IT GOVERNANCE MATURITY AT INDONESIAN STATE OWNED ENTERPRISES: CONTINGENT FACTORS & IMPACTS

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ABSTRACT

IT governance is part of corporate governance that is the responsibility of the organization's top executive to ensure that organization’s information technology supports the goals and objectives of the organization, using variety of structural mechanisms, processes and mechanisms for communication / relationship. Fundamentally, IT Governance is concerned on how IT is delivering value and the management of IT risks, which was driven by strategic alignment between business and IT, resource management and performance management.

This study aims to find out what drives, enables and inhibit companies in implementing good IT governance, as well as the effect or influence those three factors have towards IT governance maturity level. In addition, this study also wanted to confirm whether with good IT governance, the value of IT investments can be perceivably felt by the organization, and whether the IT risk can be mitigated.

The general approach of this research used quantitative paradigm, although at an early stage also used qualitative approaches. Survey was conducted in 2010 at 103 State Owned Enterprises (SOEs) by using questionnaires collected by field workers, though some were delivered electronically.

The research found that major IT Governance drivers include external audits, free market competition, corporate governance regulations and core system/enterprise-wide ERP implementations. The IT Governance enabler proven is ‘high awareness of risk management amongst staff. Also, the larger the number of the drivers or enablers, the better the IT Governance. Inhibiting factors of IT Governance do not play part in influencing IT Governance maturity level.

This research also demonstrates that implementation of IT governance is the answer to organization’s need to ensure IT value creation and may influence bottom-line SOE’s performance. However in this research, we are unable to prove that IT Governance can lower IT risks.

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CHAPTER 1
INTRODUCTION

1.1 Background

State owned enterprises (SOE) – or Badan Hukum Milik Negara (BUMN) – are very important to the government. Some serve as a vehicle for the government to execute their strategy, and some provide good dividend to the government. Due to its importance, Good Corporate Governance (GCG) is important issue at SOEs. It provides transparency and clear decision making, authority and responsibility structure at SOEs. GCG also includes good governance on information technology, as clearly described in ITGI (2003).

As van Grembergen (2004) of University Antwerpen School of Management defines, IT Governance is the organizational capacity exercised by the board, executive management and IT management to control the formulation and implementation of IT strategy and in this way ensure fusion of business with IT. It consists of leadership, organizational structures, and processes that ensure that the organization's IT sustains and extends the organizational strategy and objective. This definition still rhymes with ITGI's (2003) definition – loosely – is a part of enterprise governance that consist of leadership, organizational structures, communication mechanisms and processes that ensure that the organization's IT sustain and extends the organization's strategy and objectives, as a responsibility of the board of Directors and executive management. In the light of this definition, and the regulatory requirement for SOEs for good corporate governance (SOE Minister Decree no.117 of 2002 and also Act no.19 of 2003 on the State Owned Enterprises), it seems that IT Governance is imperative for SOEs.

According to ITGI (2003), focus areas of IT Governance are concerned on how IT is delivering value and the management of IT risks, which was driven by strategic alignment between business and IT, resource management and performance management. Organizations that wishes to provide IT Governance may opt to implement those five focus area of IT Governance by following the control objectives of COBIT 4.1 (ITGI, 2007) especially domain Monitor & Evaluate 4 (ME4). COBIT can also be used for organizations to measure up *how good* are their IT Governance.

In this sector, the implementation of good IT governance might be the answer to organization need to ensure IT value creation and also return on IT investments. Without good IT Governance, there might be risk of inappropriate IT investment, failure of services to public / customer and even non-compliance to regulations. In Van Grembergen, De Haes & Guldentops (2004) terminology, proper IT Governance is needed to ensure that the investments in IT will generate the required business value and that risks associated with IT are mitigated.

According to (Weill & Ross, 2005), IT Governance performance correlate with desired corporate performance measure. For example, companies that have better IT governance may profit 20% higher than those of other companies pursuing similar strategies and also achieve higher returns on equity. They argue that IT Governance and bottom-line performance measures correlate quite well.

Good Corporate Governance may not be the only reason organization initiates IT Governance. More practical manner sometimes drives the need for IT Governance, for example at author's client, a SOE bank, underlined that board of directors demand accountability for return from huge IT investment. From the terminology of ITGI (2003), we identify the 'stakeholder value drivers' which was the reason an organization embarked on IT Governance. We can also see that in AS-8015:2005 *Corporate Governance of Information & Communications Technology* we have the same driver concept, which are business pressures and business needs of IT Governance (Standards Australia, 2005). It is interesting to understand how pressures from stakeholders drives the need of IT Goverrrnance at SOEs. Maybe, some SOEs do not have good IT Governance because they do not have the need for it.

On the other hand, if in the when cases IT Governance is clearly needed, there are some SOEs who had easier time implementing IT Governance. I might suppose that must be some external factors that smoothens the IT Governance implementation. At the other end, some other SOEs had difficult times implementing IT Governance, which I assume that some external forces also takes place which hinders good IT Governance. We name this external supporting as enablers of IT Governance and we name the opposing as inhibiting factors. These terms are inspired by Luftman, Brier & Pap (1999) study of enablers & inhibitors of business-IT alignment.

1.2 IT Governance Philosophy Used

For the purpose of this research, to large extent we are using IT Governance Institute family of frameworks as our main reference, which includes ITGI (2003), ITGI (2007) and ITGI (2008). This school of thought also extends to IT Governance definition of van Grembergen (2004) and also related work such as Van Grembergen, De Haes & Guldentops (2004).

Other works are also referenced, but they are supplemental in nature.

1.3 Research Question

Let us now define our problem in term of research question below:

No.	Research question	Relevant theory
1.	How well do the SOEs in Indonesia govern their IT? How sophisticated is their IT Governance processes? (i.e. what is their IT Governance control objective maturity level[1]?)	Domain ME4 'Provide IT Governance' of COBIT 4.1 (ITGI, 2007)

[1] We shall later may simply use the term 'IT Governance level' to refer to IT Governance control objective maturity level as defined in COBIT 4.1 (ITGI, 2007).

2.	Also, do higher IT Governance level leads to higher return value from IT investment and also lower number of risk?	ITGI (2003) and Van Grembergen, De Haes & Guldentops (2004)
3.	Does IT Governance maturity level have an impact on bottom-line company performance?	(Weill & Ross, 2005)
4.	In addition, we would like to know what drives good IT Governance in organizations. What are the major drivers? Do number of drivers acting on a SOE correlates with the IT Governance level?	Business pressure/needs of AS-8015 of Standards Australia (2005), also stakeholder value drivers of ITGI (2003).
5.	We also wanted to know, what factors enables good IT Governance practices? And what are the inhibiting factors of good IT Governance on those organizations? Do number of enablers and inhibitors acting on a SOE correlates with the IT Governance level?	Inspired by Luftman, Brier & Pap (1999) on enablers and inhibitors of business-IT alignment

1.4 Research Significance

The significance of this research is that the results can be used as input for Ministry of State Owned Enterprise to prioritize policies or revise existing regulations.

It can also help SOEs to benchmark their IT Governance practices among themselves, thus provide an indication what are the things they need to improve.

Thus, agreeing to Becker, Saul, Bryman & Sempik (2006). (2006), eventually the results of this study can develop the capacity of policy maker and service users (in this case SOEs) to make informed decision and take appropriate actions.

1.5 Scope of Study

The scopes of this study are as follows:

1. The primary qualitative data source is a collection of theses along with their interview transcripts and observation notes which used the same IT Governance framework that shall be explained later in this document. These theses are the works of students at the Graduate Program in Information Technology, University of Indonesia, during January to December 2007 periods. It must be noted that the author came up first with the research design before the students joined the research. The author in many cases also went to the field with the students.
2. The data extraction is only focused on elicitation of the original data source without changing the substance.
3. The mode of quantitative analysis shall use parametric test whenever possible.
4. Reliability test of quantitative dataset shall be done by the means of correlating variables with the same topic.

1.6 Writing Structure

This dissertation is written with the following structure:

1. Chapter 1 explains the subject matter of this research, research problem and question, significance of the research, and scope of this study.
2. Chapter 2 elaborates some definitions of IT Governance and also previous studies on IT Governance.
3. Chapter 3 describes the theoretical foundation which this research relies on.
4. Chapter 4 explains the research methodology, including both the qualitative and quantitative research design.

5. Chapter 5 explains how the data are analyzed, including the discussion of both the qualitative data extraction process and the quantitative statistical test processing.
6. Chapter 6 explains the analysis of research result including the triangulation of the research result with the previous studies (including foreign studies) and the implications of the research result.
7. Chapter 7 describes the conclusions and further works based on the result of this research.
8. At the end we present the reference list and also the questionnaire used for the survey.

CHAPTER 2 Literature Review

2.1 Attempting to Define "IT Governance"

As there has been some misunderstanding and different perceptions of IT Governance, we shall attempt to first define it. The first mention of IT Governance was actually coined by renowned information systems researchers, Henderson & Venkatraman (1993), in their seminal paper in IBM Systems Journal, nearly two decades ago. They define what was called 'I/T Governance' as selection and use of mechanisms to obtain and deploy competencies.

Still in the same journal, Jerry Luftman (1993), a former IBM Consultant, former CIO and now a Professor at Stevens Institute of Technology, defines 'I/T Governance' as the extent of ownership of organization's technology (e.g. end user executive, steering committee) or the possibility of technology alliances (e.g. partnership, outsourcing) or both. However, later on Luftman redefined his definition of IT Governance to 'the degree to which the authority for making IT decisions is defined and shared among management, and the processes managers in both IT and business organizations apply in setting IT priorities and the allocation of IT resources' (Luftman, 1996).

Brown & Magill (1994) defines IT Governance as a concept that describes the locus of responsibility for IT functions. Robert W. Zmud and V. Sambamurthy in their 1999 research on multiple contingencies that influence IT decision making, refers IT Governance to the patterns of authority for key IT activities (Sambamurthy & Zmud, 1999). Shortly afterwards, they propose another perspective similar to Brown & Magill (1994). They defined IT Governance as the locus of enterprise decision-making authority for core IT activities (Sambamurthy & Zmud, 2000).

According to IT Governance Institute *Board Briefing on IT Governance, 2nd ed*, the organization that published the COBIT standard, IT Governance is the responsibility of the board of Directors and executive management. IT Governance is an integral part of enterprise governance and consists of the leadership and organizational structures and processes that ensure that the

organization's IT sustains and extends the organization's strategy and objectives. Critical to the success of these structures and processes are effective communication among all parties based on constructive relationships, a common language and a shared commitment to addressing the issues (ITGI, 2003).

Included in the same document is the IT Governance focus areas, which consist of: stakeholder value drivers; strategic alignment; value delivery, resource management; risk management and last but not least, performance management.

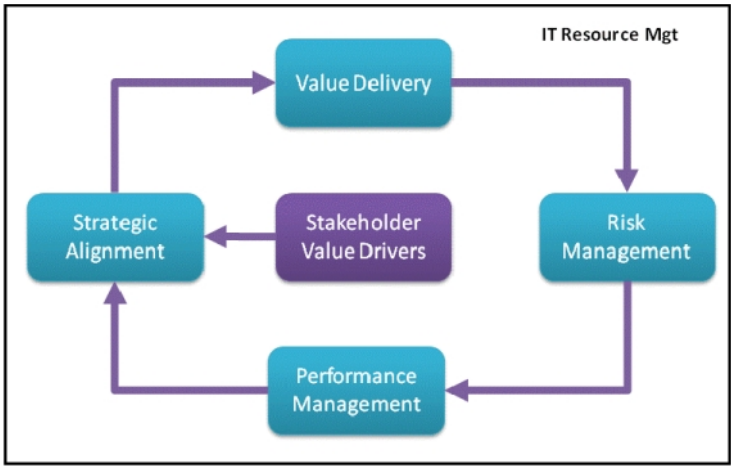


Figure 1. IT Governance Focus Area (ITGI, 2003)

Schwarz & Hirschheim (2003) defined IT governance as the IT related structures or architectures (and associated authority pattern) implemented to successfully accomplish (IT imperative) activities in response to an enterprise's environmental and strategic imperatives. In defining governance this way, they included three essential elements to governance:

1. Strategic and environmental imperatives that define a necessary response from IT.
2. Structures designed to support the response.
3. An imperative for IT to be successful in this design.

Prominent IS researchers, Peter Weill & Jeanne Ross of Centre of Information Systems Research (CISR), Sloan School of Management, MIT, defined IT Governance as specifying the decision right and accountability

framework to encourage desirable behaviour in the use of IT (Weill & Ross, 2004, 2005). It seems that their definition is somehow similar to the definitions of Sambamurthy & Zmud (1999, 2000). Weil & Ross's (2004, 2005) definitions seems also be embraced by Saha (2005).

Peterson (2001) also has somewhat similar definition as above. He defined IT Governance as the formal allocation of IT decision-making authority. However in 2004, Peterson reformulated and enhanced his definition. He defined IT Governance as the system by which an organization's IT portfolio is directed and controlled. It also describes the distribution of IT decision making rights and responsibilities among different stakeholders in the organization, and the rules and procedures for making and monitoring decisions on strategic IT resources (Peterson, 2004b).

