence the mission, strategy, and programs to be implemented. In public organizations, especially at universities, organizational goals emphasize non-financial performance compared to achieving financial performance because, in this public organization, the goal is not profit-oriented (Halim and Kusufi, 2014). (Campbell, 2009) state that the public sector faces multiple mostly intangible and conflicting goals that are driven by government priorities and limited by policies.

Contrary to the goals of private organizations, which are more profit-oriented, public organizations aim to provide easily accessible services, to meet the needs of the community and to use existing resources effectively and efficiently (Balaboniene and Vecerskiene, 2015). According to Zeithalm and Bitner in (Balaboniene and Vecerskiene, 2015), a competitive environment affects the economic areas, which performance result is not tangible. However, the impact can be felt for a long time.

Therefore, public organizations need to measure their performance systematically and consistently to improve organizational management and to increase the satisfaction of society by providing services and accessibility in the face of a competitive environment.

Technology influences industry structure creates a competitive advantage, and has the potential to change competition rules. Also, almost every function in an organization has integrated technology in it, including production, procurement, distribution, accounting, and marketing (Edwards, 2001), so that it requires good IT governance in determining the priorities of IT investment projects. Previous research shows that IT enables organizational change that leads to increased productivity and should not only be seen as a tool to automate the current process (Mithas et al., 2012). Technology effectiveness, information processing, and determination of investment projects are crucial for organizational success. Also, Weill and Ross (2004) argue that public organizations that have good governance skills will also produce good and effective IT performance that will improve organizational performance.

2.4. IT Investment Governance

Information technology governance is an essential part of organizational governance to achieve organizational goals. Organizational goals can be achieved if the organization can implement IT governance effectively. IT governance consists of a set of practices that are grouped into three categories: structure, process, and relational mechanisms (Peterson, 2004). According to Weill and Ross (2004), effective IT governance requires an analysis of who makes decisions and how decisions are made based on five IT domains, namely: principles, infrastructure, architecture, business, and investment application requirements, and IT priorities. This study focuses on the IT investment aspect of IT governance. IT investment governance, which is a subset of IT governance, is mainly concerned with the aspects of value delivery and resource management of IT within organizations (Weill and Ross, 2004; ITGI, 2008).

2.4.1. Structure

The IT investment governance structure refers to the mechanism of the roles and responsibilities used by the organization to ensure that IT investments meet organizational objectives. The IT investment governance structure and position of decision-making authority in the organization determine the ability of IT governance (Weill and Ross, 2004). The IT investment governance structure consists of IT organizations, IT committees, roles, and responsibilities.

An effective IT investment governance structure is needed so that there is no ambiguity regarding the roles and responsibilities of the parties involved. Effective IT governance is also influenced by the implementation of IT functions and how IT decision-making authority is distributed. IT governance must be an integral part of organizational governance, and tasks can be carried out through the IT strategy committee (Van Grembergen and De Haes, 2009). Structure in this study was measured by Van Grembergen and De Haes (2009), which represent the key types of IT decisions to determine what decisions are made, who makes decisions, how IT decision making is distributed and organizing IT functions. The items used are the IT organizational structure, roles and responsibilities, IT director, and IT steering committee.

2.4.2. Process

In the context of IT governance, the process involves an organization's approach to monitoring the results of IT assessments and setting directions, rules, and recommendations related to IT (Peterson, 2004). Van Grembergen and De Haes (2009) define processes as systems used in organizations about how strategic decision making, strategic information system planning, monitoring, control, and process frameworks. One process that can be used to achieve IT-business alignment is strategic information system planning that helps align IT with business objectives, use IT for competitive advantage and manage IT resources more effectively and efficiently. This study measures the IT investment governance process based on the following items: (i) Organizational strategic planning, (ii) IT strategic planning, (iii)

organizational governance framework, and (iv) IT governance framework. The organization's capability provides a process to create organizational strategic plans in line with the organization's strategic directions (Van Grembergen and De Haes, 2009). The organization's capability provides a process to create IT strategic plans in line with organizational priorities and IT strategic directions (Van Grembergen and De Haes, 2009). Further, the organization's capability provides a process to provide strategic directions to the organization (ISACA, 2013), and the organization's capability provides a process to provide strategic directions to IT in line with organizational priorities (ISACA, 2013).

