Does the Adoption of IT Governance Affect a Company's Financial Performance?

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Abstract

There had been many IT failures over the past 40 years due to high correlation of IT spending with risk. The increasing rate of IT investments has led to more attention and action with regard to the implementation of IT governance. While IT investments consist of large amounts of money and it may affect firm performance. An effective IT governance can leverage IT performance and in the end influence firm performance. This thesis focuses on IT governance and its relation to financial performance using companies listed on the Indonesian Stock Exchange (IDX) over the sample period of 2007-2014. This study uses IT governance performance and financial performance as measurement tools in firm performance. The empirical results show a positive relation between IT Steering Committee (ITSC) as structural mechanism and IT governance performance. Furthermore, the results reveal that the use of structural IT governance mechanism evidently improves financial performance, particularly in accounting-based measure (ROA). When the IT-related decisions are made by Manager, CIO or other board members, it will have an impact on increasing ROA.

Keywords: IT governance, IT governance awareness, IT governance mechanism, IT governance performance, Financial performance

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CHAPTER 1 - INTRODUCTION

1.1. Background

Currently, companies are facing multiple challenges, such as shareholder's demand for superior performance and a higher pressure of competition from other companies. Globalization is the cause of this phenomenon. One way to overcome these challenges for firms is to support their business operations through optimizing the use of information technology (IT) systems. IT plays an important role in the process of identifying and collecting business transaction data. It is also used to record and present data in a certain form and time (Richardson et al. 2014).

Along with the higher pressure from competition, many companies are using all means to improve their business performance that is reported and sometimes the standard accounting rules are violated for this purpose. Since the Sarbanes-Oxley (SOX) Act was set and implemented in 2002 as a response to several accounting scandals (i.e. Enron, WorldCom, and Tyco), the awareness of the importance of IT adoption has increased. The rules of SOX are intended to improve the reliability of financial reporting through control (Wagner and Dittmar 2006). This is another reason as to why IT is needed for performing risk assessments as well as control design and monitoring (Richardson et al. 2014). IT implementation in a company is classified as an asset investment, and usually entails high costs. It is therefore of importance to ensure that IT spending creates value (Weill and Ross 2004).

1.2. Research Background

Indonesia has commenced performing business reforms, which make starting a business easier (Doingbusiness 2016). Moreover, Indonesia has a plan to accelerate the economic development through an information and communication technologies (ICT) infrastructure, which is visualized in the Masterplan for Acceleration and Expansion of Indonesia's Economic Development (MP3EI) and the Palapa Ring Project. In MP3EI, Indonesia aims to become a developed country by 2025 with an expected per capita income of US$ 14,250 to 15,500, with a total Gross Domestic Product (GDP) of US$ 4.0-4.5 Trillion (Asean Briefing 2011). The Palapa Ring is a development project to develop a national fiber optic network that will reach 34 provinces, 440 cities/regencies throughout Indonesia. The project will act as the foundation of all operators and users of telecommunication services in Indonesia and integrates with existing network telecommunication operators (Kominfo 2013). This project will encourage the ease of business activities, which is expected to contribute to Indonesian economic growth.

Therefore, companies are expected to use IT to support its business operations and to increase their performance as well as their competitiveness. This is reflected in data from the International Data Corporation (IDC), whereas Indonesia's IT spending in 2014 was US$ 16.8 billion, or a 12.5% increase from 2013 (EU-Indonesia Business Network n.d.). Furthermore, according to the Global Information Technology Report from World Economic Forum, Indonesia's Networked Readiness Index (NRI) ranks for 2014 increased from time to time, which was 64, where its rank on 2013 and 2012 were 76 and 80, respectively (Weforum 2013; Weforum 2014). This rank improvement indicates that Indonesia has strived for the best use of IT to increase its competitiveness and country's economic development as well.

The increasing rate of IT investments should lead to more attention and action with regard to the implementation of IT governance. While IT investments consists of large sums of money and it may affect firm performance. Many researchers in Indonesia are still focused on studying IT investments. The most recent research of IT implementation in Indonesian companies by Handoko et al. (2015) reveals that IT has a positive impact on competitive advantage and firm performance. Earlier research from Ranti (2008) shows unique values as a result from IT implementation in Indonesia, after comparing the effects of IT implementation to other developed countries' cases. The unique values are to reduce subscription and application development cost and to increase companies' image caused by using branded systems as well as following government regulations. These IT business values are attributed to the increasing level of firm performance by giving benefit to the customers, employees, and shareholders. However, these studies did not examine whether the companies implement IT governance or not, whereas as explained earlier, the IT governance is vital in supporting and achieving corporate goals. Hence, this is the motivation to study this topic.

1.3. Problem Statement

There are many studies that examine the impact of IT investment on firm performance in different ways, such as how IT affects a company its products, services and internal processes (Dos Santos et al. 1993), profitability (Mithas et al. 2012), business operation and performance (Rao et al. 2015).

Luo and Bu (2016) also find that IT is important for a firm's productivity, competitiveness or performance, since IT acts as the main infrastructure in coordinating, harmonizing and increasing knowledge. However, sometimes the investments in IT do not deliver the results that are expected. A survey by Gartner in 2002 found that 20 percent of global value or equivalent to $600 billion are only a waste spending of IT, and another survey

of Fortune 1000 Chief Information Officers (CIOs) from IBM in 2004 uncovered that almost half of all IT expenditures are not generating any return for companies (Crutchley 2008). Those surveys imply that it is of importance to implement IT governance in order to find out whether the amount of money spent in IT can deliver the expected results.

While much of the literature focuses on the effect of IT expenditure on firm performance, there is still limited research on the impact of IT governance adoption on firm performance, more specifically what its effect is on financial performance. Research mostly aims to explain and describe IT governance frameworks (Dahlberg and Kivijarvi 2006; Hardy 2006; Chaudhuri 2011). Considering these facts, this thesis aims to examine the financial performance of companies that have implemented IT governance. This study examines the current situation in a developing country, Indonesia, in order to understand the effect and possible value of implementing IT governance, taking into account the country's increasing rate of IT investment since 2013 as mentioned earlier.

1.4. Research Question

This thesis attempts to examine whether there is an improvement in financial performance of companies that have adopted IT governance, in order to answer the following research question:

Does the adoption of IT governance affect a company's financial performance?

1.5. Contribution of the Study

This thesis aims to contribute to current research in examining the impact of IT governance adoption on financial performance in Indonesian companies and may encourage more studies. Furthermore, this thesis result may be useful as an additional literature for other researchers, especially in developing countries, to expand research on IT governance and financial performance.

For practitioners, as Indonesia's government issued IT governance regulation for SOEs, this study provides more insight in understanding the impacts of IT governance on financial performance, not only for SOEs, but also for other companies in Indonesia.

From a managerial perspective, it is important for managers to have an understanding of possible effects of IT governance and financial performance, so they may be able to make better decision for IT-related investments. This study is also relevant for shareholders because as investors they want to make sure that the capital used for IT spending generates maximum value for the company.

1.6. Research Method and Sample Selection

This thesis focuses on IT governance and its relation to financial performance among Indonesian companies that are listed on the Indonesian Stock Exchange (IDX). The sample period is limited from 2007 until the end of year 2014. The time span that has been selected is because the Indonesian government has issued IT governance regulation for State-Owned Enterprises (SOE) in 2007 and since then, consequently, IT governance in Indonesia has been implemented especially for SOE. Another reason is that the latest data of Indonesia's IT spending in year 2014 shows an increasing rate when compared to 2013. The performance measurement takes place two years after IT governance is adopted, because the impact of the IT governance adoption is not instant (Weill and Ross 2004).

This study uses IT governance performance and financial performance as measurement tools in firm performance, and the financial performance are separated into accounting and market based measures. The ordinary least square regression (OLS) method is used to examine whether the adoption of IT governance is affecting financial performance. In order to identify the companies that implement IT governance, several methods are used, such as using internet as a platform to conduct desk study on IT adoption statements, and also directly contact the listed companies by email for the exact starting time. The financial performance data is gathered from the IDX database.

1.7. Structure of the Thesis

This thesis is structured as follows, chapter one, provides an overall view of the research. Chapter two presents a literature review of previous studies on IT governance and financial performance. Chapter three illustrates the explanation of the methodology employed, it concentrates on how this research is conducted to obtain the findings and conclusions. Chapter four presents the results of the data analysis and discussion of the results. Chapter five provides a summary of the research, compares the findings of this study to prior research and gives some possible avenues for further research in this area.

CHAPTER 2 – LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Introduction

This chapter presents a literature review to provide an insight in current theoretical views on and empirical findings related to IT governance and financial performance. The literature review focuses on the basic constructs by defining and reviewing relevant research that has been done in the field of IT governance as well as financial performance. It is necessary to delineate the main concepts as they are used in this thesis because these provide the foundation for the actual research performed for this thesis. The relevant literatures were obtained through Erasmus University Library that gives access to widely known digital libraries such as IEEE Explore, JSTOR, Proquest, Science Direct, Springer Link. Using specific keywords, IT investment, IT governance, information technology governance, business-IT alignment, IT governance mechanisms, and IT governance framework, different studies were selected for inclusion in the review. In addition, the search done from "going backward" and "going forward" as suggested by Webster and Watson (2002) on writing a literature review. To select relevant literature, the criterion used was that studies must explicitly be related to IT governance and its mechanisms. Accordingly, the remainder of this chapter starts by illustrating the importance of and theories related to IT governance. The next section presents financial measurements that are typically used in prior studies. The fourth section provides previous relevant research that examines the relation between IT governance and performance, by explaining the methods used and the results obtained. This section also presents the hypotheses developed based on literature review.

2.2. IT Governance

Essentially, IT governance reflects broader corporate governance principles by emphasizing the use of IT and manage it to achieve corporate performance goals. Since it is often difficult to measure the IT result, companies have to determine on who is responsible for the output to be achieved and to assess how well they attain this output. Therefore, an effective IT governance should answer what, who, and how the decisions of IT investment have been made. "What" illustrates the importance to determine a clear objective of an IT investment, so the implementation of IT governance can be more effective, and therefore can improve a company's performance. Meanwhile, "who" identifies who makes the decisions and who is accountable for each decision. The right "who" person will know the outcome if they comply with a company its goals in each decision domain, so they can aim for the company its

objectives with full responsibility. In other words, the quality of decisions is influenced by who has the right to make decisions. Lastly, "why" associates with IT mechanisms that describe the structures, processes, and communications to implement the desired IT governance. A transparent, well-designed and well-understood mechanisms will deliver the IT governance as expected. On the contrary, if the mechanisms fail to be implemented, the result of IT governance will be undesirable.

IT governance is thus be defined as follows:

"specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT" (Weill and Ross 2004).