During an interview in *Information Management*, Prof Van Grembergen, a recognized IT Governance researcher from University of Antwerpen Management School (UAMS) and also a committee member at IT Governance Institute, stated that IT Governance is the organizational capacity exercised by the Board, Executive management and IT management to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT (Van Grembergen, 2004).

Rau (2004) while agreed with ITGI's definition, also explained that IT Governance is about the way senior managers interact and communicate with IT leaders to ensure that technology investments enable the achievement of business strategy in an effective and efficient manner.

Standards Australia (2005) has devised their own standard for 'Corporate Governance of Information & Communication Technology', known as AS 8015 - 2005. It defines Corporate Governance of ICT as 'the system by which the current and future use of ICT is directed and controlled. It involves evaluating and directing the plans for the use of ICT to support the organisation and monitoring this use to achieve plans. It includes the strategy and policies for using ICT within an organisation'.

2.2 Dimensions of IT Governance

Based on our review on existing IT Governance definitions, we try to interpret and extract important dimensions of from each one of them.

Definition	Dimensions				
	Decision making, authority, responsibility within an organization structure	Leadership	Process, as a management cycle (from planning to monitoring)	Resource Management	IT used to accomplish organization's strategy or objective, or IT to respond business pressure
Henderson & Venkatraman (1993)				✓	
Luftman (1993)	✓				
Luftman (1996)	✓		✓	✓	
Brown & Magill (1994)	✓				
Sambamurthy & Zmud (1999)	✓				
Sambamurthy & Zmud (2000)	✓				
Peterson (2001)	✓				
ITGI (2003)	✓	✓	✓		✓
ITGI (2003) IT Governance Focus Area (model)			✓	✓	✓
Schwarz & Hirschheim (2003)	✓				✓
Weill & Ross (2004)	✓				
Van Grembergen (2004)	✓	✓	✓		✓
Rau (2004)		✓		✓	✓
Peterson (2004)	✓		✓	✓	
Standards Australia (2005)			✓		✓
Standards Australia (2005), AS-8015 (model)	✓	✓	✓		✓

Table 1. Dimensions of IT Governance

2.3 Previous Studies

Luftman, Brier & Pap (1999) studied enablers & inhibitors of business-IT alignment. This research is quite of our interest for two reasons. First, alignment is one of the IT Governance focus area (ITGI, 2003). Second, it maps well with our research agenda to find inhibitors and enablers of IT Governance. The survey data on which their findings rest on were obtained from executives from over 500 firms representing 15 industries attending classes at IBM's Advanced Business Institute. Analysis of the survey data shows that the enablers and inhibitors are:

Enablers	Inhibitors
Senior executive support	IT/non-IT lack close relationship
IT involved in strategy development	IT does not prioritize well
IT understands business	IT fails to meet its commitments
IT, non-IT have close relationship	IT does not understand business
IT shows strong leadership	Senior executives do not support IT
IT efforts are well prioritized	IT management lacks leadership
IT meets commitments	IT fails to meet strategic goals
IT plans linked to business plans	Budget and staffing problems
IT achieves its strategic goals	Antiquated IT infrastructure
IT resources shared	Goals/vision are vague
Goals/vision are defined	IT does not communicate well
IT applied for competitive advantage	Resistance from senior executives
Good IT/business communication	IT, non-It plans are not linked
Partnerships/alliances	

Table 2. Enablers & inhibitors of business-IT alignment (Luftman, et.al., 1999)

Zmud & Sambamurthy (1999) conducted case study research at 8 organizations about their arrangements of IT Governance. They studied multiple contingencies (pulls & pressures) from different factors influencing the IT Governance mode of the organizations. Those contingent forces includes different corporate governance mode, geographic dispersion, line IT knowledge (absorptive capacity of IT), and economies of scope (corporate & business strategy). The research suggests that reinforcing contingencies will induce either a centralized or decentralized mode of IT governance. Conflicting contingencies will induce a federal mode of IT governance. Lastly, the findings showed that dominating contingencies will induce centralized or decentralized mode of IT governance.

Peterson (2001) conducted an exploratory case study at three European financial service companies. The findings indicate that financial institutions adopt distinct hybrid configurations and coordination mechanisms contingent on their strategic context. The results suggest that whatever formal configuration is chosen for IT governance, mechanisms for *lateral coordination* (relational mechanisms) need to be addressed. Effective mechanisms for lateral coordination move beyond the level of structure, and focus on the different stakeholders involved in the IT governance process.

Later on, Peterson (2004) conducted a literary study from several published research papers to see how various determinants such as organization size, business strategy and governance business structure influence IT decision making rights. From the research he concluded that centralized IT decision making seems to be associated with organizations which are small, have a cost-focus business strategy, exist in a stable environment, centralized governance structure and low experience/competence in managing IT. On the other hand, decentralized IT decision making seems to be associated with large, complex organization following an innovation strategy in a volatile environment, characterized by decentralized business governance structure and high competence in managing IT.

Peterson admitted though, that the findings are not prescriptive. A combined approach of centralization & decentralization can be used. Like

previous researchers such as Zmud & Sambamurthy (1999), Hodgkinson (1996), Rockart et.al. (1996), Peterson also argued that federated IT decision making model is one model that organizations adopt to answer those various determinants.

However Peterson – again – argued that by using a federated model, where some decisions are made centrally, is essentially still a vertical division of labour. To achieve the intended organization objective, an organization needs an integration mechanism to coordinate IT activities distributed across organization. That is the point where relational integration process and structures (both are called *relational mechanisms*) takes place (Peterson 2004).

Ribbers, Patel and Parker (2002) studied the significance of IT Governance process and structures at nine organizations. They showed that the use of management tools and frameworks (such as balanced scorecard, information economics, etc.) are insufficient to govern IT effectively. These tools should be embedded within the organizational context of stakeholders' experiences, judgments and understanding. On the other hand, attention for stakeholders' experiences and judgments, without some analysis of costs, benefits and risks, is unlikely to lead to a satisfactory result. Hence organizations need to infuse the use of IT Governance tools into organization context.

In his case study at ING, a global financial service company, Kan (2004) showed how ING manages different portfolios of IT investment to achieve different organization objective. Kan showed that shareholder return is at least partly related to IT intensity, i.e., how much and how money is spent on IT. There is some evidence for potentially good returns on IT new development activity. In the short term, best shareholder return is generated by transactional (cost saving) projects because they emphasize standardization and efficiency, which result in lower cost per transaction. However, strategic IT investments must also be pursued to create future revenue growth and to further improve sustainable financial performance for all stakeholders. ING, are not risk-averse, but they strongly prefer to take a calculated risk to allow strategic initiatives to sustain competitive advantage.

A quite similar study was also done by Jeffery & Leliveld (2004). Basically they categorized IT portfolio into a 2 x 2 matrix formed by value from

IT investment versus risk of those investment. They suggest that a project within the low risk and high value quadrant should be pursued.

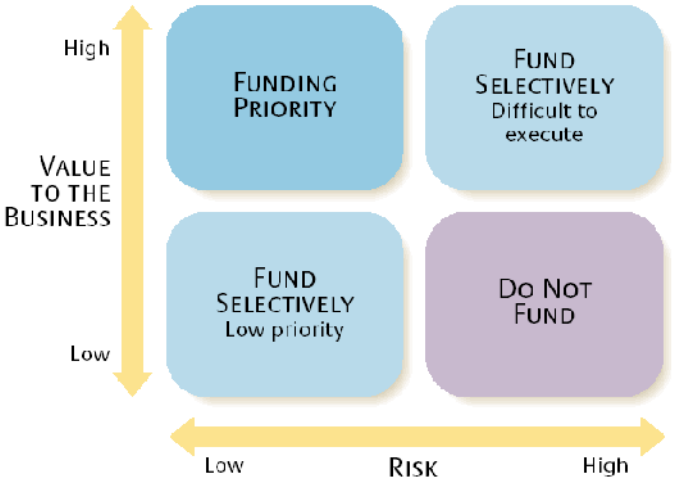


Figure 2. Jeffery & Leliveld's (2004) framework to prioritize IT investments

They also clustered the maturity on how the organization manages their IT portfolio, from defined stage, managed stage and then to synchronize staged, being synchronized as the most sophisticated. The synchronized stage is characterized by continuous monitoring of IT portfolio, and in this stage weeding out a bad IT investment even after it was executed is not a an 'embarrassment'.

They conducted survey with 130 respondents, mostly CIO. Although only 17% of the organizations polled are at the synchronized stage, Jeffery & Leliveld's findings suggest that becoming synchronized is the right move for others. They experienced cost savings of up to 40% of budgets before having a synchronized IT portfolio management, better alignment between IT spending and business objectives, and greater central coordination of IT investments across the organization.

Subsequently, IT Governance Institute (ITGI, 2006) produced a guideline called *Val IT*, which suggest best practice IT Value Delivery parallel to Jeffery & Leliveld's (2004) maturity model on how organizations manages their portfolio of IT investment to bring maximum value while reducing risk to the organization. Kan's (2004) work provides a strong foundation in this ITGI publication. *Val IT* differs from COBIT (ITGI, 2007). While the primary focus of COBIT domains is

on delivering the technology capability that enterprise need, the primary focus of *Val IT* is on delivering business value.

Val IT recommends three major processes to obtain maximum return from IT investments. First, the *Value Governance* process, by establishing governance framework & control, and also strategic direction for investments. Second, *Portfolio Management* process, by managing investment profiles, evaluating, prioritizing, deferring and rejecting investments. Third, *Investment Management* process, by developing business cases, manage the execution of IT programmes/projects, and actively manage the realization of benefits.

Weill & Ross (2004, 2005) developed a simple matrixed IT Governance framework that can help companies allocate IT decision rights and accountabilities so that each IT decisions align with strategic objectives. The matrix comprises *what* kind of decision must be made versus *who* should make the decision. Those major decisions includes IT principles, IT architecture, IT infrastructure, business application needs, and IT investments. They also propose six archetypal patterns of on who makes the decision ranging from the centralized business monarchy archetype, to feudal (decentralized business unit dominated IT decisions) archetype.

Their research suggests that there is no single best model for IT Governance. Given different strategies and organizational forms, different enterprises will attempt to encourage different IT governance pattern. They also showed that top performing organizations govern significantly different from other companies. The seven characteristics of top governance performers are (Weill & Ross, 2004):

1. More managers in leadership positions could describe IT governance
2. They can describe IT Governance, simply because they engage more often and more effectively.
3. More direct involvement of senior leaders in IT governance
4. Clearer business objectives for IT investments
5. More differentiated business strategies

6. Fewer renegade and more formally approved exceptions
7. Fewer changes in governance from year to year

Decision Arche-type	IT Principles	IT Architecture	IT Infrastructure Strategies	Business Application Needs	IT Investment
Business Monarchy					
IT Monarchy					
Feudal					
Federal					
Duopoly					
Anarchy					
Don't know					

Table 3. Governance Arrangement Matrix (Weill & Ross, 2004).

In addition, those top performing organizations can be categorized further:

- Most profitable companies tend to centralize their IT decision making, characterized centralized committees for enterprise wide decision making process, architecture compliance, and formal post implementation review of IT projects.
- Fast revenue growing companies, focusing on innovation and time to market, tend to insist on local (decentralized) accountability. They try to maximize customer responsiveness by limiting number of governance constraints and use only a few technology standards.
- Companies seeking optimal asset utilization, attempt to balance the contrast between governance for profitability and governance for revenue growth and innovation. They emphasize on shared service of process, technology and data to achieve responsiveness and/or economies of scale. Asset utilization demands a hybrid approach of IT Governance, mixing elements of centralization & decentralization.

Csaszar & Clemons (2006) study about governance of IT function, revealed several major points. They suggest that under most conditions the governance of the IT functional area does affect the performance of the firm; and the CIO's business savvy and ability to communicate with the rest of the senior

management team will affect performance, by determining the quality of consensus decisions reached and the speed with which consensus is achieved.

In 2005, Saha (2005) conducted an IT Governance research in cooperation with MIS Asia. The research showed that while respondents demonstrated a strong awareness of IT Governance and how important it is to overall business performance, a large majority felt they did not adequate internal support for IT Governance. Few were taking advantage of IT Governance in enhancing business value. While discussion on IT decisions take place at the highest levels it seems to focus on IT investments. Most organizations feel that IT is important but not strategic, and still use cost as an important criterion for measuring IT success.

In addition, Saha also list IT governance related problems in this research, amongst them are:

- slow mechanisms to make IT decisions
- IT resources are frittered away in fire-fighting
- senior management senses low value from IT investment

Bi-annually, since 2004, PriceWaterhouseCoopers International Survey Unit in collaboration with IT Governance Institute publish IT Governance Global Status Report (ITGI, 2006b, 2008). It is a global survey with 749 respondents around the world, conducted using telephone or mail. Some of the latest research key findings include:

1. Although C-level executive champions IT Governance, in daily practice IT Governance is still a CIO/IT director issue.
2. Self-assessment regarding IT Governance is increasing
3. Communication between IT and user is improving slowly
4. Compared to the 2006 report, in 2008 they observer that there is a large increase of action being taken or plans are underway to implement IT Governance
5. More than half respondents apply or plan to apply Val IT principles of good governance of IT investments, but not familiar with the ‘Val IT’ brand. A major obstacle to adoption of good governance of IT investment is the lack of knowledge/expertise.