2.4.3. *Relational Mechanisms*

Relational mechanisms involve the ability of an organization to provide active participation and collaborative relationships between the board, IT management, and line managers (Patton, 1999). The relational mechanism is the dominant mechanism for obtaining and maintaining the alignment of an IT business, even when the structure and process exist.

There is a possibility that an organization has an established IT governance structure and process and is still not running because of the ambiguity between IT and the business side. Therefore, to achieve effective IT governance, good communication, and active participation or collaboration relationships between the business side and the IT side are very important (Van Grembergen and De Haes, 2009). In line with the research of Van Grembergen and De Haes (2009) and Ali and Green (2007), this study measures the maturity of an organization to design, implement, and practice related to (i) CIO involvement in top management agenda; (ii) top management involvement with IT initiatives; (iii) job rotation of staff in IT and other organizational units; (iv) organizational communication system.

2.5. *Top Management Team Background*

Organizations are a reflection of their top managers, and these top managers play an essential role in shaping organizational strategy choices and directing

organizational goals (Hambrick and Mason, 1984). Also, the involvement of top management in IT governance can positively influence the establishment and implementation of effective IT governance in determining the priorities of IT investment projects in the organization. Weill and Ross (2004) conducted a survey and found that IT governance performance can be accurately predicted by knowledge of IT governance held by top management. Thus, the level of knowledge of IT governance is essential for top management to be actively involved in IT governance arrangements (Ali et al., 2011).

One of the essential features of the top management team is its diversity, which focuses on the effect of team member's heterogeneity on the performance of the organizational team. When top management has a broad background of knowledge about IT governance, the organization will produce better IT governance within their organizations so it will improve IT performance and organizational performance. Thus, the performance of an organization can be considered as a function of the leadership of its top management team (Sobol and Klein, 2009).

The background of the top management team in this study was measured based on absorptive capacity (ACAP-ITG). ACAP-ITG can be used to assess the level of knowledge of top management IT governance. The ability to absorb the knowledge of IT governance is defined as the ability of top management in the organization to recognize the value of IT governance information and knowledge, assimilate it, and apply it to competitive advantage (Ali et al., 2011).

3. Research Method

Evaluation of IT investment decisions is not only about determining the type of investment that can be done but, more importantly, how organizations can prioritize investments given limited resources and human resources (Wirawan et al., 2014). The organization has many factors to consider when prioritizing IT investment projects. The organization must decide which information technology investments should be funded and implemented, including which IT investment priorities should be focused on. Management has to determine projects that are appropriate and aligned with

organizational goals. These projects are considered essential for companies to maintain the organization's competitive position. Effective IT investment governance can improve information technology performance that will have an impact on improving organizational performance. Determination of IT investment governance is based on the structure, process, relational mechanism (Peterson, 2004), the background of the top management team, and information technology performance as well as the organization (Tonelli et al., 2017). Thus, the research framework that can be taken as follows:

Figure 1
Research Framework

4. Case Study

This study uses a qualitative approach. This study adopted a qualitative method by conducting a case study. A case study aims to get an in-depth understanding of a complex phenomenon (Oates, 2006). The type of case study that this paper will use is an exploratory study, which will help to understand the research problem. The reason for using exploratory study is because there is little academic research literature, and this method is based on the investigation of a real-life instance (Oates, 2006).