The essence of IT governance is on the IT decision making process (Peterson 2004; Simonsson and Johnson 2006), for instance in selecting the best decisions on how to obtain and utilize IT resources (Henderson and Venkatraman 1993). IT governance is addressed to enhance IT performance that can lead to superlative business value, yet remain in compliance with the rules (Bloem et al. 2006). The importance of IT governance is also due to (1) no common perception of IT's value and how to measure its performance which leads to IT performance dissatisfaction, and (2) IT investment is often not considered as a profit-making aspect, despite the cost of IT investment is usually quite large and being capitalized, especially on hardware (Remenyi et al. 2007). Considering the importance of IT governance, it is critical that the board level put greater concern by aligning the business and IT goals so it can generate a maximum business value (Chaudhuri 2011).

A study by Remenyi et al. reveals that there had been many IT failures over the past 40 years due to a high the correlation of IT spending with high risk (Remenyi et al. 2007). On a research conducted in sixteen IT projects, Biehl (2007) discovers that most of the failed IT projects is due to lack of support from top management by not considering IT projects as priority concerns. Moreover, managers from unsuccessful IT projects are ignoring IT synergy across business units, whereas it is important for employees over business units to be involve in IT projects. Another possible reason of unsuccessful IT projects is the lack of knowledge and skills that can lead to employees' resistance to change, as if employees are in their comfort zone and refusing not to adopt new system (Othman and Chan 2013). On the contrary, companies who succeed in implementing IT governance may have an enhancement of firm performance through the business' alignment, accountability, performance measurement, and risk management (Isaca 2003; Weill and Ross 2004; Symons 2005). Therefore, to achieve the certain enhancement, a good IT governance should not only to govern the information and IT

that relate to business process and company's key assets, but also to govern the company's organizational structure and the desired behavior within the company (Bloem et al. 2006). The goals of IT governance are to ensure the daily operational activities provide an excellent service to stakeholders but remains comply with regulations, and also to minimize the risks of wasted investments (Robinson 2005).

An effective IT governance needs to adopt specific IT governance mechanisms such as structures, processes and relational mechanisms in order to get the desirable behaviors (Peterson 2004; Van Grembergen et al. 2004). Structures mechanism relates on how a unit or individual is maintaining to optimize its role and responsibility in making IT-related decisions. Chief Information Officer (CIO) on board, IT strategy committee, or IT steering committee are examples of structures mechanism. The second mechanism, processes, intends to ensure the daily behaviors are consistent with IT policies applied in the company through formal process of strategic decision making, planning and monitoring. Several common frameworks in this mechanism are Control Objective for Information and related Technology (COBIT) and IT Infrastructure Library (ITIL). The last mechanism, relational, focuses on people aspect which is linking two previous mechanisms and it aims on enabling better communication within the company to build trust and respect among stakeholders (Maes et al. 2011).

IT governance implementation is important to be fully supported by top level management. With a board its commitment, the existing IT investments are expected to optimize a company its daily operations and maximize return from its IT investments (Nolan and McFarlan 2005). An illustration of a board its commitment is an IT strategy/steering committee, because it consists of senior level management that have the authority for setting priorities, reviewing all the sources required, and managing conflicts among users' interest (McKeen and Guimaraes 1985; Boritz and Lim 2007). A good IT project depends on the effectiveness of selection process, and the steering committee is crucial in this process to ensure IT spending is aligned with company's objectives. However, there is a difference in viewing the importance of IT steering committee in a study by Huang et al. (2010). They use interview as a method of collecting data in a comparative case study to identify authority degree, the involvement of senior management in IT governance process, IT governance communication policies and the success in IT use. One of third organization found to have no IT steering committee in its organizational structure and this organization argued that the IT-related issues still can be discussed through informal interaction between CIO and senior managers. From this study it can be concluded that each company can design their own IT governance mechanisms which are most relevant to its business strategy and culture. Since each company

has its own characteristics, the mechanisms that works best for one company may not suitable for another (Weill and Ross 2004).

2.3. Financial Performance

Financial performance (as well as operational performance) relates to firm performance in creating more benefits than costs, and it is usually reflecting company's value (Venkatraman and Ramanujam 1986; Saraf et al. 2007). According to Palepu et al. (2013), a company's value is determined by its profitability and growth that influenced by product market and financial market strategies. The product market strategy relates to company's competitive strategy, operating policies, and investment decisions. Meanwhile, financial market strategies relate to financing and dividend policies. Each strategy is projecting the competitive advantages that can influence company's value. Not only useful in reflecting value, financial performance is often used to get company's health overview (Remenyi et al. 2007). It can be obtained through financial statement so the managers can predict various things from free cash flow, dividends to future earnings, and therefore the investors can use this information related to the investment decision. In other words, financial performance is useful to both management and investors, to help anticipate future conditions and, more importantly, as a planning tool to improve company's future performance (Brigham and Ehrhardt 2008).

Financial performance is commonly measured by using accounting-based or market-based measures (Tanriverdi 2006; Ravichandran et al. 2009; Lim et al. 2011). Accounting-based measures relate to financial ratios such as revenue, sales, return on investment (ROI), return on equity (ROE), and return on sales (ROS) (Mahmood and Mann 1993; Rai et al. 1997; Tanriverdi 2006), which reflect company's ability in making profit from its operations. Although these ratios useful in indicating company's profitability, however, each has its own role. For instance, revenue can reveal how much the cost for IT spending, ROI to measure the efficiency of IT investment, and ROE can discover how much profit a company earned with the invested fund (Rist and Pizzica 2014). Meanwhile, market-based measures are based on stock price or stock market returns. Tobin's Q is the most common ratio used in recent research to observe IT effects on firm performance (Tam 1998; Bharadwaj et al. 1999; Hitt and DJ Wu 2002; Tanriverdi 2006).

In relation with IT topic, numerous studies have been conducted to examine the relation between IT investment and financial performance. Most of the studies support IT investment and financial performance improvement, such as the decreased of operating expenses (Harris and Katz 1991), higher ROA (Rai et al. 1997), higher Tobin's Q (Bharadwaj et al. 1999).

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However, a study conducted in four Asian countries found contradictive results (Tam 1998). In this study, computer capital as IT spending is positively associated with ROA in Singapore, whereas in Taiwan it comes with the opposite result. ROS is negatively associated with computer capital in Hong Kong, meanwhile ROE is found to have positive relation with computer capital in Singapore and Malaysia but negative in Taiwan. Earlier study by Hitt and Brynjolfsson (1996) which is using United States (US) data also have variety financial performance results; positive relation between IT stock and ROA but no relation is found between IT stock and ROE. The diverse results signify that different characteristics may exists in a research such as firm size, industry, company's culture, or government policies that can influence the financial performance, and therefore it need to be considered in a research.

2.4.   IT Governance and Firm Performance

As discussed in previous section, IT governance mechanisms (structures, processes, and relational mechanisms) are better not to be used separately in order to produce an effective IT governance that will leverage IT performance. This, in turn, will enhance company's reputation, trust, product and market leadership, as well as cost reduction, or in other word it will contribute to better firm performance (Bharadwaj 2000; Weill and Ross 2004; Bowen et al. 2007). The commitment of top level management in IT governance is essential in communicating the role and responsibilities of related parties in IT governance (De Haes and Van Grembergen 2004). In addition, adequate knowledge of IT in board level can accelerate IT investment decisions yet remain on budget (Nolan and McFarlan 2005). Boritz and Lim (2007) confirm this theory by conducting a study on US public companies. They argue that board of directors and executives should have knowledge in IT so they can initiate IT-business alignment and guide management to be effective in selecting IT investments. Moreover, they explicitly express that IT knowledge can enhance an effective IT governance and can lead to financial performance improvement. Using IT strategy committee and CIOs as IT governance mechanisms and several ratios (i.e. return on assets (ROA), ROS, and growth) as financial performance measurement indicators, they find that companies adopted IT governance have better financial performance, compared to non-adopter companies. The research result successfully demonstrated to business leaders that the decision to do IT investment and followed by IT governance implementation will not undermine financial performance.

A recent study confirms prior research and found that IT governance improves financial performance, particularly in profitability Lunardi et al. (2014). This is based on study using data from Brazilian companies that listed at Sao Paulo Stock Exchange, by comparing financial

performance between adopter and non-adopter companies before and after IT governance implemented. From total 405 listed companies taken in the year 2001-2007, 101 companies were identified as IT governance adopters with various type of IT governance mechanisms. Afterward, the financial performance measurements are categorized into three measures, such as profitability measures (ROE, ROA and profit margin), productivity measures (assets turnover, operating margin and operating expense to sales), and market measures (sales growth and share repurchase). Each measurement reflects the financial performance of Brazilian companies that might affected by IT governance implementation. The research result shows that the profitability in companies adopting IT governance are having improvement in the year post-adoption than the year in which IT governance was adopted. Meanwhile, there are no evidence that the market and productivity measures were associated with IT governance implementation, which is contrasting Neirotti and Paolucci (2007) study. Neirotti and Paolucci indicate there is a positive correlation between IT governance and productivity. They conclude that a company's productivity (in terms of cost reduction) will increase if the company success integrating its IT investments portfolio. Through an integration, it can eliminate unnecessary investment and stimulate new innovations at once. In addition, their research result confirms the importance of business and IT alignment as critical success in IT governance that can enhance firm performance (Weill and Ross 2004).

An effective IT governance also relates with IT-related decision making authority that is important to be placed close to the source of information where such decisions need to be made (Sambamurthy and Zmud 1999). Before SOX Act implemented in 2002, IT-related decisions were executed in business unit (or subsidiaries) and any existed IT-related issues mostly were delegated to IT professionals (Henderson and Venkatraman 1993). Nowadays, most large companies that have subsidiaries in general, often use the centralized decision making model which means that IT-related issues are decided at headquarter. This centralized model is widely used especially since the enactment of SOX Act to minimize IT risks, strengthen internal control, and support the business strategy that aligned with IT resources (Henderson and Venkatraman 1993; Weill and Ross 2004). An excellent synergy of business units is needed in IT-business alignment to improve firm performance (Tanriverdi 2006). The synergies are derived from multi IT resources integration (i.e. IT strategy-making processes, IT-HR management processes, and IT vendor management processes) which also complements the functions of each resources. Furthermore, this research reveals that even though one single IT resource has value for itself, however, it does not have significant impact on firm performance. The research therefore provide evidence that the IT synergy across business units

leads to higher financial performance, by examining its effect on accounting and market-based measures.

Two years later, Gu et al. (2008) conduct a study using US and Canadian business foundation data, and discover similar result. This study attempts to measure IT governance misalignment impact on financial performance. They illustrate IT governance misalignment as non-functioning IT applications when being used, and consequently it can interfere company's daily operations as well as integration among business units. By adopting the same financial performance measurement as Tanriverdi (2006), this study reveals that high IT governance misalignment leads to lower financial performance, and the misalignment indicates poor IT governance. These findings are in line with prior studies which state that IT governance is essential in gaining return from IT investment (Isaca 2003; Weill and Ross 2004; De Haes and Van Grembergen 2004).