De Haes & Van Grembergen (2006) conducted several case studies on best practice IT Governance at six (6) Belgian organizations. It also includes their previous major in depth case study at KBC, one of the large banks in Belgium (De Haes & Van Grembergen, 2005). They started their case study with several propositions. First, organizations are using a mix of structures, processes and relational mechanisms to build up an IT governance framework. Second, the chosen mix of structures, processes and relational mechanisms is dependent upon multiple contingencies. Lastly, a well balanced mix of structures, processes and relational mechanisms will enable better IT governance outcomes. Findings of from these six case studies indicated that those propositions are supported.

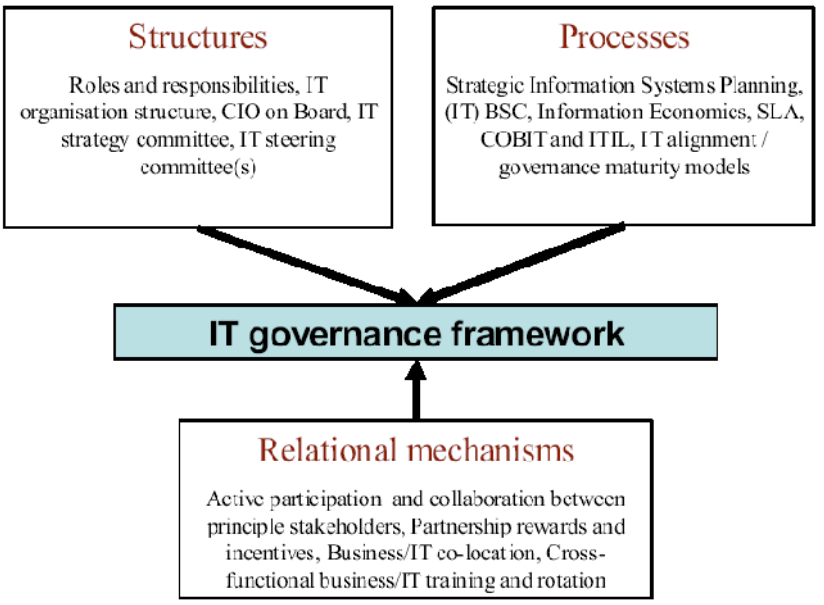


Figure 3. DeHaes & Van Grembergen's (2006) elements of IT governance framework

There are some other interesting results from De Haes & Van Grembergen's (2006) research. IT steering committees are common practice and are used in many different names. IT strategy committees at the other hand are not common in Belgium. Most companies operate either in centralized or federated IT governance mode. In the federal model, operations are centralized to achieve economies of scale, but developments are decentralized to stay closer to business need. Regarding IT governance processes, De Haes & Van Grembergen found that the BSC and COBIT are not (or merely) used and that processes found in ITIL such as SLA are more popular. Many prioritization methods and processes

were identified, based on IE or other frameworks accompanied with ROI type of measures. Finally, many relational mechanisms were used in the domains of shared understanding of business/IT objectives, active conflict resolution, cross-functional business/IT training and business/IT job rotation. In many cases, these mechanisms were rather informally organized.

By examining previous studies, we conclude that we have not yet found any IT Governance survey research at Indonesian State Owned Enterprises. Moreover, we have not discovered any research concerning what are the drivers, enablers and inhibitors of good IT governance. Luftman, Brier & Pap's (1999) work on enablers & inhibitors of business-IT alignment actually inspires our research.

CHAPTER 3
THEORETHICAL FRAMEWORK

3.1 Framework Employed

The following sections explained what framework this research used to answer the research problem described in section 1.2.

3.1.1 Framework for IT Governance Maturity Level

We derive some questions from best practice framework – in this case section ME4 'Provide IT Governance' of COBIT (ITGI, 2007). It answers the question of, *"How well are they governing their IT, irrespective of their organization context?"* We hope by referring to a professional standard like COBIT, the research result will be acknowledged by professional community, not just by academics. Note instead of using process maturity level, we developed control objective maturity question from the defined control objectives.

The reason for this approach is because in our opinion, the process maturity level definition in COBIT ME4 is too vague and ambiguous to be asked to the respondents. However, by using control objective maturity, readers ought to be aware that lower control objective maturity level does not imply that the organization's IT Governance is worse than organization with higher control objective maturity level. Probably it only needs less sophisticated form of IT Governance due to less organizational complexity it has.

Recall at the first paragraph of this sub section, we implied that COBIT was used because it is a widely accepted professional standard. This does not imply that COBIT can not be used in scientific work like ours. Tuttle and Vandervelde (2007) proved that matching COBIT's conceptual model onto audit relevant assessments confirms the internal consistency between the underlying

constructs of CobiT. The assessments were made by a panel of highly experienced IT auditors. In our opinion, this research showed the validity of COBIT, hence it is viable to use COBIT in scientific research.

Another issue that needs explanation is of why did we not use the whole COBIT. i.e. all of the four domains (PO, AI, DS and ME). First, the large nunber of questions that must be derived from them – and then asked to the respondents - will make data collection impractical as it may become uncessarily too long to take. Second, as De Haes & Van Grembergen (2008) propose an IT Governance baselining, they also discard IT Governance practices at operational level. Therefore, we opt to pick ME4 'Provide IT Governance' as the best subdomain of COBIT to be used in our research, as we want to keep the research at the strategic level.

The IT Governance maturity model used in this study itself is originally modelled after Software Engineering Institute Capability Maturity Model (SEI-CMM). Below we present the IT Governance Maturity Levels that will be used (ITGI, 2003):

0 Nonexistent – Management processes are not applied at all

1 Initial – (IT Governance) processes are ad-hoc and disorganized

2 Repeatable – (IT Governance) processes follow a regular pattern

3 Defined – (IT Governance) processes are documented and communicated

4 Managed – (IT Governance) processes are monitored and measured

5 Optimised – (IT Governance) best practices are followed and automated

We developed our own questions best to operationalize each IT Governance focus area. Those IT Governance focus areas are as follows:

1. **Strategic alignment** focuses on ensuring the linkage of business and IT plans; on defining, maintaining and validating the IT value proposition; and on aligning IT operations with enterprise operations.
2. Value delivery is about executing the value proposition throughout the delivery cycle, ensuring that IT delivers the promised benefits against the strategy, concentrating on optimising costs and proving the intrinsic value of IT.
3. Resource management is about the optimal investment in, and the proper management of, critical IT resources: applications, information, infrastructure and people. Key issues relate to the optimization of knowledge and infrastructure.
4. Risk management requires risk awareness by senior corporate officers, a clear understanding of the enterprise's appetite for risk, understanding of compliance requirements, transparency about the significant risks to the enterprise, and embedding of risk management responsibilities into the organization.
5. Performance measurement tracks and monitors strategy implementation, project completion, resource usage, process performance and service delivery, using, for example, balanced scorecards that translate strategy into action to achieve goals measurable beyond conventional accounting.

A glance at 33 baseline IT Governance pratices of De Haes & Van Grembergen (2008) revealed plenty of similarities with our IT Govermamce control objective maturity questionaire based on ME4 'Provide IT Governance' as shown in appendix A.

We did not use model-based IT Governance assessment developed by Simonson et.al (2007). They claimed that their proposed method is easier use for collection of data, requiring less professional judgment of the data collector. It is also COBIT based. We agree on their point that it is easy to use, but we argue that their proposed IT Government assessment method is best suited for case studies or real-world audit. Still, the number of questions to be filled is still way too much to be a practical approach in a large scale survey like our research.

3.1.2 Framework for Drivers

We recategorize – albeit loosely - the 'stakeholder value drivers' from the ITGI (2003) IT Governance focus area with AS-8015's business pressures and business needs (Standards Australia, 2005), into a new dimension we call 'Drivers for IT Governance'. We did not discriminate between external business pressure and internally oriented business need, since it may make the interview process a bit more complicated.

'Drivers for IT Governance' variable demonstrates what are the things that drive the organization to implement good IT governance. We were unable to find any scientific research paper that gathered empirical evidence of what the drivers are. Moreover, Schwarz & Hirschheim (2003) also emphasized that one element of IT governance is the IT response to strategic and environmental imperatives.

3.1.3 Framework for Enabler & Inhibitors

During the qualitative phase of the research as we shall explain in section 4.1.4 and section 5.1, we also noticed that some organization, knowingly that they had to carry out certain best practice process, cannot perform that process, because of certain things that we call *inhibitors*. In other cases, we found the opposite. We found several factors that actually help or *enable* the organization to implement good IT Governance.

We coined the term *enablers* and *inhibitors* of IT Governance, inspired by a study by Luftman, Brier & Pap (1999) on enablers and inhibitors of business-IT alignment.

3.1.4 Framework for IT Value & IT Risk

In addition, the questions relating to IT value and IT risk were taken from previous survey (ITGI, 2008) because we would like to have a degree of comparability between them. We know also that ITGI (2003) and Van Grembergen, De Haes & Guldentops (2004) also suggest that good IT Governance is important to create IT value and mitigating IT risks. Note that we supplement the ITGI (2008) survey question about IT value with our own rephrased question to eliminate bias inherent in the question.

3.1.5 Association between IT Governance and Bottom-line Financial Performance

According to (Weill & Ross, 2005), IT Governance performance correlate with desired corporate performance measure. For example, companies that have better IT governance may profit 20% higher than those of other companies pursuing similar strategies. They also achieve higher ROE (returns on equity). Although Weill & Ross cannot conclude whether superior governance performance causes superior financial performance, they argue that both measures correlate quite well and it is plausible that the two are linked.

In our case here in Indonesian SOEs, the bottom line corporate performance measurement has been laid down in Ministry of SOE Decree no.Kep-100/MBU/2002 on Evaluation of Health Level of SOEs. It described three categories of SOE health level: healthy (sehat), rather healthy (kurang sehat), and not healthy (tidak sehat), each category with three addition subcategories. The health level can be calculated by considering financial, operational and administrative aspects. The financial aspect can be derived from fincancial statements that had been audited by a public accountant or the National Audit Agency (Badan Pemeriksa Keuangan). The other two aspects parameters are established during stakeholders' general meeting (rapat umum pemegang saham/RUPS) and evaluated by the board of commissioners (dewan komisaris).

3.2 Conceptual Model Hypothesis

To make a clearer picture, we sketched a correlational hypothesis from all of the contributing factors (drivers, enablers, inhibitors) down to the outcomes of IT Governance. This is modelled after stakeholder value drivers of IT Governance focus area (ITGI, 2003) and partly inspired by Luftman et.al (1999). It also sketches the IT Governance level of the SOEs taken from COBIT ME4 (ITGI, 2007). It also models the impact on value delivered from IT investment and its imposing risks, similar as described by Van Grembergen, De Haes & Guldentops (2004). Finally, the model also shows the plausible link / association between IT Governance level and SOE's health level.

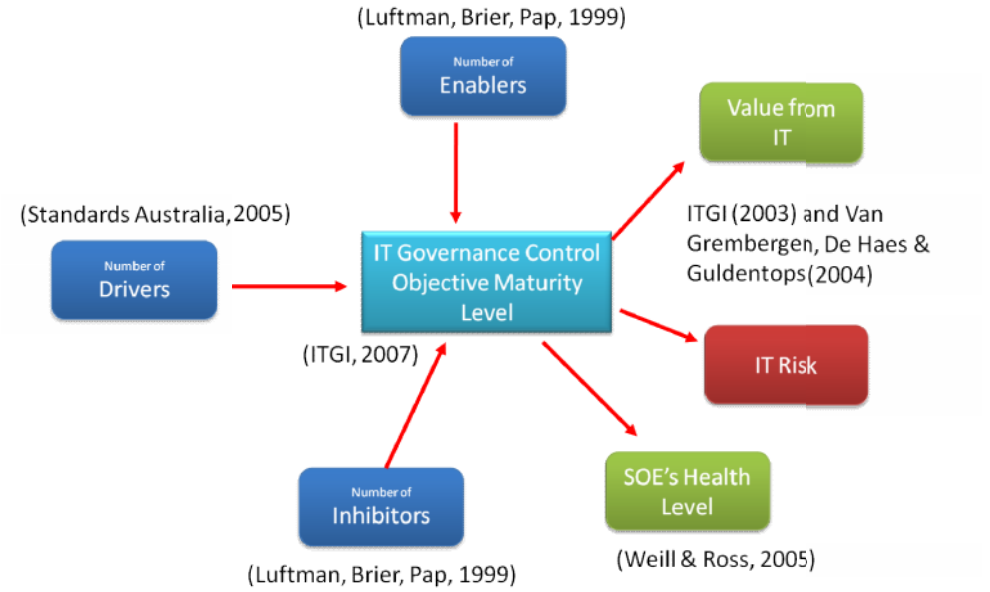


Figure 4. Conceptual model hypothesis of our research questions along with relevant theories

Special note on IT risks, we may break it down to more operational concept. Since for practical and future comparability reason we use ITGI (2008) survey as our basis, then the operational concept of IT risks has to be selected from what is available from ITGI (2008). If we assume that IT risk can be defined as security for information systems, then we may base it on the concept of CIA (confidentiality, integrity and availability) as defined by (Harris, 2003). Thus in our research here, the IT risk operational concepts are:

a. IT service delivery problems
b. Problems with business continuity and/or disaster recovery plan
c. Serious IT operational incidents
d. Privacy related incidents

3.3 Some Hypothesis Testing Related to the Conceptual Model

Although the statistical testing of the conceptual model hypothesis will be elaborated in section 5.2.3 about 'Association Among Variables Based on Conceptual Model', in this section we declare some of the related hypothesis.