The case study was carried out at one of the largest universities in Indonesia. This university is one of the oldest and biggest universities in Indonesia. It has 18 (eighteen) faculties, which in total consist of 67 (sixty-seven) study programs. The number of active students at this university was as follows: (i) Diploma: 7,335

students; (ii) Bachelor: 31,719 students; (iii) Postgraduate: 16,814 students; (iv) Foreign: 25 students. While the number of lecturers at this university was 3,054 people, the education staff is 5,127 people.

This university is one of the educational organizations or institutions that rely on information technology to carry out various activities. As a research university, this university gives great attention to research activities that are realized by encouraging lecturers and students to conduct and develop various researches and by establishing study centers related to various scientific fields. Various kinds of IT investments and projects are needed to support these activities.

The purpose of a case study is to explore the influence and real contribution of IT investment governance to determine the priority of investment projects in information technology in improving IT performance and organizational performance. There are several obstacles to the implementation and integration of applications in all work units within the university. Therefore, an analysis is needed in the process of implementing integrated and ongoing information technology investment governance to find out how the development and integration of information technology investment governance at the university. The primary data collection method that will be used in this study is an interview. In addition to using the interview approach, data collection can be done by reviewing documents (Oates, 2006).

4.1. Research Question and Data Collection Technique

Based on the previous literature review, this research proposed the following research questions: How is the effect of information technology investment governance in improving IT performance and organizational performance in one of the largest universities in Indonesia?

This study conducted a case study and analyzed data collected from parties at the university. The interviewees involved in this study were the parties of the Directorate of Finance, Directorate of Resources and Information Systems, Vice-Rector of Planning, Finance, and Information Systems, Vice Dean of the Faculty of Economics and Business, the Faculty of Engineering, and the Faculty of Social and Political

Sciences. The reason for selecting these interviewees is because they, as leaders of each unit, are expected to be able to describe the performance of each organizational unit and so that it can represent organizational performance.

Data collection techniques used in this study are interviews and document reviews. The primary data collection techniques that will be used in this study are interviews. Semi-structured interviews allow the interviewer to add new questions, which may arise from the discussion. This method is very suitable for this research because it allows interviewees to discuss their thoughts freely and allow the interviewer to emphasize the topics of interest. The next collection technique is to review documents. Documents to be used will be provided by the organization, must be relevant and can provide useful data. The method for gaining access to documents is through negotiating agreements and online research (Oates, 2006). Document review is used to complete the interview technique to get more relevant data.

4.2. Data Validity

The data validity in this study uses triangulation. Based on Patton (1999), data validity testing performed is as follows: (i) methods triangulation, (ii) triangulation of sources, (iii) analyst triangulation, and (iv) theory/perspective triangulation.

4.3. Data Analysis Technique

Data analysis used in this study is qualitative data analysis. The data collected in this study are qualitative data from semi-structured interviews and document reviews. The data analysis technique chosen for this research is theme analysis, which focuses on identifying the main themes in the data. The idea of this technique is to find segments and units of data that exist in the data that can compose categories or subcategories (Bandur, 2016).

Analysis of this research data is assisted by using Nvivo software. NVivo is an application that is used to organize and analyze data in the form of text, coding text data, determining themes and sub-themes, and making a description of all participant demographic data. It also capable of analyzing the text content with text search,

quickly knowing the main words most often appears in the data through word frequency queries, presents the results of data analysis in the form of graphs, tree diagrams, theme comparison diagrams based on participant background (Bandur, 2016).

The reason for using NVIVO is because qualitative data is usually in the form of interview recordings, which before being analyzed first, need to be transcribed, that is, writing the records into writing as they are. The transcription is then read and marked the parts that are relevant to the study; this process is called coding. Coding can be done manually or with the help of a computer. The NVivo program helps make coding easier, and more efficient helps with logic consumption and research design, and provides facilities for analyzing content. With the NVivo application, researchers can analyze from the results of coding, or researchers can search for relationships between one theme and another and visualize the relationship (Bandur, 2016).