To summarize, there are numerous studies investigate relation of IT governance mechanisms to IT governance success, but little discusses the impact of IT governance implementation to financial performance. If so, the studies mainly focus on only one financial performance measure; either accounting-based or market-based measures. in addition, most of the studies are conducted in developed countries. Due to differences in economic growth and other characteristics, the research result conducted in developed countries may not be applicable in developing countries. Thus, in attempt to answer those gap, the purpose of this thesis is to contribute in existing literature, by providing evidence whether IT governance implementation in Indonesia as a developing country influence financial performance. Furthermore, this study covers both accounting and market-based measures in financial performance that can reveal how effective the companies in using their assets, and how the performance of IT governance adopters can be reflected in market value.

2.4.1. IT Governance and Performance

It has been stated previously that the effective IT governance can leverage IT performance and in the end will influence firm performance. An effective governance in IT is essential as it can help companies in reducing overall costs, or even to avoid unnecessary expenses (Weill and Ross 2004; Liang et al. 2011). In addition, it can improve business values such as an increase in customer satisfaction around 15% to 20%, a decrease for almost 10% in IT budget due to the effectiveness in IT projects decision (Isaca 2013), or a 20% higher in IT investment return compared to competitors with the same business strategy (Weill and Ross 2004). Some companies even make IT investments to gain competitive advantage and increase

their market share (Weill and Ross 2005). For these reasons, it is obvious that many companies are making IT investments even though it costs a lot. The high amount of IT spending then should be followed with IT governance in order to prevent loss from ineffective spending. Based on research, companies with good IT governance earn higher return than companies with poor governance (Weill and Ross 2004).

A successful IT governance can be seen from boards' support for IT governance implementation. For instance, assign senior managers to have IT governance awareness and communicate the need of IT governance to other employees within the company. Senior managers are expected to act as role model of IT governance awareness, so other employees will follow and implement it in daily operation, and eventually it became company's culture (Weill and Ross 2004). With IT governance awareness, a certain goal of IT performance is expected can be achieved. Thus, for the first hypothesis, I predict that companies who have more awareness in IT governance will have higher IT governance performance.

H1.   IT governance awareness has a positive relation with IT governance performance

Besides IT governance awareness, as described in previous sub-section, the success of IT governance is determined on how well a company designs the most suitable mechanisms (structures, processes, and relational mechanisms) to be used and then consistently implementing it (De Haes and Van Grembergen 2004; Van Grembergen et al. 2004; Weill and Ross 2004; Weill and Ross 2005). Structures mechanism relates on how the IT-related decisions are made, by optimizing each individual or unit role and responsibilities. IT strategy committee, IT steering committee, or CIO on board are common examples of this mechanism. Processes mechanism goals are to ensure the company's IT policies are implemented and reflected in employees' daily behaviors. Several frameworks in this mechanism are COBIT and ITIL. Relational mechanism links structures and processes mechanisms in order to enable better communication within the company to build trust and respect among stakeholders (Maes et al. 2011).

Have a careful planning of these mechanisms is important since each company have different characteristics that depends on its scale of business or the industry type, for example. Different companies therefore might have different mechanisms as well. Those determinants of IT governance, if continuously implemented, will create an effective IT governance and therefore the maximum business value can be achieved (Robinson 2005). In second hypothesis,

I predict that companies who applied IT governance mechanisms will have enhancement in governing IT effectively.

H2. IT governance mechanisms have positive relation with IT governance performance

2.4.2. IT Governance Adopters and Financial Performance

By implementing IT governance, the firm's performance is expected to be increased through IT governance values and benefits. These benefits are mostly associated with firm performance which refers to companies' effectiveness in financial and operational performance, relative to their competitors (Venkatraman and Ramanujam 1986; Saraf et al. 2007). The operational performance relates to non-financial benefits perceived by stakeholders and it also relates to individual perception, for instance an employee's convenience in performing day-to-day activities efficiently by using an IT-based system, or satisfaction of a bank customer due to the easiness of having transactions using an IT-based system. Meanwhile, the financial performance relates in measuring everything using numbers. It has a clear figure of calculation and the result can be seen straightforward (Remenyi et al. 2007). Weill and Ross (2005) suggest that an effective IT governance need to be clearly reflected in financial performance measurement.

There are two common significant financial performance indicators used in prior literature, namely accounting-based measures and market-based measures (Tanriverdi 2006; Gu et al. 2008). Accounting-based measures intends to find out how effective the companies in using their assets to achieve corporate objectives. Since IT investment is considered as company's assets and it needs to be governed, therefore the effectiveness of a company in using its assets can be reflected in this measurement. Meanwhile, market-based measures reflect market valuation of a company. Information of companies that started adopting IT governance will be captured by investors, and they presume that companies who adopted IT governance will have better performance.

As stated previously, the main sign of an effective IT governance is to use IT governance mechanisms to improve financial performance (Boritz and Lim 2007; Lunardi et al. 2014). Thus, I predict that companies who adopted IT governance will have improvement in its financial performance, particularly in both accounting and market-based measures.

H3. IT governance adopters are more likely to have higher financial performance

2.4.3. Libby Boxes

In order to provide an overview of the conceptual relation examined, it is important to construct a predictive validity framework This predictive validity framework is also known as Libby Boxes (Libby 1981). The Libby Boxes helps to show how the conceptual research design is executed.

Libby Boxes are used in order for a study to be efficient and effective through the use of internal, external, and construct validity (Libby et al. 2002). The Libby Boxes contains five links and boxes which consist of the measured variables, the independent variable, dependent variable, and control variables. The five links illustrate the internal and external validity and also the relation between variables. The Libby Boxes in this research are presented in Figure 1.
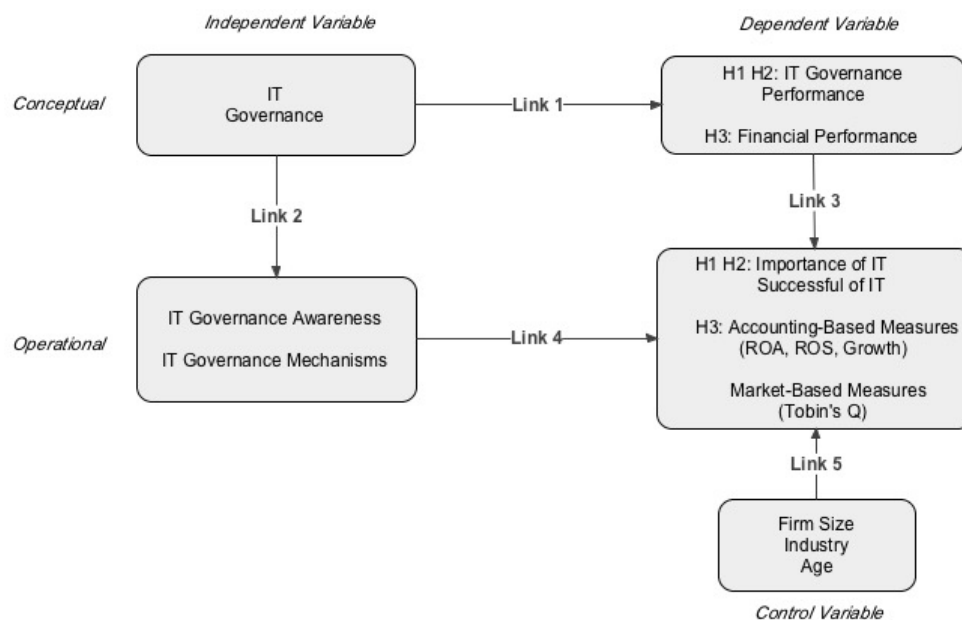
Figure 1: Predictive Validity Framework Libby Box

The construct validity refers to how the operational variables are measured and that this measurement represents the conceptual variables (Bisbe et al. 2007). It is reflected in the second and third links by demonstrating on how to measure both independent and dependent variables. The independent variable is operationalized by assigning a set of questions to respondents so the IT governance awareness and IT governance mechanisms can be identified.

Furthermore, the dependent variable is operationalized through IT governance performance by measuring the importance and successful of IT that is used. To analyze the IT governance performance, a set of questions is distributed to the respondents. Another dependent variable, financial performance is operationalized by accounting and market based

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measure. The accounting-based measure used are Return on Assets (ROA), Return on Sales (ROS), and growth. Meanwhile, the market-based measure used is Tobin's Q.

The internal validity addresses the relation of independent and dependent variables, and it must be ensured that the observed results are from the impact of independent variable to dependent variable. In other word, internal validity can be achieved through testing the conceptual theories by examining relation between independent and dependent variable. Internal validity is shown in the fourth link. The data used are from primary and secondary data. The primary data is obtained from a survey distributed to IDX public listed companies, whereas the secondary data is for financial performance (ROA, ROS, growth, and Tobin's Q) that collected from IDX website. In addition, there are other factors, or known as control variable, that might potentially influence the dependent variables (IT governance and financial performance), such as size of the firm, age of the firm, and industry type. The use of these control variables determines higher internal validity.

Regarding the external validity, which is reflected in the first link, relates to whether the results can be generalized to other measurement methods, time periods or either the samples observed. This research focuses on Indonesian public listed companies from 2007 to 2014. Since it focuses only on one country, therefore the research result cannot be generalized to other countries, yet it can still be applied to other developing countries that have similar characteristics as Indonesia.

CHAPTER 3 – METHODOLOGY

3.1. Introduction

This chapter outlines how this research is done and what models are used to help in answering the research question stated earlier. In this chapter, firstly it will explain the data and variable used, including the source of data. In general, this study uses primary and secondary data. The primary data is derived from a survey distributed to Indonesian Stock Exchange (IDX) public listed companies, and the secondary data sources from IDX website to obtain the company financial report. The last part of this chapter describes the method of analysis that is used in analyzing the hypotheses.

3.2. Data and Variable

3.2.1. Data and Data Sources

This research sets its focus on Indonesian public listed companies on Indonesian Stock Exchange (IDX). Public listed companies are obliged to submit its financial report and to have transparency in presenting company's information. This will facilitate in obtaining the required data for conducting the research. The time span for this research is limited from 2007 until 2014 due to the increasing rate of IT spending and the enactment of IT governance regulation in Indonesia. From the listed companies on IDX, companies that adopting IT governance have to be identified. The first step to be done is to deploy questions by contacting the IT department in listed companies through email. The questions' main goal is to find out whether the companies adopted IT governance or not. The questions sent to the companies consist of following questions:

1) *Does your company consider IT as an important factor in supporting company's goals?*

2) *Who makes every IT-related decision in company's structural organization? And to whom the decision maker has to be accountable for?*

3) *Does your company implement IT governance?*

4) *If the answer of question (3) is "Yes", since when did the implementation period start?*

5) *What kind of IT governance mechanisms does your company use? (Choices are given)*

6) *In communicating IT-related policies to employees, what kind of media does your company use?*

7) *Are there any regular meeting being held to discuss IT-related issues, and who are the participants included?*

The first and second questions relate each other in order to know whether there is full support from company's management, if the company does consider IT as important factor in achieving company's goals, and also to know whether IT governance awareness exists. The third question purpose is to identify which adopters and non-adopters company in order to compare each financial performance between the two groups. The next question acts as continuation of the third question, to analyze the financial performance by taking the beginning implementation period as started point and compare the financial performance before and after implementation. The three last questions intent to discover which IT governance mechanisms adopted by a company.