1. Null hypothesis H_0: there is no associaton between number of IT Governance drivers and IT Governance maturity level

   Alternate hypothesis H_A: there is an associaton between number of IT Governance drivers and IT Governance maturity level

2. Null hypothesis H_0: there is no associaton between number of IT Governance enablers and IT Governance maturity level

   Alternate hypothesis H_A: there is an associaton between number of IT Governance enablers and IT Governance maturity level

3. Null hypothesis H_0: there is no associaton between number of IT Governance inhibitors and IT Governance maturity level

   Alternate hypothesis H_A: there is an associaton between number of IT Governance inhibitors and IT Governance maturity level

4. Null hypothesis H_0: there is no associaton between IT Governance maturity level and how much value of IT investment being felt (experienced)

   Alternate hypothesis H_A: there is an associaton between IT Governance maturity level and how much value of IT investment being felt (experienced)

5. Null hypothesis H_0: there is no associaton between IT Governance maturity level and SOE's health status

   Alternate hypothesis H_A: there is an associaton between IT Governance maturity level and SOE's health status

6. Null hypothesis H_0: there is no associaton between IT Governance maturity level and IT risks experienced

   Alternate hypothesis H_A: there is an associaton between IT Governance maturity level and IT risks experienced

   IT risks are caluclated several times, as IT risk variable are decomposed / operationalized into other more 'practical' variable, which are:

   - IT Service Delivery Problems
   - Inadequate Business Continuity Plan / Disaster Recovery Plan

- Serious IT Operational Incidents
- Privacy/Security Incidents

All of those operatinal variables were taken from ITGI (2008), and the data were of course also taken during data collection.

CHAPTER 4
RESEARCH METHODOLOGY

4.1 General Approach

4.1.1 Two stage multi paradigm design

This research has a multi-paradigm approach, i.e. combined qualitative paradigm and quantitative paradigm (Creswell, 1994). The research started with multiple qualitative interpretive case studies (Yin, 1994). The objective of this qualitative phase is to capture the depth, or the rich story (the *why* and *how*) of IT Governance practices and problems in Indonesian state owned enterprises (Creswell, 1994).

This study also uses a two stage design as explained by Cooper & Schindler (2006). Early on, much of the problems were not known, but should be known before the costly survey is conducted. The first half exploratory study should find the major dimensions of the research, development of hypothesis, and eliciting factors to be asked. Besides the exploratory case studies mentioned, supplementary literary review is also important. For the other half of this research, we used a positivist paradigm research approach to enhance our findings, that is, a descriptive quantitative survey (Sekaran, 1992).

Apparently this multi-paradigm approach is also similar to the approach of Centre for Information Systems Research (CISR) Sloan School of Management, Massachusetts Institute of Technology when they did their IT Governance research during 1995-2004 (Weill & Ross, 2004).

This research is also a social policy research (Becker et.al, 2006), which one of the important issue of policy research is the development of capacity of policy maker (Ministry of State Owned Enterprise) and/or service user (the State Owned Enterprises) to make informed decision and then take appropriate actions.

4.1.2 Time Horizon

The descriptive study in this research provides a 'snapshot' or description of elements at a given point in time, thus called cross-sectional study (Hair et.al, 2007). The exploratory case studies conducted earlier are also not meant to elicit factors and their changes in long period in time, generally the case studies also took 'snapshots'.

4.1.3 Unit of Analysis

According to Babbie (1998), formal social organizations are eligible for the unit of analysis in social scientific research. State owned enterprises are such example of formal social organizations, therefore eligible as the unit of analysis of this study. Since however we cannot 'ask an organization', the respondents are the IT head, IT manager or the IT staff responsible (or at least knowledgeable) for IT Governance.

4.1.4 Reasons for approaches/methods used in this research

To clarify the reasons behind a particular approach or method being used in this research, we shall show it in a more readable table format below:

Research issues to deal with	**Approach or method used**
There are unexplored research area (especially enabler & inhibitors of IT Governance), but at the same time we also wanted to have a reliable and statistically sound research results.	Multi-paradigm approach, i.e. qualitative approach followed-up with quantitative approach (Creswell, 1994). Two stage design (Cooper & Schindler, 2006).
The need for in depth investigation of IT Governance issues in Indonesia that might contextual differences.	The use of case studies (Yin, 1994) with no rigid samples yet. See also section 4.2.
Some issues during case study stage need deep understanding of the situation, for example in understanding	Besides common descriptive case study approach, *explanatory* case study (Yin, 1994) approach was also employed to

the motivations or drivers for IT Governance.	understand the *why* of IT Governance in Indonesia.
The need to provide sound qualitative result as a basis for the next quantitative stage. For example in this research, the elicitation of extensive list of drivers, enablers & inhibitors.	The use of multiple case studies (Benbasat et.al., 1987 and Yin, 1994) at the early stage of the research at several large Indonesian organizations. IT Governance case study with multiple cases was also done by Robb & Parent (2008).
The need to measure the IT Governance control objective maturity level of SOEs	Quantitative approach was considered approriate to answer this issue (Creswell, 1994). Shall be elaborated more in section 4.3. Since the population size is quite small, total sampling is used.
The need to eliminate requirement for probabilistic assumptions of the sample, and also to address the possibility of ending up with small number of samples.	The use of non-parametric statistics (Siegel & Castellan, 1988) for the quantitative research stage. Shall be explained in section 5.2.3.
The need to associate multiple nominal (or at most ordinal) variables as described in conceptual model hypothesis in section 3.2.	The extensive use of chi-square analysis (Cooper & Schindler, 2006). Shall be explained in section 5.2.3.

Table 4. Reasons for a particular approach and/or method being used

4.2 Qualitative Stage Method

The main purpose of this qualitative stage is to generate ideas, conjectures and hypothesis as a foundation for the next stage (Neuman, 2003).

The qualitative study in this dissertation is based on the eighteen of cases at several large Indonesian organizations, led by the authors under IT Governance Lab, Faculty of Computer Science, University of Indonesia. It was an explorative and qualitative research, because we want to find new ideas in the IT Governance family of theories. Those grounded research were mainly conducted during January to December 2007.

In addition, we would also like to include our observation as strategic IT consultant at large organizations using the framework of ethnographic research, since we immersed ourselves in the daily operation of the organizations we studied, and sought to place the phenomena studied in their social and cultural context (Lewis, 1985). Observations are eligible for complementary data source (Cooper & Schindler, 2006).

The samples were drawn from a carefully constructed sampling frame. The sampling frame includes organizations which are:

1. State Owned Enterprises (SOEs), because they have the obligation to comply with Good Corporate Governance mandated by the Ministry of SOE. Secondly, SOEs are interesting because they are experiencing liberalization & privatization with government slowly relinquishing part of its shares to public or foreign investors. This in turn will require more rigor governance for transparency of majority shareholder and the executives to protect the interest of minority shareholder and the public.
2. Banks, because they have the obligation to obey strict and detailed central bank rules and regulations, and they have relied completely on IT for their daily operations.
3. Some of the government agencies which we believe should have a high intensity of IT use. Usually its business had something to do with large number of transactional data.

4. Publicly owned companies, because they have to obey strict information disclosure regulations from Securities Exchange Authority (Bapepam-LK).
5. Highly regulated industries, such as airlines companies.
6. Large scale privately ownedd companies in a competitive market.

Apparently, the chosen sampling frame above implicitly also relate to judgmental or purposive sampling of the study, which samples were selected on the basis of researcher's own knowledge of the population (Babbie, 1998). Following the sampling frame, we use convenient sampling (Hair et.al, 2007) to reach to our respondents. Convenient sampling allows us to use our existing contacts, relations, connections or ties with the organizations. Some of our samples are actually also our consulting clients. It allows better in-depth discussion.

Note that six out of eighteen of the case study samples are state owned enterprises. At the early stage of this study, we have not known where to focus our attention, and that is the reason why the sampling frame was quite broad. As we shall see later, this research later focused on IT Governance at state owned enterprises.

The case studies research design was carefully designed by the researcher (me). The researcher also provided the original interview guide (list of questions). Later, case study research observation guide and the interview guide along with the codes were finalized together by the assistants (i.e. the students doing their master's theses) guided carefully be the researcher in a workshop. Those guides and codes were based on the aforementioned research framework. The guides were written in local language to allow easier interview by the assistants.

The research assistants then collected data, although in many cases the researcher accompanied them in the field data collection. A common short presentation about IT Governance developed earlier by the researcher was distributed to the assistants. It can be presented to respondent to gain common understanding of the subject matter. The assistants were allowed to add the interview guide during the interview to suit the situation.

The respondents in those case studies are mainly the IT managers, and in some cases we had access to the other functional managers or business unit managers. The interviews were recorded and transcripted. The transcripts are then analyzed with a qualitative data analysis software, using axial coding (Neuman, 2003) prepared by both the author and the research assistants. The author then reviewed and qualitatively analyzed the data with the research assistants.

4.3 Quantitative Stage Method

One of the purposes of the qualitative stage is to confirm the findings from the previous qualitative stages (including literary study). We believe that the focus of this research is to find the magnitude of the issues found at the qualitative stage, to see the magnitude of a problem when it exists. We also wanted to know the strength of the relationships among variables, as modelled in the conceptual model hypothesis in figure 4. We developed the questionnaire based on theoretical framework as described in chapter 3 and also naturally from results taken from qualitative stage.

To ensure validity of our survey questionnaire design, we pre-tested the questionnaires to several respondents (Neuman, 2003). It gave us some idea what might be the barriers during the data collection phase. The questionnaires were also face validated (Sekaran, 1992) by several of colleagues who had academic and practical IT management experience. The finalized questionnaire is presented in the appendix.

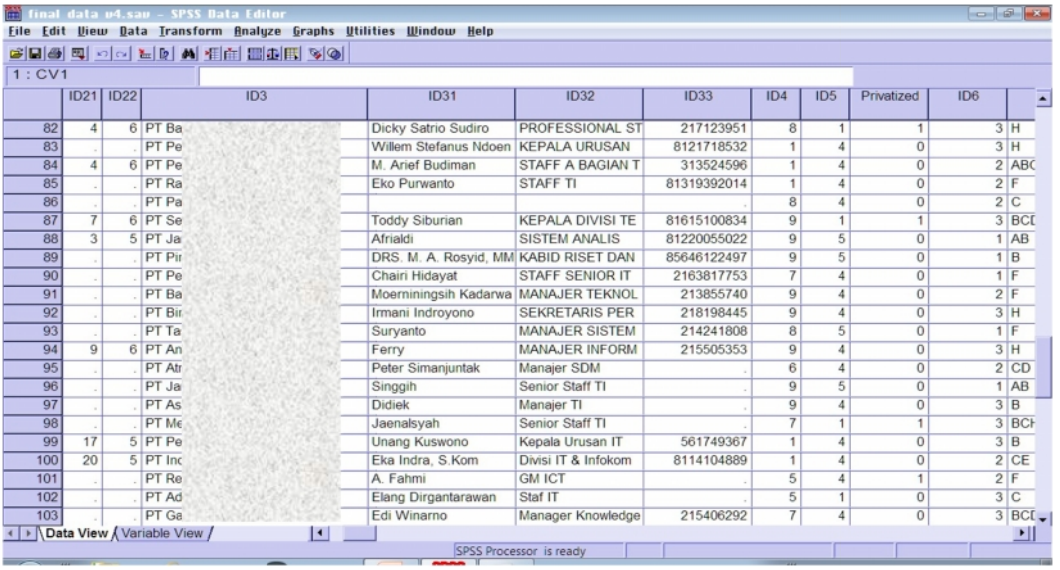
List or sampling frame (Babbie, 1998) of SOEs were taken from Ministry of State Owned Enterprises website (Kementerian BUMN, 2010), all of them totalled 147 SOEs. Therefore since we took all the available samples in the population, this research is actually a census (Neuman, 2003).

Before the data collection phase begins, the data collectors was trained how to properly administer questionnaires. The data collectors were explicitly told that the respondents must be the person responsible for the IT for the organization (e.g. IT Division Head), or person responsible for IT Governance for the organization. Upon the return of the questionnaires, we found that majority of the

respondents were the head of the IT unit or an IT manager of the SOE. Few were the staffs, which according the data collectors were delegated with the job filling the questionnaires. Even fewer were from IT unit such as human resources unit. This is due to the non-existence of IT unit at the particular SOE and/or other unit are assigned responsibility to IT related issues. Despite minor variability of the respondents, we still believe that the validity of the research is still high.