5. Discussion

Based on the analysis of case studies, this study found some critical findings of the influence of IT investment governance on IT performance and organizational performance in one of the largest and the most prominent universities in Indonesia.

5.1. Information Technology

Based on Information and Communication Technology (ICT) Strategy Guidelines, 2012-2032, information and communication technology (ICT) is a strategic component that is needed to achieve the university's goals. The application of ICT in education, research, service, and university governance is expected to be a catalyst for the realization of the university's vision. The application of ICT is also expected to be a reference and strengthen the reputation of the University. ICT Strategy Guidelines 2012-2032 explains that Information and Communication Technology (ICT) plays an increasingly important role in helping the university to collaborate in the fields of research and education. Based on the results of documentation and interviews with several respondents, the role of IT at the university

is to facilitate the achievement of tri dharma, achieve organizational goals, and improve the process.

5.2. IT Investment Governance

5.2.1 Structure

The parties involved in IT investment governance are the Directorate of Resources and Information Systems (DRIS) and the Vice-Rector of Planning, Finance, and Information Systems. The university has a special department and vice-rector who directly deals with technology and information systems and is responsible to the Rector for carrying out his roles and responsibilities. Both parties have their respective roles and responsibilities clearly defined. The roles and responsibilities of DRIS are to formulate policies, plan, consolidate, supervise, optimize, and evaluate the application and utilization of ICT infrastructure as a whole. In DRIS, there is an IT director who is assisted by a secretary and several sub-directorates. All IT-related activities are all under DRIS coordination. In carrying out its duties, DRIS cannot run alone, and it needs to involve other units and coordinate with the Vice-Rector of Planning, Finance, and Information Systems.

The Vice-Rector of Planning, Finance, and Information Systems play a role in monitoring and providing suggestions for improvement regarding the planned IT investment at the university. The ICT infrastructure development process is a proposal submitted by the work unit and accommodated by the Directorate of Resources and Information Systems (DRIS) to be realized in the Annual Work Plan and Budget, which is aligned with the university's strategic plan and campus master plan. The approval and focus of development are also determined by the Vice-Chancellor for Planning, Finance, and Information Systems. Some of these explanations are also supported by the Rector of The University Regulations and several other sources obtained from the DRIS website.

IT investment decision making is centralized so that the working units must coordinate in advance with DSSDI when they want to perform IT investments or do some development of information systems. Everything is under DRIS coordination. After that, the need for investment will be decided by the budget committee, then will

be sent to the Academic Senate. Then the IT investment will be highlighted, considered, and given input. After the Academic Senate, the process will be sent to the Board of Trustees (BoT). The Vice-Rector of Planning, Finance, and Information Systems will make a presentation and discuss the IT investment needs. Then, BoT will provide input. When the IT investment needs are approved, the BoT will issue a decree with approving the budget.

Based on the Financial Statements for the year ended 31 December 2016, stated that other assets in the form of software reached 4 billion. Also, the amount of IT investment budget reached tens of billions. When viewed from the percentage level, the IT investment budget is approximately 5% of the total budget. Even though the percentage is quite small, but if it converted to rupiah, the numbers are quite large. Based on the results of observations and interviews with several respondents, prioritized IT investments in 2018 are access points, internet connections, hardware and software development, and investment in tax application.

Another problem that arises is that the investment decisions and IT priorities at the university are still based on common or shared goals or interests. Based on Rivenbark et al. in Hartono and Abdillah (2016) stated that investment decisions in the public sector must be based on several perspectives on the development of internal processes and the provision of good services. Not all investment decisions and IT priorities carried out at the university are linked to the development of internal processes, but rather to the approved budget and work units that proposed IT investments.

5.2.2 Process

University Strategic Planning is based on the Government Regulation of the Republic of Indonesia and University Strategic Plan 2012-2017. The drafting of the strategic plan does not only involve top management, but students are also involved in the preparation of strategic plans. Based on the strategic plan, an operational plan is prepared. The operational plan will be deployed to all faculties used to prepare the

budget. This does not rule out the possibility of input to change the operational plan, targets, or activities.