Another method in identifying IT governance adopters is by using internet as a platform to conduct desk study on IT governance adoption statements. The information needed will be traced through the company's annual reports, which are available on IDX and company's website. When searching in the annual reports, several keywords will be used such as "IT governance" and "IT steering committee". These keywords represent IT governance adoption in a company. An additional important information can also be seen from company's organizational structure. When a company puts IT in the organization structure (i.e. CIO or Head of IT), the company then has given its support to IT governance implementation. Therefore, this research also observes the organizational structure contained in the annual report to discover whether a company has an IT function, so the IT governance adopters can be identified.

3.2.2. Dependent Variable
IT Governance Performance

There are four objectives to measure IT governance performance (ITPERF) as identified by Weill and Ross (2004), which are cost-effective use of IT, effective use of IT for growth, asset utilization, and for business flexibility. These objectives imply that IT governance performance correlates with the desired performance outcome. For example, companies that have better IT governance may have reducing overall costs or unnecessary expenses in IT investment. A set of questions will be used in assessing ITPERF as follow:

Figure 2. IT Governance Performance Survey

Source: Weill and Ross (2004)

The answers from both questions are then summed and the performance is calculated using following equation:

$$ITPERF = \frac{(\Sigma_{n=1\,to\,4}\,(Q_1+Q_2))*100}{\Sigma_{n=1\,to\,4}\,(5*Q_1)} \tag{1}$$

Financial Performance

As explained earlier in Chapter 2, this thesis uses two-based financial measurements as dependent variables in regression analysis, which are accounting-based measures and market-based measures. All financial data will be obtained from company's financial report in IDX website.

Accounting-Based Measures

This measurement is following prior studies from Tanriverdi (2006) and Boritz and Lim (2007). Their research used financial ratios in measuring firm performance. It basically reflects company's profitability, and it is useful in providing information to forecast company's future profitability.

✓ Return on total assets (ROA) is considered as a signal of how well a company use its assets to generate earnings before fulfilling its obligations to be paid off.

$$ROA = \frac{Net\ Income}{Total\ Assets}$$

- ✓ Return on sales (ROS) is also known as operating profit margin ratio. It indicates company's ability to generate profit from its sales. A higher ROS means a company's performance is more efficient and lower ROS reflects that the company is having financial issues.

$$ROS = \frac{Net\ Income}{Sales}$$

- ✓ Growth is measured by calculating year-to-year percent change in sales. This ratio indicates a company's health. A healthy company is reflected through its growth rate of sales. Therefore, a declining rate of growth in a company will be needed serious attention from its management.

$$Growth\ (GR) = \frac{(Current\ Period\ Sales - Previous\ Period\ Sales)}{Previous\ Period\ Sales}\ x\ 100\%$$

Market-Based Measures

Tobin's Q will be used in measuring company's future performance based on financial market valuation (Tanriverdi 2006). This ratio can be useful in predicting profitable investment opportunities and in measuring the value of technological assets (Bharadwaj et al. 1999), by comparing total market value of the firm to total value of its assets.

$$Tobin's\ Q\ (Q) = \frac{Total\ Market\ Value\ of\ the\ Firm}{Total\ Value\ of\ its\ Assets}$$

3.2.3. Independent Variable

IT Governance Awareness

IT governance awareness (ITAWA) is a dummy variable which equals one for senior managers that have IT governance awareness, and zero otherwise. This variable is identified by distributing questions to companies, for instance how well they realize the importance of IT governance, how well they define it, and do they have concern of communicating IT governance to their employees.

IT Governance Mechanisms

IT governance mechanisms consists of three mechanisms, which are Structures (ITSTR), Processes (ITPRO), and Relational (ITREL). Each mechanism is a dummy variable which equals one for companies that adopting IT mechanisms, and zero otherwise. This variable is identified by distributing questions to companies through email.

3.2.4. Control Variables

Firm Size (FIRMSIZE)

Larger companies will likely have diversity in products and/or services, to produce in a large scale, and have more access to technology (Leng 2004). In addition, small and medium companies may not have sufficient resources for IT-related investments (so as IT governance) as much as large companies, and therefore it can affect their IT governance performance as well as their financial performance. Firm size can be measured using natural log of total assets (Lee et al. 2008).

Industry Classification (INDUSTRY)

Industry can influence the association between IT investment and firm's financial performance. As described earlier, IT investment decisions is best followed with IT governance for its benefits, especially in cost effectiveness. It is possible that the firm's financial performance is differ among different industries. For example, companies in financial industry put higher investment in IT than other industries in order to increase customers' easiness and safety. Thus, this study includes dummy industry to control industry effect on IT governance in relation with IT governance performance as well as financial performance.

Age of Company (FIRMAGE)

Unlike newborn firm, a mature firm may likely have better firm performance due to the experienced in managing its business, in recognizing the business environment, or in designing the most suitable business strategy. The newborn or young firm still need to observe and determine the best business strategy to be applied in their company. Moreover, older companies tend to have more relations for accessing any information relates the business. In this study, age is the logarithm of the number of years since the company was listed on IDX.

3.3. Method of Analysis

The first and second hypotheses are intended to examine whether IT governance awareness and IT governance mechanisms have impact on IT governance performance. Those hypotheses will be tested using following model:

$$ITPERF_i = \beta_0 + \beta_1 ITAWA_i + \beta_2 ITSTR_i + \beta_3 ITPRO_i + \beta_4 ITREL_i + \gamma_1 FIRMSIZE + \gamma_2 INDUSTRY + \gamma_3 FIRMAGE + \varepsilon_i \qquad (2)$$

where ITPERF is the IT governance performance, ITAWA is a dummy variable which equals 1 for senior managers that have IT governance awareness and 0 otherwise, ITSTR is a dummy variable which equals 1 for company that adopting structures mechanism and 0 otherwise, ITPRO is a dummy variable which equals 1 for company that adopting processes mechanism and 0 otherwise, ITREL is a dummy variable which equals 1 for company that adopting relational mechanism and 0 otherwise. SIZE, INDUSTRY, and AGE are control variables and already explained in prior sub section.

The regression model used to test the third hypothesis will be formulated referred to accounting-based and market-based measures. The formulated models are specified as follow:

$$ROA_{it} = \beta_0 + \beta_1 ITSTR_i + \beta_2 ITPRO_i + \beta_3 ITREL_i + \gamma_1 FIRMSIZE + \gamma_2 INDUSTRY + \gamma_3 FIRMAGE + \varepsilon_{it} \tag{3}$$

$$ROS_{it} = \beta_0 + \beta_1 ITSTR_i + \beta_2 ITPRO_i + \beta_3 ITREL_i + \gamma_1 FIRMSIZE + \gamma_2 INDUSTRY + \gamma_3 FIRMAGE + \varepsilon_{it} \tag{4}$$

$$GR_{it} = \beta_0 + \beta_1 ITSTR_i + \beta_2 ITPRO_i + \beta_3 ITREL_i + \gamma_1 FIRMSIZE + \gamma_2 INDUSTRY + \gamma_3 FIRMAGE + \varepsilon_{it} \tag{5}$$

$$Q_{it} = \beta_0 + \beta_1 ITSTR_i + \beta_2 ITPRO_i + \beta_3 ITREL_i + \gamma_1 FIRMSIZE + \gamma_2 INDUSTRY + \gamma_3 FIRMAGE + \varepsilon_{it} \tag{6}$$

Equation (3) to (5) are used for accounting-based measures, while equation (6) is used for market-based measures.

CHAPTER 4 – RESULT

4.1.   Introduction

This chapter presents the results of this research, and firstly it explains the brief description of the questionnaire and the process of gathering the data. The next section provides the descriptive statistics of the data collected, not only the respondent's profile but also the summary statistics of the variable used in analysis. The fourth section describes the result of Cronbach's alpha test, which is used to determine the reliability of the variables. The next section presents the heteroscedasticity test by performing the Breusch-Pagan test as a standard test for heteroscedasticity. The next two sections provide the analysis of testing the hypotheses by conducting the regressions, which is presented in the regression result tables. Finally, the last section describes the multicollinearity tests conducted in this study.

4.2.   Brief Description of Questionnaire

The presented hypotheses in this thesis are examined using questionnaire. It consisted of four parts: IT governance awareness in parts (1) and (3), IT governance mechanisms in part (2), and company and respondent's background in part (4). In IT governance awareness parts, the respondents should fill out their general view of IT governance, their definition of IT governance, and from where they have knowledge of IT governance, whether from training, sharing or government rule.

Meanwhile, in IT governance mechanisms part is divided into four components: structure, process, relational, and IT governance performance measurement. In structure and process mechanisms, the respondents chose which mechanisms are used in their company (CIO, IT Steering Committee COBIT, ITIL or ISO 20000), who made the IT-related decision (manager, CIO or other board members) and does the decision accountable to a higher level. The relational mechanisms questionnaire part required the respondents to choose how IT-related policies are communicated (announcement letter, internal portal, email or give directions in person), whether there was a regular meeting held to discuss IT-related issues, and whether CIO and other board members attended the regular meeting.

In IT governance performance measurement, respondent was required to fill in the company IT governance performance based on outcome and success measure. The last part of questionnaire contains company and respondent's background: number of IT division and total

employee, respondent's age, position and years working. Overall, the content of questionnaire is summarized in Table 1.