The finalized questionnaires were then sent by email, fax or brought by the data collectors to the respondents. From 147 listed respondents, 103 questionnaires (70%) were returned via the data collector directly, fax, or email during end of April 2010 to early June 2010. Unreturned questionnaires are due to company liquidation, rejection, uncooperative behaviour, or considered too long to respond. In our experience, the use of data collectors responsible for delivering and returning filled questionnaires significantly increase the return rate of completed questionnaires. Our previous attempt via e-mail only achieve 21% return rate.

The returned questionnaires were then entered into and analyzed with SPSS 13, a statistical software package. Some of the data, especially regarding the health status of each SOE, were taken from Ministry of SOE, and were inputed into the corresponding row/record based on company name. We were only able to get the 2009 SOE health status as our most recent reference.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1 : CV1

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83	.	.	PT Pe	Willem Stefanus Ndoen	KEPALA URUSAN	8121718532	1	4	0	3	H
84	4	6	PT Pe	M. Arief Budiman	STAFF A BAGIAN T	313524596	1	4	0	2	ABC
85	.	.	PT Ra	Eko Purwanto	STAFF TI	81319392014	1	4	0	2	F
86	.	.	PT Pa				8	4	0	2	C
87	7	6	PT Se	Toddy Siburian	KEPALA DIVISI TE	81615100834	9	1	1	3	BCI
88	3	5	PT Ja	Afrialdi	SISTEM ANALIS	81220055022	9	5	0	1	AB
89	.	.	PT Pir	DRS. M. A. Rosyid, MM	KABID RISET DAN	85646122497	9	5	0	1	B
90	.	.	PT Pe	Chairi Hidayat	STAFF SENIOR IT	2163817753	7	4	0	1	F
91	.	.	PT Ba	Moerniningsih Kadarwa	MANAJER TEKNOL	213855740	9	4	0	2	F
92	.	.	PT Bir	Irmani Indroyono	SEKRETARIS PER	218198445	9	4	0	3	H
93	.	.	PT Ta	Suryanto	MANAJER SISTEM	214241808	8	5	0	1	F
94	9	6	PT An	Ferry	MANAJER INFORM	215505353	9	4	0	3	H
95	.	.	PT Atr	Peter Simanjuntak	Manajer SDM	.	6	4	0	2	CD
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97	.	.	PT As	Didiek	Manajer TI	.	9	4	0	3	B
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103	.	.	PT Ge	Edi Winarno	Manager Knowledge	215406292	7	4	0	3	BCI

Data View / Variable View

SPSS Processor is ready

Figure 5. Data were analyzed using SPSS. SOEs name are obscured to hide company names.

Note that this is not an experimental causal study, but an ex post facto study, meaning the fact was happening or had already happened (Cooper & Schindler, 2006).. Therefore the research is not looking at suggesting ‘variable A causes variable B’, but more on the association (Sekaran, 1992) or prediction of one variable based on other variable (Cooper & Schindler, 2006). Therefore when we said that a causes B, actually it really means:

- A is associated with B or
- value of A can predict value of B.

During data processing, apparently it was found that the question ‘Has IT brought value to the organization’ seems biased due to leading question design as the question was taken from ITGI (2008). Therefore, the question was rephrased so it should not lead the respondents to a particular answer. Along with a reduced set version of the original 2010 questionnaire, we recollect the new data during IT Governance 2011 Seminar at Hotel Bidakara in March 2011. We were able to collect data from 38 SOEs.

CHAPTER 5
DATA ANALYSIS

5.1 Qualitative Data Elicitation

Following the methodology mentioned earlier in section 4.1.4 we coded the results from each case study. Drivers were easily recognized explicitly from the ITGI (2007) IT Governance Focus Area and business pressure/needs from AS-8015 (Standards Australia, 2005). The researcher than categorized the results. The process of data analysis in this phase is largely a search for patterns of similarities and differences, followed by interpretation of those patterns (Babbie, 1998).

Despite sampling frame had included non SOEs, through careful analysis, however, all of the drivers resulted were considered relevant for SOEs, thus incorporated in the final questionnaires in survey phase later on.

To complement those findings, using ethnographic approach (Lewis, 1985) as described previously in section 4.1.4, some personal experience as IT management consultant enriched list of drivers. As explained by (Harvey & Myers, 1995), ethnography offers an approach to the analysis of institutional context of information systems (and information technology) practices, with the notion of context being one of the social construction of meaning frameworks. It deals with actual practices of real world situation, thus allowing for relevant issues to be explored and frameworks to be developed. One example of driving factors added by the researcher is ‘accountability for huge IT investment’, as it was mentioned by the IT strategy & policy head of a SOE bank during researcher’s involvement in a COBIT-based audit in 2007.

Below we list those IT Governance driving factors:

Accountability & transparency regulations from stock market regulator
Accountability of huge IT investments
Business partner pressure
Community pressure regarding bureaucracy reform
Core system or enterprise-wide ERP implementation
Corporate governance regulations
Data accuracy/reliability/timeliness requirement from directors or users
External audit
Free market competition
Industry sector regulations
Merger & acquisition
Previous Y2K problem
SOE specific regulations
Transparency requirement of Public Information Access Act

Table 5. Elicited Drivers of IT Governance

The enablers and inhibitors must be extracted from the case studies. As Luftman (1999) did not supply the definition of enablers nor inhibitors, we must define them. Enablers were defined by the researcher as “things that makes it easier in governing and managing IT”. In the opposite, inhibitors were defined as “things that can hinder or impede the process of governing or managing IT the way it should be done”.

Through the process of interpretation and classifying (Neuman, 2003), the inhibitors and enablers were extracted. Quite specifically, this part used hermeneutics (Boland, 1991), as text from the case studies were being understood to include their social context, including the data collector and/or writer (i.e. the assistants). In Babbie (1998) terms, the meaning of the text is sought after. Also, as Neuman (2003) explained, aaccess to reality only through social constructions, such as language, consciousness and shared meanings. Therefore researcher’s judgment, past experience and social understanding of the situation plays important role.

The in the case of inhibiting factors, apparently the sampling frame differences between the qualitative phase and the later quantitative survey phase

must be accounted on. For example, President Decree no.80 of 2003 on Goods & Service Procurement was considered irrelevant to be accounted for state owned enterprises, as they have their own set of rules as a limited liability company (*perseroan terbatas*).

As with driving factors, researcher's personal experience also complement the enabler and inhibitor list taken from case studies. Some of them include "allowing changes of KPI…" from a SOE and "selfishness for not exchanging data…" from a financial government agency. Taken together, the list of enablers and inhibitors are shown below:

Awareness of IT benefits from top executives
High level of awareness of risk management amongst staff
The use of objective & performance based management system
Company's commitment to knowledge management
Continuous optimization of organization design for better governance
Existence of audit committee on Board of Commissioners
Multiple level of authorization of budget use
Existence of PMO to monitor project cycles
Customary practice to reach consensus formally
Customary practice to reach consensus informally
Contingency budget for unexpected expenditures
Investment committee on Board of Commissioners
Regulation/procedure allowing changes to budget in half year time
Allowing changes of KPI during execution

Table 6. Elicited Enablers of Good IT Governance

Many employees have low IT awareness
IT investment only uses financial calculation
Sorts of communication problems
Some other units are slow to respond to IT needs or bureaucracy problems
Lack of commitment of top executives
Unclear IT career path
No formal procedures for prioritization of IT investments
Relatively low salary for IT staff

Selfishness of units for not exchanging data
Procurement unit incapable to provide support for high tech procurement
Some business unit activities such as unit's IT procurement, unreported to central IT unit
Mandatory completion of IT projects within one fiscal year
Reprioritization of IT initiatives are not allowed
Closing of IT projects by December, no carry over's to next year are

Table 7. Elicited Inhibitors of Good IT Governance

These three lists were then validated through a face validity process by other researchers in the lab (also working as IT management consultants), and pre-tested to three test respondents (IT heads), as described earlier in section 4.1.4. New items were uncovered during these processes (for simplicity, they are already included in the lists above, for example "procurement unit incapable to…").

5.2 Quantitative Data Analysis

5.2.1 Demographics

Majority of the respondents were the head of the IT unit or an IT manager of the SOE. Few were the staffs. Even fewer were from IT unit such as human resources unit. This is due to the non-existence of IT unit at the particular SOE and/or other unit are assigned responsibility to IT related issues. Despite minor variability of the respondents, we still believe that the validity of the research is still high.

The collected samples consist of SOEs from various industry sectors. We took the industry sectors classification (Klasifikasi Baku Lapangan Usaha Indonesia or KBLUI) from Statistic Centre Agency or Badan Pusat Statistik (BPS, 2009). Due to non-proportionality of the samples, it is unwise to process the data based on industry sector and accepting it as statistically correct. Nevertheless we argue that informing the readers about the composition of the samples are quite important.

The table below shows the composition of samples:

Industry Sector	Frequency	Percent
Agricultural, Farming, Forestry & Fishery	19	18,6%
Construction	15	14,7%
Transportation & Telecommunication	10	9,8%
Finance & Service Companies	7	6,9%
Processing Industry	4	3,9%
Trading, Hotel & Restaurant	4	3,9%
Mining	3	2,9%
Electricity, Gas & Water	3	2,9%
Others	37	36,3%

Table 8. Industry sector composition of the respondents

Among the respondents, most of them were SOEs which have not been privatized albeit possible, totalling 80 companies. Only 10 of the respondents cannot be privatized due to their public service obligation (PSO). The other 13 SOEs were already privatized, either by initial public offering (IPO) at stock exchange market (12), or strategic sales (1).

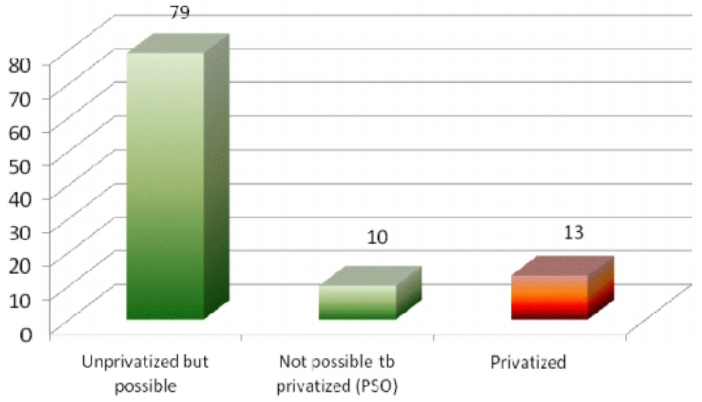

Figure 6. Composition of cases based on privatization status

When asked how they perceive the competitive environment, only a few 13,7% of the cases consider their business environment as uncompetitive, in particular because usually the SOE has a special Public Service Obligation from the government. However, most of the respondents feel that they are in rather competitive or very competitive market, each 44,1% and 42,2% of cases respectively.

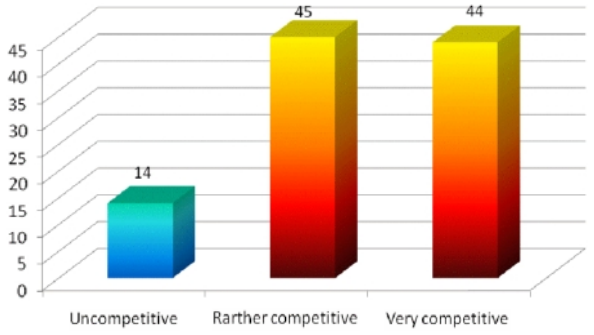

Figure 7. Composition of cases based on their market environment

5.2.2 Basic Descriptive Analysis

This section discusses the descriptive analysis of each variable in the conceptual model hypothesis previously described.

Majority of the respondents we surveyed (93 cases) pointed out that they agreed or strongly agree that IT investment has created value. Only six cases we found that it somehow create value and even fewer four cases where it didn't create value. Due to the uneven distribution of the result as shown in Figure 8, we suspect that the answer was biased caused by leading question design. As previously explained, we recollect new data a year later using a different question but pointed out to the same concept ('has IT brought value'). The new result is shown in Figure 9, which seems that the result is more evenly distributed as expected. Around 41,6% of the respondents said that value they felt from IT investment is more than expected or seems just comparable with the IT investment spent. On the other hand, 47,2% of the respondent said that value they felt from IT investment is a little bit less than expected or even not comparable with the IT investment spent. Only a handful 11,1% of the respondents choose don't know to the question.