IT strategic planning cannot be carried out individually. Each unit or department at the university only took the initiative and then communicated it to the unit responsible for IT strategic planning. IT strategic planning is based on the University Strategic Plan. ICT strategy guidelines are also used as the formulation of IT strategic plans. The guidelines refer to the Decree of the Rector of The University concerning Guidelines for Information and Communication Technology Strategies.

The organizational governance framework refers to the Regulation of the Board of Trustees concerning Organizations and Governance. The governance principle is conveyed in CHAPTER VI, Article 14. University governance is also contained in the General Policy of 2012-2037, which is stated in the Regulation of the Trustee Council.

The scope of IT investment governance within the university ensures that information technology investments are in line with the strategic direction, themes, and priorities of the university written at the university's strategic plan. Thus, the university focuses on good IT governance, including the regulation of data access rights, IS development governance, and the adoption of governance frameworks and ICT management. However, what remains a problem is that a clear IT investment standard or governance framework has not been implemented, which can be used as a guideline for work units in carrying out their activities. So that there are still difficulties in handling problems in each user in each work unit at the university.

5.2.3 Relational Mechanisms

Relational mechanisms involve the organization's ability to provide active participation and collaborative relationships between the board, IT management, and line managers (Peterson, 2004). Thus, to achieve effective IT investment governance, there needs to be good communication and participation or collaboration relationships between the parties involved, especially between the CIO or IT Director and top management. Based on the results of the interviews, both the CIO or IT Director and top management coordinated to carry out their duties.

The university has the Vice-Rector of Planning, Finance, and Information Systems, whose task is to monitor and suggest improvements to IT implementation in the university environment. It requires the involvement of top management to integrate IT initiatives because the work units at the university cannot develop themselves; there needs to be coordination first. There must be top management who initiates and manages so that it is integrated.

The work rotation of IT staff is very rarely done. If referring to the Rules of the Trustee Council concerning Organization and Governance, rotation of the work of IT staff is five years. Organizational communication systems within the university can be done through routine coordination and leadership meetings. This is needed to communicate what tasks need to be done to get optimal results.

5.2.4. Top Management Team Background

Top management plays an essential role in shaping organizational strategic choices and directing organizational goals. The involvement of top management influences the implementation of effective IT governance in determining the priorities of IT investment projects within the organization. Information and Communication Technology Strategy Guidelines 2012-2032 states that universities need to take steps to ensure that all lecturers, employees, students get the basics of information literacy skills and ensure that all understand the responsibilities and ethics of using information. Socialization, campaigns, and other creative activities need to be encouraged to disseminate the use of ICTs appropriately. The findings of researchers in the field found that top management attended training, workshops, and socialization.

5.3. Information Technology Performance

Based on the results of observation, documentation, and research interviews, it was shown that the IT performance at the university was going well even though there were still some weaknesses. This is indicated by the existence of several IT initiatives

that are aligned with the goals of the organization, and IT continuously contributes to organizational flexibility and management of optimal IT resources.

IT initiatives that have been carried out by the university are in line with the goals of the organization, helping to produce relevant, timely decisions, create more information, increase transparency and collaboration between institutions. This shows that harmony between IT and the organization has been created. Some IT initiatives carried out to contribute to increasing organizational flexibility. This is evidenced by the making of some transaction processing systems. The system helps the work units and academics to carry out their activities more effectively and efficiently.

Although some IT initiatives have been carried out to provide benefits and convenience, in reality, the system does not eliminate all processes. There are still several processes that cannot use the system so that the unit or department still does its work in duplicate. At present, the university is trying to prepare a more dynamic and practical system. For example, the need for planning approval and accountability letters will no longer use files, and all are expected to have used the system. The optimal management of IT resources will provide significant benefits to the university. These benefits are included in the university strategic plan for 2012-2017. In the strategic plan explains in detail that the university has utilized and developed information systems and technology to support the implementation of academic activities.