Table 1. Summary of Questionnaire

Questionnaire	
Part 1: IT Governance Awareness (10 questions)	
General view of IT governance	ITAWA1
Part 2: IT Governance Mechanisms (11 questions)	
IT governance adoption year	
CIO in structural organization	ITSR1
IT steering committee in structural organization	ITSR2
IT-related decision made by manager	ITSR3
IT-related decision made by CIO	ITSR4
IT-related decision made by others board member	ITSR5
The decision maker accountable to	ITSR6
COBIT	ITPRO1
ITIL	ITPRO2
ISO 20000	ITPRO3
IT-related policies communicated through announcement letter	ITREL1
IT-related policies communicated through internal portal	ITREL2
IT-related policies communicated through e-mail	ITREL3
IT-related policies communicated through directions in person	ITREL4
Regular meeting is held to discuss IT-related issues	ITREL5
CIO attending the regular meeting	ITREL6
Other board member attending the regular meeting	ITREL7
IT governance performance measurement (8 questions)	ITPERF
Part 3: IT Governance Awareness (2 questions)	
Short description of IT governance	ITAWA2
Knowledge source of IT governance: trair	ITAWA3
Knowledge source of IT governance: sharing	ITAWA4
Knowledge source of IT governance: government rule	ITAWA5
Part 4: Company and Respondent's Background (5 questions)	
Number of total employee	
Number of IT division employee	
Respondent's age	
Respondent's current position	
Respondent's years working	

Since the questionnaire was completely conducted in Bahasa Indonesia, therefore all the questions were translated into Bahasa Indonesia before sent to the companies. Firstly, a small pilot study among three IT managers was conducted. This pilot study was done to get a picture whether there were ambiguities with the questions. The main adjustment was that a few of questions were fixed. The questionnaires were distributed from December 2016 to May

2017, by sending email to 267 companies, particularly to IT department. However, until January 2017 the email returned was only six questionnaires even though phone call as follow up action has been made. Due to the result was not as expected, make a company visit to collect the required data is taken. Until May 2017, the questionnaires received and completed were 64 or around 24%.

4.3. Descriptive Statistics

Descriptive statistics are used to summarize the data collected in a clear and understandable way. Based on table 2 below, most survey respondents were aged in the range of 35 - 44 years old (67.19%), followed by aged 25 - 34 years old (20.31%), and respondents aged above 45 years old were only 12.5%. Moreover, it also can be seen that 39 respondents have work experience for more than five years (60.94%), 21 respondents have 3 to 5 years work experience, and four respondents have less than three years work experience (6.25%). Another information obtained that there are 40 companies with total employees of over 1000 people (62.5%), while there are 53 companies with IT division employees under 50 people (82.81%).

Table 2. Respondent Profile

Description		Frequency	%
Respondent Profile			
Range of Age	25 - 34	13	20.31%
	35 - 44	43	67.19%
	> 45	8	12.50%
	Total	*64*	*100.00%*
Position	Manager	44	68.75%
	Senior Manager	18	28.13%
	Director	2	3.13%
	Total	*64*	*100.00%*
Years Working	< 3	4	6.25%
	3 - 5	21	32.81%
	> 5	39	60.94%
	Total	*64*	*100.00%*
Number of Employee			
Total	< 500	16	25.00%
	500 - 1000	8	12.50%
	> 1000	40	62.50%
	Total	*64*	*100.00%*
IT Division	< 50	53	82.81%
	50 - 100	4	6.25%
	> 100	7	10.94%
	Total	*64*	*100.00%*

From the total 64 companies, 47 were identified as IT governance adopters, and 17 were non-adopters (Table 3). The companies that adopted IT governance are dispersed in 9 different industries according to IDX's classification. The highest concentration is in finance industry (11 companies) and basic industry (8 companies), followed by agriculture (6 companies), infrastructure and property industry (5 companies, respectively). It turns out that most of IT governance adoption occurred in 2011 (8 companies or 12.5%), and afterwards in 2013 (6 companies or 9.38%).

Table 3. IT Governance Adopters per IDX Industry Classification

Adoption Year	IDX Industry Classification									Total
	Agri-culture	Basic Industry	Consumer Goods	Finance	Infra-structure	Mining	Misc. Industry	Property	Trade Service	
Non-adopters	2	5	1	3	-	2	1	1	2	17
1986	-	-	-	-	-	-	-	1	-	1
2000	-	-	-	1	-	-	-	1	1	3
2004	-	-	-	-	-	-	-	1	-	1
2005	-	-	1	-	-	-	-	-	1	2
2006	-	-	-	-	2	-	1	-	1	4
2007	1	1	-	1	-	-	-	-	1	4
2008	-	-	-	2	-	-	-	-	-	2
2009	-	-	-	4	-	-	-	1	-	5
2010	-	2			2	1	-	-	-	5
2011	1	2	1	3	-	1	-	-	-	8
2012	-	-	-	-	-	1	1	-	-	2
2013	2	3	-	-	1	-	-	-	-	6
2014	1	-	-	-	-	-	-	-	-	1
2015	1	-	1	-	-	-	-	1	-	3
Total	8	13	4	14	5	5	3	6	6	64

Furthermore, from 47 IT governance adopters, four companies were removed due to the IT governance adoption year take place prior the listing year in IDX. Consequently, the final sample is reduced to 43 companies.

A summary statistics of variables used in this research is presented in Table 4. The statistics are computed based on data set of 43 companies listed in IDX between 2007 and 2014. The first five variables (ITPERF, ROA, ROS, GROWTH, TOBINSQ) are dependent variables. ITAWA1 – ITAWA5, ITSR1 – ITSR6, ITPRO1 – ITPRO3, ITREL1 – ITREL7 are independent variables. The other remaining variables, FIRMSIZE to MINING, are control variables. Table 4 also shows that ITPERF, ROA, ROS, GROWTH, and TOBINSQ have 43 observations with a mean 35.418, 0.035, 0.565, 0.488, and 1.351 respectively.

Table 4. Descriptive Statistics for Variables Used

Variables	Observation	Mean	Std Dev	Min	Max
ITPERF	43	35.418	3.863	24.000	45.450
ROA	43	0.035	0.148	-0.384	0.701
ROS	43	0.565	0.525	0.029	2.526
GROWTH	43	0.488	2.272	-0.613	14.834
TOBINSQ	43	1.351	5.811	0.047	38.478
IT Governance Awareness					
ITAWA1 (General View of IT Governance)	43	4.288	0.336	3.400	4.900
ITAWA2 (Definition)	43	0.977	0.152	0.000	1.000
ITAWA3 (Training)	43	0.651	0.482	0.000	1.000
ITAWA4 (Sharing)	43	0.581	0.499	0.000	1.000
ITAWA5 (Government Rule)	43	0.302	0.465	0.000	1.000
IT Governance Mechanisms - Structure					
ITSR1 (CIO)	43	0.349	0.482	0.000	1.000
ITSR2 (ITSC)	43	0.535	0.505	0.000	1.000
ITSR3 (Decide by Manager)	43	0.465	0.505	0.000	1.000
ITSR4 (Decide by CIO)	43	0.302	0.465	0.000	1.000
ITSR5 (Decide by Others Board Member)	43	0.279	0.454	0.000	1.000
ITSR6 (Decision Maker Accountable to)	43	0.977	0.152	0.000	1.000
IT Governance Mechanisms - Process					
ITPRO1 (COBIT)	43	0.116	0.324	0.000	1.000
ITPRO2 (ITIL)	43	0.093	0.294	0.000	1.000
ITPRO3 (ISO 20000)	43	0.186	0.394	0.000	1.000
IT Governance Mechanisms - Relational					
ITREL1 (Announcement Letter)	43	0.310	0.468	0.000	1.000
ITREL2 (Internal Portal)	43	0.442	0.502	0.000	1.000
ITREL3 (E-mail)	43	0.628	0.489	0.000	1.000
ITREL4 (Directions in Person)	43	0.116	0.324	0.000	1.000
ITREL5 (Reguler Meeting)	43	0.860	0.351	0.000	1.000
ITREL6 (CIO Attending)	43	2.256	1.026	0.000	3.000
ITREL7 (Other Board Member Attending)	43	1.512	0.856	0.000	3.000
FIRMSIZE	43	29.164	2.086	23.198	33.390
FIRMAGE	43	2.912	0.439	1.792	3.332
TRADING	43	0.093	0.294	0.000	1.000
MISCINDUSTRY	43	0.023	0.152	0.000	1.000
INFRASTRUCTURE	43	0.116	0.324	0.000	1.000
FINANCE	43	0.256	0.441	0.000	1.000
PROPERTY	43	0.047	0.213	0.000	1.000
BASICINDUSTRY	43	0.186	0.394	0.000	1.000
CONSUMERGOODS	43	0.070	0.258	0.000	1.000
AGRICULTURE	43	0.140	0.351	0.000	1.000
MINING	43	0.070	0.258	0.000	1.000

This table provides the descriptive statistics for variables used in analysis. All variables are defined in Appendix 1.

4.4. Cronbach's Alpha Test

A Cronbach's alpha test was performed to determine the reliability of the measures (Hair et al. 1998, 5:). The reliability analysis is necessary to make interpretations of the predictive model confidently. This test is done by calculating alpha coefficients for each question asked in the survey. In general, the lowest limit for the alpha coefficient is 0.7. According to table 5, all of the coefficients are greater than 0.7. This result implies that all the variables used in this study are reliable.

Table 5. Cronbach's Alpha Test Result

Item		Obs	Alpha
IT Governance Awareness	ITGOVAWA1	64	0.92
	ITGOVAWA2	64	0.92
	ITGOVAWA3	64	0.93
	ITGOVAWA4	64	0.92
	ITGOVAWA5	64	0.93
	ITGOVAWA6	64	0.93
	ITGOVAWA7	64	0.92
	ITGOVAWA8	64	0.93
	ITGOVAWA9	64	0.93
	ITGOVAWA10	64	0.93
	ITAWA2	64	0.92
	ITAWA3	64	0.92
	ITAWA4	64	0.92
	ITAWA5	64	0.92
IT Governance Adoption Year	ADOPTIONYEAR	64	0.92
IT Governance Mechanisms	ITSR1	64	0.92
	ITSR2	64	0.92
	ITSR3	64	0.92
	ITSR4	64	0.92
	ITSR5	64	0.92
	ITSR6	64	0.92
	ITPRO1	64	0.93
	ITPRO2	64	0.93
	ITPRO3	64	0.93
	ITREL1	64	0.92
	ITREL2	64	0.92
	ITREL3	64	0.92
	ITREL4	64	0.93
	ITREL5	64	0.92
	ITREL6	64	0.92
	ITREL7	64	0.92
IT Governance Performance	ITGOVPERF1	64	0.92
	ITGOVPERF2	64	0.92
	ITGOVPERF3	64	0.92
	ITGOVPERF4	64	0.92
	ITGOVPERF5	64	0.92
	ITGOVPERF6	64	0.92
	ITGOVPERF7	64	0.92
	ITGOVPERF8	64	0.92
Test Scale			**0.92**

4.5. Heteroscedasticity Test

Heteroscedasticity implies the standard deviations of the error terms of the independent variables are not constant. The Breusch-Pagan (BP) test is used to detect heteroscedasticity issue by presenting a chi-square value. A large chi-square would indicate that heteroscedasticity occurs. In this test, the chi-square values are quite large particularly in model 4, 6, and 7 as presented in Table 6. Therefore, the statistical evidence shows that the heteroscedasticity problem exists. To deal with heteroscedasticity problem, a White-Huber standard error is used in the regression model (N Gujarati 2004).