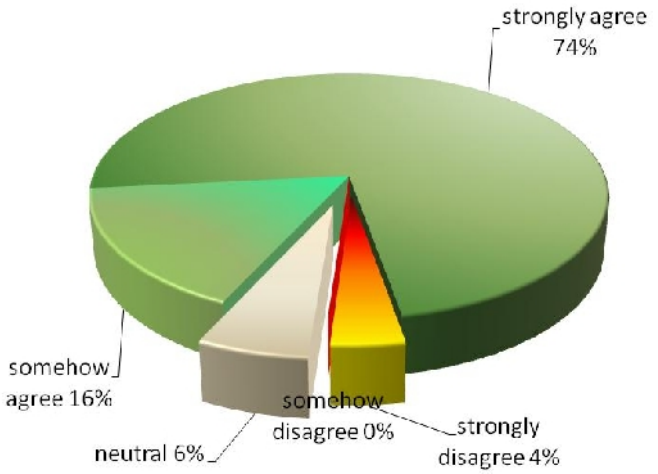

Figure 8. Perception scales on whether IT investment has brought value to the organization

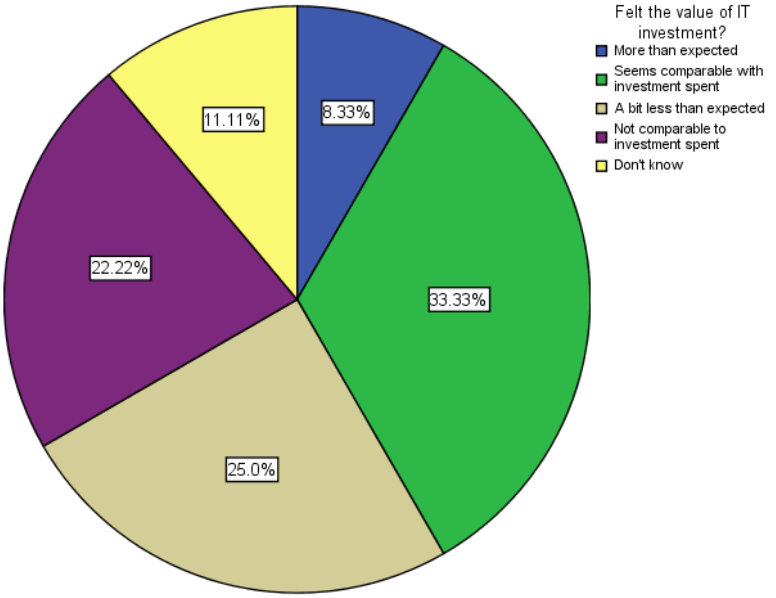

Figure 9. Perception of value from IT investment (in rephrased 2011 survey)

According the research data, about 51% of respondents claimed that insufficient number of staff was among their problems, followed second 42% responded IT service delivery problems were their problem too. It is a bit surprising that security and privacy incidents were amongst the bottom three of the mentioned problems by the respondents, along with outsourcing problems and lack of agility/development problems.

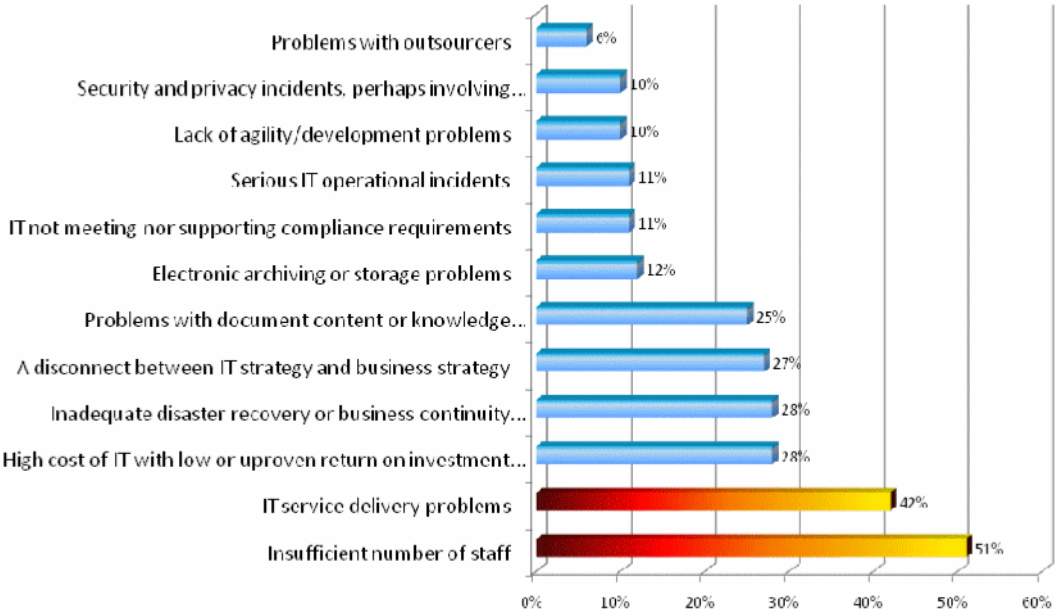

Figure 10. Problems/risks claimed experienced by respondents

Continuing our data analysis, we found that major drivers of IT Governance at SOEs in Indonesia are corporate governance regulations (63.1%), free market competition (49.5%), external audits (49.5%) and data accuracy/timeliness requirements (47.6%). As a matter of fact, all the first three drivers are related to each other. Good corporate governance are required by legislation no.19/2003, in it also explains that privatization is one way to increase the performance of SOEs. As a state owned company and also as a privatized company – preferably through IPO, it is subject under scrutiny by an external independent auditor.

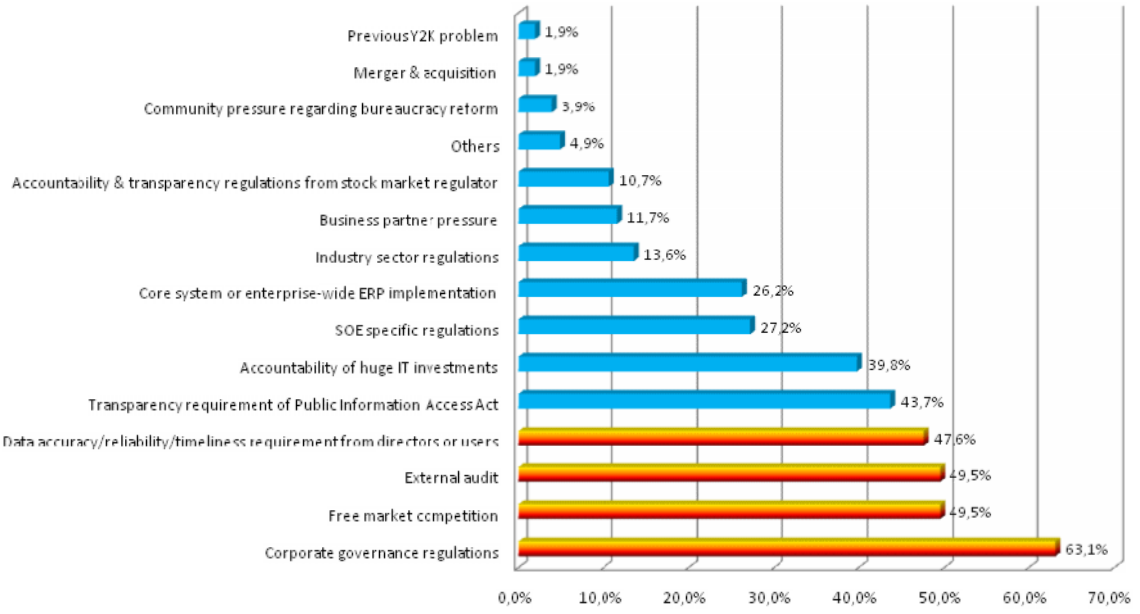

Figure 11. Drivers of IT Governance at SOEs

The two top IT Governance enablers we uncover during the research are awareness of IT benefits from top executives (84.3%) and high level of awareness of risk management amongst staff (36.3%). It seems that these 'awareness' of value and risk mirrors our hypothesis' model.

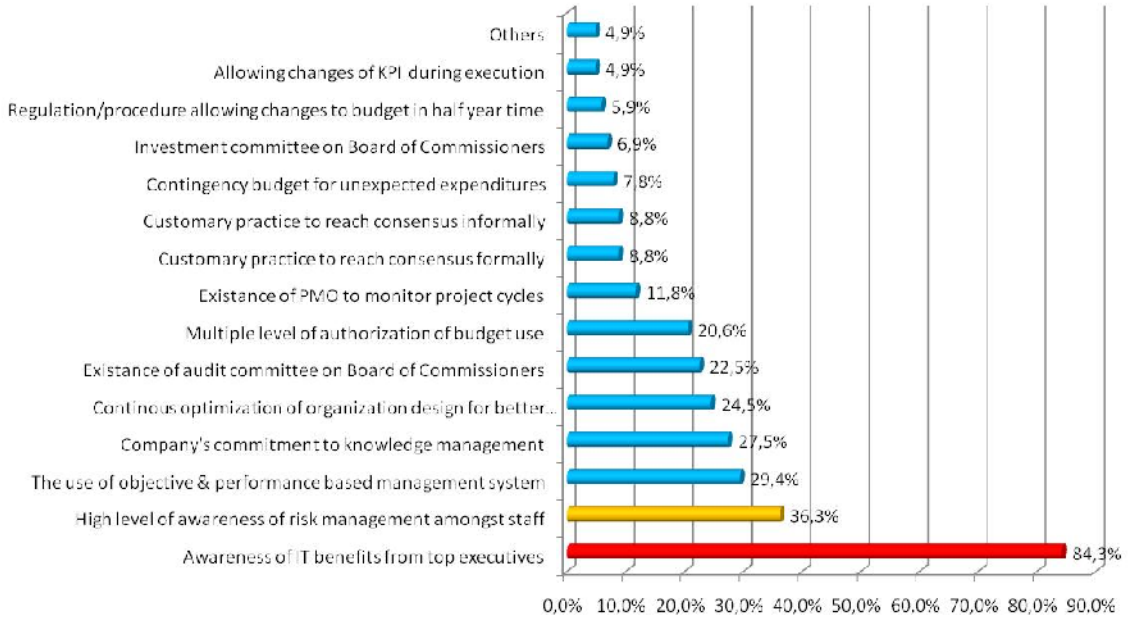

Figure 12. Enablers of IT Governance

On the other hand, the top three inhibitors of IT Governance at Indonesian SOEs are low IT awareness among staff (61,8%); IT investment only uses financial calculation (34,3%) and sorts of communication problems (34,3%). In particular, the second inhibitor is interesting and gets even worse when there is an investment in an IT infrastructure such as computer networks deployment, as it is nearly impossible to use conventional investment models. Quite interesting that

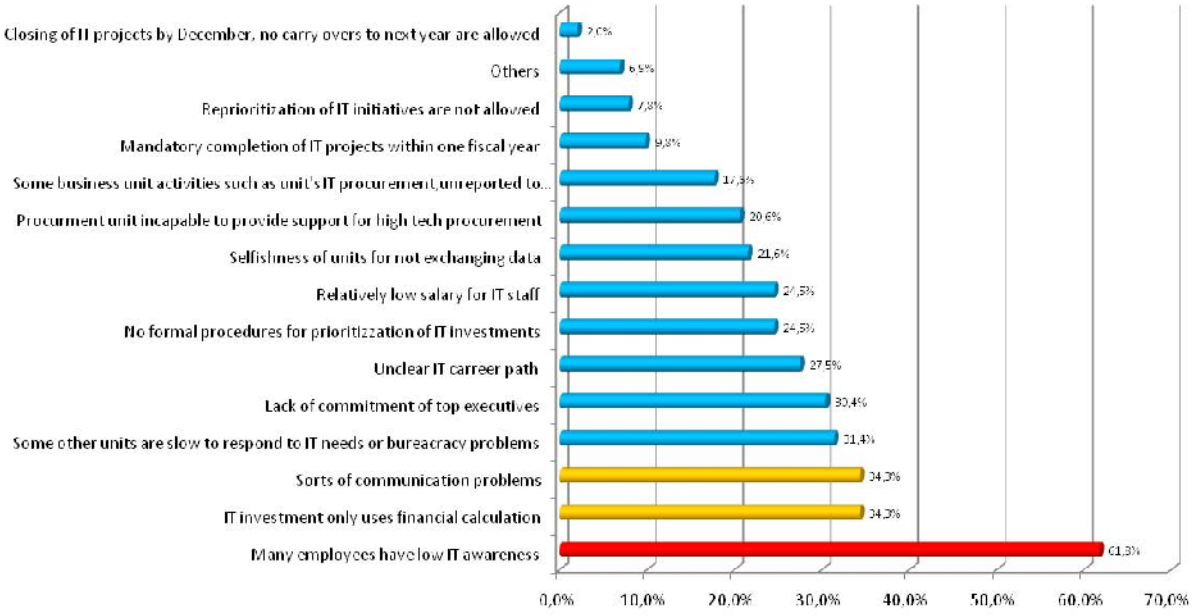

Figure 13. Inhibitors of IT Governance

among that answered 'others', two said that company's cash liquidity problem contributed to the lack of resource committed to IT. We believe that this inhibitor must be included in future research even though did not show up earlier in the qualitative elicitation phase.

As we mentioned earlier, we measure how well each SOEs IT Governance by measuring the sophistication of their IT Governance in terms of COBIT 4.1 (ITGI, 2007) ME4 'Provide IT Governance' control objectives. As readers can see the figure below, many of the SOEs are still in the 'initial' stage, i.e. they are still experimenting with IT Governance (30,1%), although second largest group has conducted IT Governance practices repeatedly – making it a habit – albeit still not documenting their IT Governance process (21,4%). Regarding documentation, only about 37,9% of the SOEs documented their IT Governance practices, while

the rest of the majority of the respondents is still not documenting their IT Governance practices.