IT investment governance is one of the factors that trigger the increasing performance of IT in the university environment. That is, the more effective IT investment governance, the more effective IT performance at the university. This IT performance will be more effective in the future when the IT investment governance at the university has been improved even better, both regarding structure, process, relational mechanism, and also the background of the top management team.

5.4. Organizational Performance

Based on the results of interviews, documentation, and observations related to organizational performance, it was found that organizational performance was good

and effective. This is evidenced by the organization's operational efficiencies that are quite effective, transparency of results that are following the rules and regulations, internal process innovations that increase unit or department activities and service improvements at the university.

The university has made policies and standards regarding financial management, including IT investment budgeting. This policy is contained in the University Annual Budget and Action Plan and is carried out consistently. However, not all investment decisions and IT priorities at the university are linked to the construction of internal processes, but rather to the approved budget and work units that proposed IT investments.

Organizational performance can be effective because it is also supported by good IT performance. The results of the analysis show that IT initiatives carried out by the university are in line with organizational goals, helping to produce relevant, timely decisions, create more information, increase transparency and collaboration between institutions. This shows that harmony between IT and the organization has been created.

6. Conclusions, Implication, Limitation

Based on the results of this study, suggestions that can be given related to IT investment governance are, first, the determination of the IT governance framework needs to be applied at the university. The framework can be used as a guide for all work units within the university in carrying out activities related to IT. The adoption of governance standards, such as Control Objectives for Information and Related Technologies (COBIT), needs to be reviewed for implementation. Secondly, IT investment decisions at the university should be based on the university's mission and several points of view on the development of internal processes and the provision of good services. Third, conduct regular evaluations related to IT investment governance in handling problems for each user.

IT investment governance at one of the largest universities in Indonesia is still in the process of development, but it has run quite well even though it cannot be said to

be ideal. This is evidenced by the existence of clear roles and responsibilities related to the structure of the IT organization at the university, IT strategic planning that is in line with the university strategic plan, determination of IT investment decisions by involving several parties, and the existence of policies and guidelines related to IT governance. There is a Directorate of Resources and Information Systems (DRIS) and a Vice-Rector of Planning, Finance, and Information Systems, specifically in charge of information technology and systems at the university.

Although it works quite well, the governance of IT investment at the university cannot be said to be effective because it still has weaknesses; namely, the university still does not have a clear IT governance standard or framework. Thus there are still difficulties in handling the problems of each unit at the university. IT investment decision making is still centralized so that units must coordinate first with DSSDI. Also, not all investment decisions and IT priorities at the university are associated with the construction of internal processes, but rather to the approved budget and units that proposed IT investments.

IT initiatives undertaken by the university have been in line with organizational goals, helping to produce relevant, timely decisions, create more information, increase transparency and collaboration between institutions. This shows that harmony between IT and the organization has been created. Also, the university has made policies and standards regarding financial management, including IT investment budgeting. This policy is contained at the university Annual Budget and Action Plan and is carried out consistently. However, not all investment decisions and IT priorities at the university are linked to the construction of internal processes, but rather to the approved budget and units that proposed IT investments.

The contribution of this research is to add insight into the influence of IT investment governance on information technology performance and organizational performance. This research is expected to provide benefits and useful input for the organization in evaluating the governance of IT investments so that organizational performance will improve. There are some weaknesses in this study. First, this research is a case study research that raises the problem of generalization. Second, the

indicators assessed in this study were obtained based on the subjective assessment of researchers through interviews. Third, this study is only limited to six respondents to the people responsible for IT investment governance at the university. Future research can use a survey to assess IT investment governance at the university, and further research can expand the scope of research into other fields because there is still little research related to IT investment conducted at the university.

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