Table 6. Breusch-Pagan Heteroscedasticity Test Result

Breusch-Pagan Test	ITPERF			ROA	ROS	GROWTH	TOBINS Q
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
chi2(1)	5.64	2.05	1.66	18.83	7.04	92.05	82.87
Prob > chi2	0.02	0.15	0.20	0.00	0.01	0.00	0.00

4.6. Relation between IT Governance Awareness/IT Governance Mechanisms and IT Governance Performance

Table 7 presents regression results to test whether IT governance awareness (ITAWA) and IT governance mechanisms have a significant impact on IT governance performance (ITPERF). There are three IT governance mechanisms variable used in this study, namely structural (ITSR), process (ITPRO), and relational (ITREL) mechanisms. This study uses three models of regression to test the hypotheses. The first model uses IT governance awareness individually, as well as the second model that uses only IT governance mechanisms as an independent variable in the regression. The third model uses both IT governance awareness and IT governance mechanisms as independent variable in the regression. This procedure was taken to find out which variable has effects on IT governance performance. Due to multicollinearity, some variables were omitted from the regression models. Property industry dummy variable was omitted in the first model and miscellaneous industry dummy variable in the second and third model.

In model 1, it shows that ITAWA2 (definition of IT governance) has significant negative relation with IT governance performance (β = -3.821, p <0.1). Contrary to hypotheses, the statistical result indicates that with the better understanding of IT governance definition will lower the IT governance performance. The result in model 1 also shows that most of IT governance awareness variable have a negative relation with IT governance performance, such as the general view of IT governance (ITAWA1), training as knowledge

source of IT governance (ITAWA3), and government rule as knowledge source of IT governance (ITAWA5). Meanwhile, sharing as knowledge source of IT governance (ITAWA4) has a positive relation with IT governance (not significant). Firm size (FIRMSIZE) as control variable also does not have significant relation with IT governance performance but it has a negative effect on IT governance performance. Age (FIRMAGE) turns out has significant negative association with IT governance performance (β = -2.875, p <0.1). This result implies that the more mature age of a company then the performance will be worse.

Table 7. Regressions Result Predicting IT Governance Performance

Variables	ITPERF		
	(1)	(2)	(3)
Main variables:			
ITAWA1	-1.933		-8.857***
ITAWA2	-3.821*		-19.536***
ITAWA3	-1.175		-0.971
ITAWA4	2.036		3.747
ITAWA5	-0.360		-4.009**
ITSR1		-2.897	-2.793
ITSR2		3.469*	2.664
ITSR3		-7.669	-17.821***
ITSR4		-7.634	-14.450***
ITSR5		-7.869	-12.176**
ITSR6		-4.651	-22.930***
ITPRO1		-2.067	-2.690
ITPRO2		-3.193	-3.705*
ITPRO3		-0.578	3.565
ITREL1		-0.983	-9.321**
ITREL2		-0.808	-2.616
ITREL3		-1.075	-3.374*
ITREL4		1.526	-3.714
ITREL5		-0.750	-9.398
ITREL6		-0.157	3.898
ITREL7		1.578	2.708
Control variables:			
FIRMSIZE	-0.153	-0.142	0.811
FIRMAGE	-2.875*	-0.784	-0.166
TRADING	-1.976	6.318	4.963
MISCINDUSTRY	-11.037**	(Omitted)	(Omitted)
INFRASTRUCTURE	-4.010	10.683	11.731
FINANCE	-3.063	4.051	-1.062
PROPERTY	(Omitted)	7.366	-0.937
BASICINDUSTRY	-4.341	5.130	6.457
CONSUMERGOODS	-4.600	5.604	3.306
AGRICULTURE	-4.615	4.032	-3.404
MINING	-10.304**	-1.590	-3.901
Constant	64.157*	49.034*	106.736***
Observation	43	43	43
R-squared	0.452	0.620	0.900

This table presents the results of testing Hypothesis 1 and 2 using OLS regression with robust standard errors adjusted for heteroscedasticity. The dependent variables in model (1), (2), and (3) are IT governance performance. All variables are defined in Appendix 1. *, **, *** denote statistical significance at the 0.10, 0.05, and 0.01 level, respectively.

In model 2, it examines whether IT governance mechanisms have a significant effect on IT governance performance. Evidently, all of IT governance mechanisms (ITSR, ITPRO, and ITREL) have a negative relation with IT governance performance, except ITSR2 and ITREL7. ITSR2 (the company that has IT Steering Committee) is found to have significant positive relation with IT governance performance ($\beta = 3.469$, $p < 0.1$). This result consistent with the predicted hypotheses, company that has IT Steering Committee (ITSC) will increase its performance. ITREL7 (other board members attend the regular meeting) has a positive relation with IT governance (not significant). Apparently, the existence of ITSC and the presence of board member in IT regular meeting indicate that the management put serious concern on IT governance. Eventually, it can leverage IT governance performance. Firm size (FIRMSIZE) and age (FIRMAGE) do not have significant relation with IT governance performance but it has a positive effect on IT governance performance.

Model 3 was a combined regression from the first and second model. It uses IT governance awareness and IT governance mechanisms as independent variables. For IT governance awareness, ITAWA1, ITAWA2, and ITAWA5 show a significantly negative relation with IT governance performance. This result against the hypotheses and it indicates that with the higher awareness IT governance of a company, then the IT governance performance will decrease. Meanwhile, ITAWA4 has insignificant positive effect on IT governance performance. Furthermore, for IT governance mechanisms, ITSR3, ITSR4, ITSR5, ITSR6, ITPRO2, ITREL1, and ITREL3 also show a significantly negative relation with IT governance performance. This result against the hypotheses as well and it shows that with the use of those IT governance mechanisms then the IT governance performance will decrease. ITSR2, ITPRO3, ITREL6, and ITREL7 have insignificant positive effect on IT governance performance. FIRMSIZE and AGE do not have significant relation with IT governance performance, but it has a positive effect on IT governance performance.

To conclude, this test attempted to examine whether IT governance awareness and IT governance mechanisms has a positive and significant impact to support the hypotheses. Of the three models tested, the positive and significant relation is found only in the second model, which is ITSR2 variable. The other models mostly resulted in negative (and significant for some variables) impact on IT governance performance. These results are not aligned with the proposed hypotheses. Research conducted by Ribbers et al. (2002) also found a similar result. Ribbers et al. (2002) reveal that the used of IT governance process mechanisms are insufficient for governing IT effectively, and thus suggest that it should be aligned with company's internal factors. The reasonable internal factor that should be included in this research such as the

internal IT governance efficiency or so called IT governance maturity. A company that has IT governance maturity is believed to have efficiency in aligning the IT governance mechanisms and thus can leverage the IT governance performance (Simonsson et al. 2010; Liang et al. 2011).

4.7.   Relation between IT Governance Mechanisms and Financial Performance

Table 8 presents regression results for four models to test whether IT governance adopters that reflected from IT governance mechanisms has a significant impact on financial performance. Three IT governance mechanisms variable such as structural (ITSR), process (ITPRO), and relational (ITREL) mechanisms are used in this study. All mechanisms were tested to figure out its effect on ROA, ROS, growth, and Tobin's Q as financial performance measurement. For financial performance measurement, it uses the average of two years' financial performance since IT governance adopted. Due to multicollinearity, miscellaneous industry dummy variable was omitted from the regression models.

For structural mechanism, companies that the IT-related decision was made either by Manager (ITSR3), CIO (ITSR4) or other board members (ITSR5) are 5% significantly associated with higher ROA (β = 0.611, 0.658, 0.615, respectively). This result indicates that structural decision making has a great influence on ROA. These results are consistent with the predicted hypotheses. Nevertheless, this mechanism does not have a significant relation to ROS, growth, and Tobin's Q. Some variables, however, have a positive effect on ROS, growth, and Tobin's Q. ITSR1, ITSR2, and ITSR6 have a positive effect on ROS and Tobin's Q. Moreover, ITSR3 and ITSR5 have a positive effect on growth and Tobin's Q, while ITSR4 has a positive impact only on growth.

Table 8 also shows that the process and relational mechanisms do not have a significant relation with all financial performances, except ITREL4. ITREL4 (IT-related policies communicated through directions in person) is found to have significant negative relation with ROA (β = 0.196, p <0.1). This result against the hypotheses and it shows that with the higher intensity of directions in person to communicate IT policies then ROA will decrease. Furthermore, some variables evidently have a positive effect on financial performances. ITPRO1 has a positive effect on ROA, ROS, and Tobin's Q. ITPRO2 has a positive effect on ROA, growth, and Tobin's Q, while ITPRO3 has a positive effect only on ROS and Tobin's Q. For relational mechanisms, it turns out that ITREL1, ITREL3 and ITREL7 have a positive impact on ROA, growth, and Tobin's Q. ITREL3 has a positive impact on ROA and growth,

while ITREL4 has a positive impact on ROS and Tobin's Q. Whilst ITREL5 has a positive impact only on Tobin's Q, ITREL 6 has a positive impact on ROS and growth.

Meanwhile, firm size (FIRMSIZE) and age (FIRMAGE) apparently do not have a significant relation with all financial performances, although there are positive impacts on financial performances. FIRMSIZE has a positive effect on ROS and Tobin's Q, while FIRMAGE has a positive effect on ROS and growth.

Table 8. Regressions Result Predicting Financial Performance

Variables	ROA (1)	ROS (2)	GROWTH (3)	TOBINSQ (4)
Main variables:				
ITSR1	-0.128	0.320	-1.139	0.272
ITSR2	0.058	0.132	-0.266	1.828
ITSR3	0.611**	-0.562	5.119	0.796
ITSR4	0.658**	-0.446	4.964	-4.657
ITSR5	0.615**	-0.408	4.118	-2.836
ITSR6	-0.302	0.584	-3.590	6.475
ITPRO1	0.004	0.459	-0.575	4.427
ITPRO2	0.063	-0.368	0.685	1.033
ITPRO3	-0.186	0.488	-1.823	6.379
ITREL1	0.024	-0.137	0.908	1.239
ITREL2	0.131	-0.453	0.307	-4.277
ITREL3	0.107	-0.268	0.074	4.580
ITREL4	-0.196*	0.311	-1.613	2.621
ITREL5	-0.361	-0.490	-3.537	5.320
ITREL6	-0.006	0.272	0.102	-3.538
ITREL7	0.025	-0.012	0.602	3.199
Control variables:				
FIRMSIZE	-0.049	0.071	-1.167	0.067
FIRMAGE	-0.050	0.057	1.048	-3.531
TRADING	-0.312	0.616	-3.873	1.061
MISCINDUSTRY	(Omitted)	(Omitted)	(Omitted)	(Omitted)
INFRASTRUCTURE	-0.429	-0.488	-0.097	-5.685
FINANCE	0.004	-0.674	2.209	-2.650
PROPERTY	-0.056	-0.066	-0.611	-1.054
BASICINDUSTRY	0.028	0.247	0.951	-0.485
CONSUMERGOODS	-0.057	0.989	-2.283	-2.591
AGRICULTURE	-0.060	-0.286	0.384	6.848
MINING	-0.046	-0.024	1.384	-0.053
Constant	1.571	-1.730	32.098	-0.209
Observation	43	43	43	43
R-squared	0.626	0.620	0.585	0.651

This table presents the results of testing Hypothesis 3 using OLS regression with robust standard errors adjusted for heteroscedasticity. The dependent variable in model (1) is Return on Assets (ROA), in model (2) is Return on Sales (ROS), in model (3) is growth, and in model (4) is Tobin's Q. All variables are defined in Appendix 1. *, **, *** denote statistical significance at the 0.10, 0.05, and 0.01 level, respectively.