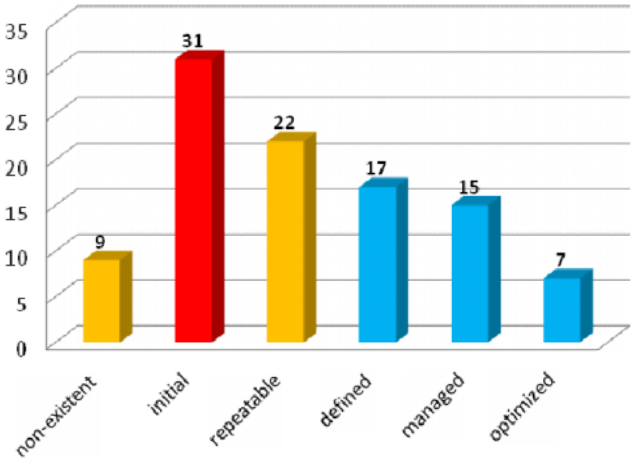

Figure 14. Overall case count of Control Objective Maturity Level

On the figure that follows, we also have a more detailed breakdown of the IT Governance level based on 5 focus areas. From those figures, it seems that SOEs are doing better in managing resource and managing performance, however this claim has to be statistically tested later.

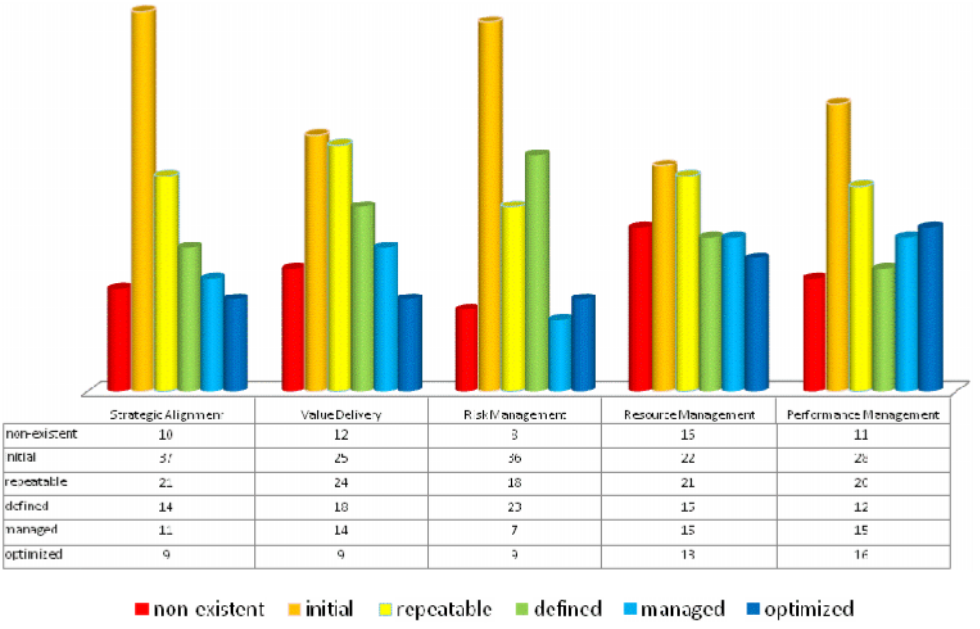

Figure 15. Case count of Control Objective Maturity Level by focus area

Simple calculation showed that the average IT Governance control objective maturity of domain ME4 'Provide IT Governance' at Indonesian SOEs is 2,22. A breakdown of the measurement showed that the maturity level for Strategic Aligenment was 2,06, Value Deliver was 2,24, Risk Management was 2,14, Resource Management was 2,29 and lastly Performance Management was 2,39. It is a pitty that SOEs pay the least attention on Strategic Alignment practices.

5.2.3 Association Among Variables Based on Conceptual Model

In this section we discuss the data analysis of our conceptual model as previously depicted in Figure 4. First of all, we are going to use non-parametric statistical analysis, as most of the data are of nominal and/or at most ordinal type of data. Second, in order to simplify the analysis, we are not going to use all levels of IT Governance maturity level, but we use the recoded variable. Level 0 through level 2 was recoded as 'undocumented' IT Governance, and level 3 through level 5 was recoded as 'documented' IT Governance (hence the better kind). The corresponding variable being analyzed was also recoded, in many cases simplified into two groups (for example: few & many).

Finally, the association among variables are presented in a cross tab, complete with its χ^2 analysis and some additional necessary analysis. Conclusion shall be drawn based on the crosstabs and/or the statistical analysis.

5.2.3.1 IT Governance Maturity & Number of Drivers

Crosstab:

			Recoded number of drivers		Total
			Few (0-3)	Many (>3)	
Documented IT Governance	Undocumented process	Count	**44**	**28**	72
		% within Documented IT Governance	61,1%	38,9%	100,0%
		% within Recoded number of drivers	84,6%	56,0%	70,6%
	Documented process	Count	**8**	**22**	30
		% within Documented IT	26,7%	73,3%	100,0%

		Governance			
		% within Recoded number of drivers	15,4%	44,0%	29,4%
Total		Count	52	50	102
	% within Documented IT Governance		51,0%	49,0%	100,0%
	% within Recoded number of drivers		100,0%	100,0%	100,0%

Observing the recoded number of drivers column, we see the few and many columns are pretty much have the same amount (i.e. 52 and 50 respetively). However, when we have them cross tabulated with IT Governance Maturity Level (recoded/reduced to documented and undocumented IT Governance) we see the proportion of documented IT Governance is higher in 'many drivers' (28:22 ≈ 1:1) than the 'few drivers' column (44:8 ≈ 5,5:1). When there are few drivers, clearly we see quite significant difference of proportions of undocumented vs documented IT Governance. Therefore we tentatively conclude that there seems to be an association between these variables.

Statistical Analysis:

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10,054(b)	1	,002		
Continuity Correction(a)	8,722	1	,003		
Likelihood Ratio	10,340	1	,001		
Fisher's Exact Test				,002	,001
Linear-by-Linear Association	9,955	1	,002		
N of Valid Cases	102				

a Computed only for a 2x2 table
b 0 cells (,0%) have expected count less than 5. The minimum expected count is 14,71.

Assuming H_0 : no association[2] and H_A : there is an association, the calculated χ^2 value is 10.05, which is higher than 3,84, the critical value when d.f.=1 and $\alpha = 0{,}05$. In this case, we reject the H_0 and conclude that there is an association between IT Governance maturity and number of drivers.

[2] When we say Ho has no association, it was actually meant that there is no difference among the groups in the crosstab. Therefore Ha should meant that there are differences amoung the observed groups, inplying (we infer) that there might be some association among variables

Symmetric Measures

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by Nominal	Phi	,314			,002
	Cramer's V	,314			,002
	Contingency Coefficient	,300			,002
Interval by Interval	Pearson's R	,314	,091	3,307	,001(c)
Ordinal by Ordinal	Spearman Correlation	,314	,091	3,307	,001(c)
N of Valid Cases		102			

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on normal approximation.

The association among number of drivers vs IT Governance maturity level is calculated using φ which is ideal for 2x2 tables. In this case φ = 0,314, which according to (Cooper & Schindler, 2006) means a moderate association exist. However, still by using symmetric measures such as φ alone, do not allow us to have a prediction capability whether one variable will influence the prediction of other variable.

Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by Nominal	Lambda	Symmetric	,175	,058	2,642	,008
		Documented IT Governance Dependent	,000	,000	.(c)	.(c)
		Recoded number of drivers Dependent	,280	,093	2,642	,008
	Goodman and Kruskal tau	Documented IT Governance Dependent	,099	,057		,002(d)
		Recoded number of drivers Dependent	,099	,057		,002(d)
	Uncertainty Coefficient	Symmetric	,078	,047	1,667	,001(e)
		Documented IT Governance Dependent	,084	,050	1,667	,001(e)
		Recoded number of drivers Dependent	,073	,044	1,667	,001(e)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Cannot be computed because the asymptotic standard error equals zero.
d Based on chi-square approximation
e Likelihood ratio chi-square probability.

Based on our conceptual model hypotheses, we predict that number of drivers will influence the IT Governance maturity – not the other way around (IT Governance maturity in real life rarely effect drivers). Looking back at the crosstab, we know the proportion of the rows (documented vs undocumented) are roughly the same. If the value of the directional measure such as λ is 1, having the knowledge of the independent variable (number of drivers) can predict the dependent variable (IT Governance maturity) with a very good certainty. Unfortunately, the λ value is 0,00 in this case. This means that it is statistically impossible to predict IT Governance maturity level by knowing number of drivers, albeit those variables are moderately associated (recall the φ measurement).

From our analysis above, in this subsection we conclude that although we cannot prove that number of drivers will effect IT Governance level, we are sure that there is at least some moderate association between them.

We shall follow the same pattern of analysis of measurement of association among variables for the other combinations, based on previously described conceptual model hypotheses..

5.2.3.2 IT Governance Maturity & Number of Enablers

Crosstabs:

Documented IT Governance * Recoded number of enablers Crosstabulation

			Recoded number of enablers		Total
			0-2 (few)	>2 (many)	
Documented IT Governance	Undocumented process	Count	49	23	72
		% within Documented IT Governance	68,1%	31,9%	100,0%
		% within Recoded number of enablers	87,5%	50,0%	70,6%
	Documented process	Count	7	23	30
		% within Documented IT Governance	23,3%	76,7%	100,0%
		% within Recoded number of enablers	12,5%	50,0%	29,4%
Total		Count	56	46	102
		% within Documented IT Governance	54,9%	45,1%	100,0%

% within Recoded number of enablers	100,0%	100,0%	100,0%

A quick look at the table indicates that IT Governance maturity clearly can be associated with number of enablers. The proportion of documented IT Governance is higher when the many drivers are working on the SOE (49:7 = 7:1), and the opposite thing happened when only a few enablers exist (23:23 = 1:1). In other words, there are differences among groups.

Statistical analysis:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	17,106(b)	1	,000		
Continuity Correction(a)	15,348	1	,000		
Likelihood Ratio	17,615	1	,000		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	16,939	1	,000		
N of Valid Cases	102				

a Computed only for a 2x2 table
b 0 cells (,0%) have expected count less than 5. The minimum expected count is 13,53.

Assuming H_0 : no association and H_A : there is an association, the calculated χ^2 value is 17,1, which is much higher than 3,84, the critical value when d.f.=1 and $\alpha = 0{,}05$. In this case, we reject the H_0 and conclude that there is an association between IT Governance maturity and number of enablers.

Symmetric Measures

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by Nominal	Phi	,410			,000
	Cramer's V	,410			,000
	Contingency Coefficient	,379			,000
Interval by Interval	Pearson's R	,410	,089	4,489	,000(c)
Ordinal by Ordinal	Spearman Correlation	,410	,089	4,489	,000(c)
N of Valid Cases		102			

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on normal approximation.

The association among number of enablers vs IT Governance maturity level is calculated using φ. In this case φ = 0,41, which indicates more than moderate association exist (φ ranges from 0 to 1, which φ = 1 indicates certain association and φ = 0 indicates no association at all).

Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by Nominal	Lambda	Symmetric	,211	,057	3,052	,002
		Documented IT Governance Dependent	,000	,000	.(c)	.(c)
		Recoded number of enablers Dependent	,348	,096	3,052	,002
	Goodman and Kruskal tau	Documented IT Governance Dependent	,168	,073		,000(d)
		Recoded number of enablers Dependent	,168	,071		,000(d)
	Uncertainty Coefficient	Symmetric	,133	,060	2,213	,000(e)
		Documented IT Governance Dependent	,143	,063	2,213	,000(e)
		Recoded number of enablers Dependent	,125	,057	2,213	,000(e)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Cannot be computed because the asymptotic standard error equals zero.
d Based on chi-square approximation
e Likelihood ratio chi-square probability.

Based on our conceptual model hypotheses, we predict that number of enablers will influence the IT Governance maturity. In this case, we must have IT Governance maturity (recoded into documented & documented IT Governance). Again we unfortunately found the λ value to be 0,00 in this case. This means that it is statistically impossible to predict IT Governance maturity level by knowing number of enablers, albeit those variables are moderately associated (recall the φ measurement).

From our analysis above, in this subsection we conclude that although we cannot prove that number of enablers will effect IT Governance level, we are sure that there is a moderate association between them.