As a conclusion, this test attempted to examine whether IT governance adopters that reflected from IT governance mechanisms has a positive and significant impact to support the hypotheses. Of the whole IT governance mechanisms, apparently, only a few that have significant relation with financial performance, specifically ROA. From structural mechanism, ITSR3, ITSR4, and ITSR5 are found to have a positively significant association with ROA. In relational mechanism, ITREL4 shows a negatively significant relation with ROA. Meanwhile, the process mechanism evidently does not have significant relation with all financial performance.

Considering the test results, as further analysis, there might be other factors that can give higher influence for financial performance, such as IT governance maturity, company policies in cost effectiveness, government policies in the interest rate or investment rules. By including additional variables, it is expected that the results will be improved since most of the results are not aligned with the proposed hypotheses. The result, however, is very much alike with a study conducted by Lunardi et al. (2014). Lunardi et al. (2014) discover that IT governance mechanisms did influence the profitability (measured by ROA, ROE and profit margin), but not for productivity (measured by asset turnover, operating margin, and operating expense to sales) and market measures (measured by sales growth and share repurchase).

4.8. Multicollinearity Test

Multicollinearity test was done to find out whether there is a correlation between the independent variable in a regression model, and it is indicated by the Variance Inflation Factor (VIF). As a rule of thumb, an indicator for multicollinearity is VIF values higher than ten, and the average of VIF value should not be greater than one (N Gujarati 2004). A high VIF means there is high multicollinearity among variables.

There are three multicollinearity tests conducted in this study. The first test consists of ITAWA and control variables, the second test consists of IT governance mechanisms (ITSR, ITPRO, and ITREL) and control variables, and the third test consists of ITAWA, IT governance mechanisms (ITSR, ITPRO, and ITREL) and control variables. The results of multicollinearity tests (VIF test) are presented in Appendix 1. Evidently, only in the first test that the multicollinearity does not occur. All variables have VIF value below 10, and the average VIF is higher than one.

The second and the third tests indicate the multicollinearity problem in the model. In the second test, ITSR3, ITSR4, ITSR5, ITREL5, ITREL6, ITREL7, TRADING,

INFRASTRUCTURE, FINANCE, BASICINDUSTRY, CONSUMERGOODS, AGRICULTURE, and MINING have VIF values greater than 10. Furthermore, in the third test, ITAWA4, ITSR3, ITSR4, ITSR5, ITPRO1, ITREL1, ITREL2, ITREL5, ITREL6, ITREL7, FIRMSIZE, TRADING, INFRASTRUCTURE, FINANCE, PROPERTY, BASICINDUSTRY, CONSUMERGOODS, AGRICULTURE, and MINING also have VIF values greater than 10. To deal with these problems, the variables that have VIF value above ten are eliminated one by one from the original models to see if multicollinearity problems disappear. The new regression results are presented in Table 9.

Table 9. Adjusted Regression after Multicollinearity Test

Variables	ITPERF		ROA	ROS	GROWTH	TOBINSQ
	(1)	(2)	(3)	(4)	(5)	(6)
Main variables:						
ITAWA1		-5.428*				
ITAWA2		-14.25***				
ITAWA3		-0.502				
ITAWA4		0.417				
ITAWA5		-2.807				
ITSR1	-2.365	-3.377	-0.133	0.263	-0.764	-0.542
ITSR2	1.651	0.673	0.154	0.008	0.200	3.061
ITSR3						
ITSR4	0.198	1.308	0.057	0.019	0.189	-5.704
ITSR5	-0.962	1.590	0.084	0.055	-0.222	-3.702
ITSR6	-6.289	-17.174*	-0.194	0.816	-2.828	5.374
ITPRO1	-4.654	-5.630	0.096	0.518	-0.427	5.577
ITPRO2	-2.564	-3.410	0.094	-0.374	1.237	0.130
ITPRO3	-0.078	0.949	-0.123	0.382	-0.617	4.830
ITREL1	0.715	-3.344	-0.033	-0.011	0.555	0.389
ITREL2	-0.353	-1.300	0.158	-0.433	0.605	-4.709
ITREL3	-0.015	-1.730	0.083	-0.305	0.179	3.987
ITREL4	-0.758	-3.839	-0.152	0.363	-1.856	3.942
ITREL5						
ITREL6	-1.209		-0.035	0.117	-0.349	-2.024
ITREL7	0.935	0.989	-0.003	-0.051	0.099	4.255
Control variables:						
FIRMSIZE	-0.139	0.264	-0.049	0.047	-1.096	0.018
FIRMAGE	-1.256	-0.639	0.012	0.058	1.531	-3.670
TRADING	-1.110	-0.734	-0.147	1.022	-5.197	5.968
MISCINDUSTRY						
INFRASTRUCTURE		2.841				
FINANCE						
PROPERTY	2.768	-0.576	0.015	0.509	-2.193	1.822
BASICINDUSTRY	-0.331	2.331	0.020	0.66**	-1.509	4.150
CONSUMERGOODS	-0.740	-1.059	0.009	1.281**	-4.110	2.342
AGRICULTURE	-0.870	-2.527	-0.059	0.254	-1.999	10.773*
MINING	-5.249	-3.897	-0.090	0.514*	-0.873	2.665
Constant	52.116***	86.989***	1.551	-2.221	32.767	-0.109
Observation	43	43	43	43	43	43
R-squared	0.583	0.757	0.458	0.586	0.497	0.636

This table presents adjusted regression after multicollinearity tests. The dependent variables in model (1) and (2) are IT governance performance. The dependent variable in model (3) is Return on Assets (ROA), in model (4) is Return on Sales (ROS), in model (5) is growth, and in model (6) is Tobin's Q. All variables are defined in Appendix 1
*, **, *** denote statistical significance at the 0.10, 0.05, and 0.01 level, respectively.

The new regression results are slightly different compared to original regression results due to the highly inter-correlated variables are removed from original regression equations. In ITPERF test model 1, it examines whether IT governance mechanisms have a significant effect on IT governance performance. Evidently, no significant relation exists in this model. Some variables, however, have positive effect on ITPERF such as ITSR2, ITSR4, ITREL1, and ITREL7. Meanwhile, in ITPERF test model 2, ITAWA1, ITAWA2, and ITSR6 still have negative and significant relation with ITPERF. This result against the hypotheses due to it shows that with the higher awareness IT governance of a company and with the use of those IT governance mechanisms, then the IT governance performance will decrease. Furthermore, in all model of the financial performance test, the result comes with no significant relation exists in this model. Nevertheless, some variables have a positive effect on financial performances. This means that even though not significant, the IT governance mechanisms remain influential to the increase of financial performances.

CHAPTER 5 – CONCLUSION AND DISCUSSION

5.1. Conclusion

This research investigates the impact of IT governance awareness (hypotheses 1) and IT governance mechanisms (hypotheses 2) to IT governance performance. The test shows a positive and significant relation between IT Steering Committee (ITSC) as the structural mechanism and IT governance performance. This result indicates the management put an outstanding interest in IT governance, therefore the IT governance performance is increased. Moreover, this result is in line with prior research that a maximum business value can be achieved with the use a defined IT governance mechanism (Isaca 2003; Weill and Ross 2004; Symons 2005; Robinson 2005). However, IT governance awareness turns out to show a negative and insignificant relation with IT governance performance. The research results, therefore, support hypotheses 2 and reject hypotheses 1.

Furthermore, this study also examines the impact of IT governance mechanisms to financial performance. Accounting-based (ROA, ROS, and growth) and market-based measures (Tobin's Q) are used to test the proposed hypotheses. The test reveals that the use of structural IT governance mechanism evidently improved the financial performance, particularly in the accounting-based measure (ROA). When the IT-related decisions are made by Manager, CIO or other board members, it will have an impact on increasing ROA. This result indicates that structural decision making influences on financial performance. The IT-related decision making authority is essential in effective IT governance (Sambamurthy and Zmud 1999) to support the business strategy that aligned with IT resources (Henderson and Venkatraman 1993; Weill and Ross 2004). Thus, in general, the research result supports hypotheses 3, particularly in relation to accounting-based measure (ROA). The IT governance mechanisms in relation to other financial performances (ROS, growth, and Tobin's Q), however, could not be supported for hypotheses 3.

5.2. Discussion and Limitation

The objective of this study is to contribute to existing literature, by providing evidence whether IT governance implementation in Indonesia as a developing country influence financial performance. From the research point of view, this study adds the evidence of the use of IT governance mechanisms in influencing IT governance performance and financial performance, particularly ROA. On the other hand, from the managerial perspective, it is essential for managers to understand the possible impacts of IT governance and financial

performance so that the IT investments can be decided properly. In addition, this study is also relevant to shareholders as investors, in order to be assured that the IT spending generates maximum value for the company.

As with any research, this study is exposed to some limitations as well. The foremost concern of this study is related to the very small number of respondents as primary data. As explained in the previous chapter, the respond level of the survey that distributed via email is extremely low, even though follow up actions has been done consistently. Apparently, the contact person stated in IDX database mostly are not in the IT department, thus it takes more time to find the contact person in IT department. Consequently, this makes the amount of sample is inadequate.

The next limitation is this study does not take into account IT governance maturity which might influence IT governance performance and financial performance. IT governance maturity is convinced to have efficiency in aligning the IT governance mechanisms and thus can leverage the business performance (Simonsson et al. 2010; Liang et al. 2011). Future research might take IT governance maturity into account. Furthermore, this study considered only a two-year period of financial performance analysis, which would be a too short period to analyze the impact of adopting IT governance mechanisms.

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APPENDICES

Appendix 1 – Variable Definition

Dependent Variable	Definition
ITPERF	IT governance performance based on (Weill and Ross 2004), see equation (1)
ROA	Return on assets, calculated as net income divided by total assets
ROS	Return on sales, calculated as net income divided by sales
GROWTH	A year-to-year percent change in sales
TOBINSQ	Total market value divided by total value of assets

Independent Variable	Definition
ITAWA1	An average of ten questions of general view of IT governance
ITAWA2	A dummy variable that equals one if a company gives a short definition of IT governance and zero otherwise
ITAWA3	A dummy variable that equals one if a company gives training as knowledge source of IT governance and zero otherwise
ITAWA4	A dummy variable that equals one if a company gives sharing as knowledge source of IT governance and zero otherwise
ITAWA5	A dummy variable that equals one if a company uses government rule as knowledge source of IT governance and zero otherwise
ITSR1	A dummy variable that equals one if a company has CIO in structural organization and zero otherwise
ITSR2	A dummy variable that equals one if a company has IT steering committee in structural organization and zero otherwise
ITSR3	A dummy variable that equals one if the IT-related decision is made by manager and zero otherwise
ITSR4	A dummy variable that equals one if the IT-related decision is made by CIO and zero otherwise
ITSR5	A dummy variable that equals one if the IT-related decision is made by other board member and zero otherwise
ITSR6	A dummy variable that equals one if the decision maker is accountable to higher level and zero otherwise

ITPRO1	A dummy variable that equals one if a company uses COBIT and zero otherwise
ITPRO2	A dummy variable that equals one if a company uses ITIL and zero otherwise
ITPRO3	A dummy variable that equals one if a company uses ISO 20000 and zero otherwise
ITREL1	A dummy variable that equals one if the IT-related policies is communicated through announcement letter and zero otherwise
ITREL2	A dummy variable that equals one if the IT-related policies is communicated through internal portal and zero otherwise
ITREL3	A dummy variable that equals one if the IT-related policies is communicated through email and zero otherwise
ITREL4	A dummy variable that equals one if the IT-related policies is communicated through directions in person and zero otherwise
ITREL5	A dummy variable that equals one if regular meeting is held to discuss IT-related issues and zero otherwise
ITREL6	A dummy variable that equals one if CIO attends the regular meeting and zero otherwise
ITREL7	A dummy variable that equals one if other board member attends the regular meeting and zero otherwise

Control Variable	**Definition**
FIRMSIZE	The natural log of company's total assets
FIRMAGE	The natural log of number of years since company was first listed in IDX
TRADING	A dummy variable that equals one if a company is classified as trading industry in IDX and zero otherwise
MISCINDUSTRY	A dummy variable that equals one if a company is classified as miscellaneous industry in IDX and zero otherwise
INFRASTRUCTURE	A dummy variable that equals one if a company is classified as infrastructure industry in IDX and zero otherwise
FINANCE	A dummy variable that equals one if a company is classified as finance industry in IDX and zero otherwise

PROPERTY	A dummy variable that equals one if a company is classified as property industry in IDX and zero otherwise
BASICINDUSTRY	A dummy variable that equals one if a company is classified as basic industry in IDX and zero otherwise
CONSUMERGOODS	A dummy variable that equals one if a company is classified as consumer goods industry in IDX and zero otherwise
AGRICULTURE	A dummy variable that equals one if a company is classified as agriculture industry in IDX and zero otherwise
MINING	A dummy variable that equals one if a company is classified as mining industry in IDX and zero otherwise

Appendix 2 – Multicollinearity Test

Table 10 shows the multicollinearity test result that the original regression model contains variables with VIF score above 10.

Table 10. Multicollinearity Test Result of Original Model

Variables	Test (1)		Test (2)		Test (3)	
	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF
ITAWA1	1.43	0.70			3.93	0.25
ITAWA2	1.37	0.73			4.00	0.25
ITAWA3	1.83	0.55			3.44	0.29
ITAWA4	2.63	0.38			13.97	0.07
ITAWA5	1.86	0.54			3.78	0.26
ITSR1			3.86	0.26	9.13	0.11
ITSR2			6.43	0.16	8.36	0.12
ITSR3			33.52	0.03	46.30	0.02
ITSR4			30.37	0.03	38.83	0.03
ITSR5			24.80	0.04	28.92	0.03
ITSR6			5.50	0.18	7.88	0.13
ITPRO1			5.65	0.18	11.81	0.08
ITPRO2			2.18	0.46	2.35	0.43
ITPRO3			3.48	0.29	6.91	0.14
ITREL1			7.10	0.14	19.69	0.05
ITREL2			6.82	0.15	17.64	0.06
ITREL3			3.21	0.31	4.69	0.21
ITREL4			5.75	0.17	7.34	0.14
ITREL5			25.90	0.04	64.63	0.02
ITREL6			19.74	0.05	53.83	0.02
ITREL7			8.21	0.12	14.27	0.07
FIRMSIZE	2.71	0.37	5.63	0.18	14.31	0.07
FIRMAGE	1.62	0.62	2.66	0.38	4.10	0.24
TRADING	3.58	0.28	18.02	0.06	29.23	0.03
MISCINDUSTRY	1.85	0.54				
INFRASTRUCTURE	3.55	0.28	32.31	0.03	37.19	0.03
FINANCE	7.11	0.14	26.88	0.04	38.49	0.03
PROPERTY			8.15	0.12	11.14	0.09
BASICINDUSTRY	6.21	0.16	23.48	0.04	34.01	0.03
CONSUMERGOODS	3.44	0.29	11.06	0.09	15.01	0.07
AGRICULTURE	5.18	0.19	17.12	0.06	22.07	0.05
MINING	3.34	0.30	10.20	0.10	16.12	0.06
Mean VIF	3.18		13.39		19.14	

The first test reveals that there is no multicollinearity problem occur. However, the multicollinearity occurs in the second and the third test. After identifying the cause of multicollinearity problem in the models, this study try to fix the problem by removing the multicollinearity variables from the original regression models. Table 11 presents the result of VIF test for the new regression models.

Table 11. Multicollinearity Test Result of New Model

Variables	Test (2)		Test (3)	
	VIF	1/VIF	VIF	1/VIF
ITAWA1			3.22	0.31
ITAWA2			2.84	0.35
ITAWA3			3.14	0.32
ITAWA4			4.62	0.22
ITAWA5			3.25	0.31
ITSR1	2.73	0.37	4.74	0.21
ITSR2	3.97	0.25	6.50	0.15
ITSR3				
ITSR4	2.05	0.49	3.97	0.25
ITSR5	3.36	0.30	4.58	0.22
ITSR6	4.11	0.24	6.06	0.17
ITPRO1	3.59	0.28	5.90	0.17
ITPRO2	1.86	0.54	2.09	0.48
ITPRO3	2.45	0.41	4.78	0.21
ITREL1	4.41	0.23	6.49	0.15
ITREL2	4.92	0.20	8.27	0.12
ITREL3	2.25	0.44	3.02	0.33
ITREL4	3.54	0.28	4.92	0.20
ITREL5				
ITREL6	6.37	0.16		
ITREL7	5.70	0.18	5.75	0.17
FIRMSIZE	4.66	0.21	6.83	0.15
FIRMAGE	2.25	0.45	2.47	0.41
TRADING	3.79	0.26	5.38	0.19
MISCINDUSTRY				
INFRASTRUCTURE			5.92	0.17
FINANCE				
PROPERTY	3.08	0.32	3.97	0.25
BASICINDUSTRY	2.79	0.36	3.98	0.25
CONSUMERGOODS	2.18	0.46	3.08	0.32
AGRICULTURE	1.94	0.52	3.44	0.29
MINING	2.23	0.45	3.07	0.33
Mean VIF	3.37		4.53	

After the multicollinearity tests, the results show that all VIF values are below 10 and the average VIF higher than one. Therefore, there is no collinearity issue anymore.

Appendix 3 - Questionnaire

Part 1 – IT Governance Awareness

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	The use of information technology (IT) can leverage company's goal achievement					
2	IT investment is necessary in achieving company's goal					
3	IT investment should give value to company					
4	A careful consideration is needed before IT investment decisions are being made					
5	Poor decision making will lead to a waste IT investment spending and will not give value to company					
6	IT policies are important to be communicated to all employees					
7	In my company, employees' role and responsibility are not well defined					
8	IT employees in my company sometimes are not working consistent with their role and responsibility					
9	I am familiar with IT governance concept					
10	IT governance is important to be implemented in a company					

Part 2 – IT Governance Mechanisms

2.1. IT governance has been implemented in my company
    a. Yes, since …….. (fill in with year)
    b. No. Please continue to questions in **Part 4**

2.2. In implementing IT governance, my company uses a certain IT governance mechanisms
    a. Yes
    b. No. Please continue to question **2.4**

2.3. IT governance mechanisms existed in my company (you can choose more than one)
    a. Chief Information Officer (CIO)
    b. IT Steering Committee
    c. COBIT
    d. ITIL
    e. Others: ……………………

2.4. IT-related decision in my company is made by
    a. IT Manager
    b. CIO
    c. Others: ………………….

2.5. The decision maker on answer 2.4 is accountable to ………………….

2.6. IT-related policies in my company are communicated through
    a. Announcement letter
    b. Web-based internal portal
    c. Email
    d. Others: ………………….

2.7. In my company, regular meeting is held to discuss IT-related issues.
    a. Yes, it is held (please choose: weekly / monthly / other ………..)
    b. No. Please continue to question **2.10**

2.8. CIO is attending the regular meeting in question 2.7
    a. Always
    b. Occasionally
    c. Never

2.9. Other board members are also attending the regular meeting in question 2.7
    a. Always
    b. Occasionally
    c. Never

2.10. How important are the following outcomes of IT governance in your company?

No	IT Governance Outcome	Not Important	Less Important	Moderate	Important	Very Important
1	Cost-effective use of IT					
2	Effective use of IT for growth					
3	Effective use of IT for asset utilization					
4	Effective use of IT for business flexibility					

2.11. What is the influence of IT governance in your company for the following measure of success?

No	Success Measure	Not Successful	Little Successful	Moderate	Successful	Very Successful
1	Cost-effective use of IT					
2	Effective use of IT for growth					
3	Effective use of IT for asset utilization					
4	Effective use of IT for business flexibility					

Part 3 – IT Governance Awareness

3.1. Please give a short description of IT governance

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3.2. From where did you have knowledge of IT governance?
    a. Training program provided by the company I worked for
    b. Sharing knowledge from superior
    c. Other: …………………….

Part 4 – Company and Respondent's Background

4.1. Number of employee in my company
    a. < 500 employees
    b. 500 – 1000 employees
    c. > 1000 employees

4.2. Number of IT employee in my company
    a. < 50 employees
    b. 50 – 100 employees
    c. > 100 employees

4.3. In which range is your age?
    a. 25-34 years old
    b. 35-44 years old
    c. > 45 years old

4.4. Your current position in company
    a. Manager
    b. Senior Manager
    c. Other: …………………….

4.5. How long have you been worked in this company?
    a. < 3 years
    b. 3 - 5 years
    c. > 5 years