5.2.3.3 IT Governance Maturity & Number of Inhibitors

Crosstabs:

Documented IT Governance * Recoded number of inhibitors Crosstabulation

			Recoded number of inhibitors		Total
			0-3 (few)	>3 (many)	
Documented IT Governance	Undocumented process	Count	44	28	72
		% within Documented IT Governance	61,1%	38,9%	100,0%
		% within Recoded number of inhibitors	71,0%	70,0%	70,6%
	Documented process	Count	18	12	30
		% within Documented IT Governance	60,0%	40,0%	100,0%
		% within Recoded number of inhibitors	29,0%	30,0%	29,4%
Total		Count	62	40	102
	% within Documented IT Governance		60,8%	39,2%	100,0%
	% within Recoded number of inhibitors		100,0%	100,0%	100,0%

Observing the proportions of documented vs undocumented IT Governance on each column, we see that the proportion in the few inhibitors column (44:18 ≈ 2,4:1) is quite the same as in the many inhibitors column (28:12 ≈ 2,3:1). It seems that there is no apparent relationship between number of inhibitors with IT Governance maturity. To ensure our analysis, we must resort to statistical analysis.

Statistical analysis:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,011(b)	1	,917		
Continuity Correction(a)	,000	1	1,000		
Likelihood Ratio	,011	1	,917		
Fisher's Exact Test				1,000	,544
Linear-by-Linear Association	,011	1	,917		
N of Valid Cases	102				

a Computed only for a 2x2 table

b 0 cells (,0%) have expected count less than 5. The minimum expected count is 11,76.

Assuming H_0 : no association and H_A : there is an association, the calculated χ^2 value is 0,011, which is much smaller than 3,84, the critical value when d.f.=1 and $\alpha = 0,05$.

In this case, we accept H_0 and conclude that there is no association between IT Governance maturity and number of inhibitors. Since we disprove any association, further analysis is not required.

5.2.3.4 IT Governance Maturity & Value from IT Investment

Crosstab:

2011 IT Governance Level (Recoded) * 2011 Felt value from IT investment (Recoded) Crosstabulation

			2011 Felt value from IT investment (Recoded)		Total
			Not felt, less or DK	Felt the return value	
2011 IT Governance Level (Recoded)	Undocumented	Count	17	3	20
		% within 2011 IT Governance Level (Recoded)	85,0%	15,0%	100,0%
		% within 2011 Felt value from IT investment (Recoded)	81,0%	21,4%	57,1%
	Documented	Count	4	11	15
		% within 2011 IT Governance Level (Recoded)	26,7%	73,3%	100,0%
		% within 2011 Felt value from IT investment (Recoded)	19,0%	78,6%	42,9%
Total		Count	21	14	35
	% within 2011 IT Governance Level (Recoded)		60,0%	40,0%	100,0%
	% within 2011 Felt value from IT investment (Recoded)		100,0%	100,0%	100,0%

A glance at the table showed that there is a very considerable association between IT Governance maturity and how the value of IT investment is felt in the organization. Even better, we are certain that there must be differences among the

groups, since the proportions are somehow inverted between those two rows (high:low (17:3) vs low:high (4:11)).

Statistical Analysis:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	12,153(b)	1	,000		
Continuity Correction(a)	9,844	1	,002		
Likelihood Ratio	12,805	1	,000		
Fisher's Exact Test				,001	,001
Linear-by-Linear Association	11,806	1	,001		
N of Valid Cases	35				

a Computed only for a 2x2 table
b 0 cells (,0%) have expected count less than 5. The minimum expected count is 6,00.

Assuming H_0 : no association and H_A : there is an association, the calculated χ^2 value is 12,15, which is much higher than 3,84, the critical value when d.f.=1 and $\alpha = 0{,}05$. In this case, we reject the H_0 and conclude that there is an association between IT Governance maturity and how value from IT investment is felt.

Symmetric Measures

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by Nominal	Phi	,589			,000
	Cramer's V	,589			,000
	Contingency Coefficient	,508			,000
Interval by Interval	Pearson's R	,589	,138	4,190	,000(c)
Ordinal by Ordinal	Spearman Correlation	,589	,138	4,190	,000(c)
N of Valid Cases		35			

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on normal approximation.

Having $\varphi = 0{,}589$ indicates a rather strong (obviously more than moderate) association between IT Governance maturity level and the value being felt from IT investment.

Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by Nominal	Lambda	Symmetric	,517	,177	2,247	,025
		IT Governance Level (Recoded) Dependent	,533	,170	2,293	,022
		Felt value from IT investment (Recoded) Dependent	,500	,196	1,898	,058
	Goodman and Kruskal tau	IT Governance Level (Recoded) Dependent	,347	,162		,001(c)
		Felt value from IT investment (Recoded) Dependent	,347	,163		,001(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

The next thing is to confirm whether our hypotheses, will better IT Governance (i.e. documented IT Governance) can really affect how value of IT investments are felt? In this case, the dependent variable must be 'felt value from IT investment', and we found the value of $\lambda = 0{,}500$. Therefore knowledge about the IT Governance level to a rather good extent will allow us to predict whether value of IT investment is being felt or not. Although one might argue that the significance of 0,058 (which is higher than our assumption of $\alpha = 0{,}05$) should be interpreted that the dependent variable cannot be predicted from the independent variable, I argue that the differences between 0,05 and 0,058 is very small. Besides, one can pick another larger α such as $\alpha = 0{,}1$, which will support earlier directional association claim.

To conclude this subsection, we had clearly proven that IT Governance maturity level can affect whether value from IT investment was being felt or not.

5.2.3.5 IT Governance Maturity & SOE Health Status

Since SOE health level has only three levels, obviously we must use non-parametric approaches. Further analysis of the data indicates that the composition is heavy on "healthy", therefore it is wise to group the other option into "not or rather healthy". This recoding of SOE health status also makes the data analysis easier.

Crosstab:

Documented IT Governance * Recoded Health Level Crosstabulation

			Recoded Health Level		Total
			Not or rather healthy	Healthy	
Documented IT Governance	Undocumented process	Count	20	50	70
		% within Documented IT Governance	28,6%	71,4%	100,0%
		% within Recoded Health Level	90,9%	65,8%	71,4%
	Documented process	Count	2	26	28
		% within Documented IT Governance	7,1%	92,9%	100,0%
		% within Recoded Health Level	9,1%	34,2%	28,6%
Total		Count	22	76	98
	% within Documented IT Governance		22,4%	77,6%	100,0%
	% within Recoded Health Level		100,0%	100,0%	100,0%

From the crosstab above, we can see that proportion between 'not or rather healthy' and healthy differs between undocumented IT Governance (20:50 = 1 : 2,5) and documented IT Governance (2:26 = 1:13). SOEs with documented IT Governance tend to be a healthy SOE. However we must test this tentative conclusion using statistical analysis below.

Statistical Analysis:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5,275(b)	1	,022		
Continuity Correction(a)	4,116	1	,042		
Likelihood Ratio	6,209	1	,013		
Fisher's Exact Test				,030	,016
Linear-by-Linear Association	5,221	1	,022		
N of Valid Cases	98				

a Computed only for a 2x2 table
b 0 cells (,0%) have expected count less than 5. The minimum expected count is 6,29.

Assuming H_0 : no association and H_A : there is an association, the calculated χ^2 value is 5,275, which is much higher than 3,84, the critical value

when d.f.=1 and $\alpha = 0,05$. In this case, we reject the H_0 and conclude that there is an association between IT Governance maturity and SOE's health level.

Symmetric Measures

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by Nominal	Phi	,232			,022
	Cramer's V	,232			,022
	Contingency Coefficient	,226			,022
Interval by Interval	Pearson's R	,232	,074	2,337	,022(c)
Ordinal by Ordinal	Spearman Correlation	,232	,074	2,337	,022(c)
N of Valid Cases		98			

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on normal approximation.

Asking ourselves how strong is the association, we found that significance equals 0,022 (which is smaller than $\alpha = 0,05$) and $\varphi = 0,232$, indicates that there is an association albeit less then moderate.

Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T	Approx. Sig.
Nominal by Nominal	Lambda	Symmetric	,000	,000	.(b)	.(b)
		Documented IT Governance Dependent	,000	,000	.(b)	.(b)
		Recoded Health Level Dependent	,000	,000	.(b)	.(b)
	Goodman and Kruskal tau	Documented IT Governance Dependent	,054	,033		,022(c)
		Recoded Health Level Dependent	,054	,034		,022(c)

a Not assuming the null hypothesis.
b Cannot be computed because the asymptotic standard error equals zero.
c Based on chi-square approximation

In our conceptual model hypotheses we put SOE health status (or in other words, health level) as the dependent variable from the IT Governance maturity level as the independent variable. Unfortunately, again, we have $\lambda = 0$, which meant that we cannot predict SOE health status based on the knowledge of SOE's IT Governance maturity level.

We may conclude this subsection, by stating that there is an association between IT Governance and SOE health level, but we cannot prove that higher IT Governance will drive SOE health level better,

5.2.3.6 IT Governance Maturity & IT Risks

Recall 3.2, IT risks are composed of several more operational concepts. Here we analyze them one by one, cross tabbing them with IT Governance maturity level.

5.2.3.6.1 IT Governance Maturity & IT Service Delivery Problems

Crosstab:

Count

		IT service delivery problems		
		No	Yes	Total
Documented IT Governance	Undocumented process	39	33	72
	Documented process	21	9	30
Total		60	42	102

In this case proportion of not having problem and having it, within each row is 39:33 (for undocumented IT Governance) and 21:9 (documented). Simplifying the proportions, we have 1,18:1 and 2,3:1, in which the later proportion is roughly double of the first. So there is an indication that there are differences among groups.

Statistical analysis:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,192(b)	1	,139		
Continuity Correction(a)	1,587	1	,208		
Likelihood Ratio	2,244	1	,134		
Fisher's Exact Test				,186	,103
Linear-by-Linear Association	2,170	1	,141		
N of Valid Cases	102				

a Computed only for a 2x2 table
b 0 cells (,0%) have expected count less than 5. The minimum expected count is 12,35.

Assuming H_0 : no association and H_A : there is an association, the calculated χ^2 value is 2,129, which is smaller than 3,84, the critical value when d.f.=1 and α = 0,05. In this case, we accept the H_0 and conclude that there no association between IT Governance maturity and IT service delivery problems.

5.2.3.6.2 IT Governance Maturity & Inadequate Business Continuity Plan / Disaster Recovery Plan

Crosstab:

Count

		Inadequate BCP/DRP		
		No	Yes	Total
Documented IT Governance	Undocumented process	55	17	72
	Documented process	21	9	30
Total		76	26	102

From the crosstab above, we can see that proportion between having adequate BCP/DRP ('no' column) and inadequate one is 55:17 = 3,24:1 for SOE with undocumented IT Governance, and 21:9 ≈ 2,3:1 for SOE with documented IT Governance. The difference is small, so we predict there may be no association between the variables.

Statistical analysis:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,455(b)	1	,500		
Continuity Correction(a)	,181	1	,671		
Likelihood Ratio	,446	1	,504		
Fisher's Exact Test				,619	,331
Linear-by-Linear Association	,451	1	,502		
N of Valid Cases	102				

a Computed only for a 2x2 table
b 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,65.

Assuming H_0 : no association and H_A : there is an association, the calculated χ^2 value is 0,455, which is much smaller than 3,84, the critical value when d.f.=1 and α = 0,05. In this case, we accept the H_0 and conclude that there no association between IT Governance maturity and inadequate BCP/DRP.

5.2.3.6.3 IT Governance Maturity & Serious IT Operational Incidents

Crosstab:

Count

		Serious IT operations incidents		
		No	Yes	Total
Documented IT Governance	Undocumented process	66	6	72
	Documented process	30	0	30
Total		96	6	102

In this case proportion of not having incidents and having operations incident, within each row is 66:6 (for undocumented IT Governance) and 30:0 (documented). Simplifying the proportions, we have 11:1 and ∞. In our case here there is an indication that groups are different which might lead to association between variables.

χ^2 statistical analysis cannot be done because 2 cells (50,0%) have expected count less than 5. The minimum χ^2 can handle is if those cells are only less than 20% of the total number of cells.

5.2.3.6.4 IT Governance Maturity & Privacy/Security Incidents

Crosstab:

Count

		Privacy & security incidents		
		No	Yes	Total
Documented IT Governance	Undocumented process	64	8	72
	Documented process	27	3	30
Total		91	11	102

The proportion of not having privacy incidents and having privacy incident, within each row is 64:8 (for undocumented IT Governance) and 29:3 (documented). Simplifying the proportions, we have 8:1 and 7:1. The difference is small, thus cross tab indicates no association between variables.

χ^2 statistical analysis cannot be done because 1 cells (25,0%) have expected count less than 5. The minimum χ^2 can handle is if those cells are only less than 20% of the total number of cells.

5.2.3.6.5 Conclusion of IT Governance Maturity & IT Risk

To conclude our discussion about the association between IT Governance maturity and IT risk, we summarize the above analysis in the table below:

Variabels being tested with IT Governance maturity level	Crosstab indicates association?	χ^2 significant?
IT Service delivery problems	Yes	No
Inadequate BCP/DRP	No	No
Serious IT operations incidentsl	Yes	Cannot be calculated
Privacy/security incidents	No	Cannot be calculated

Table 9. Summary of association between IT Governance maturity level and IT risks

Although there seems to be a slight indication that IT Governance maturity and IT risk are related, clearly the association is not significant, i.e. association cannot be proven.

5.2.4 Major Factors Using Multiple Regression

To answer the problem of finding major factors of drivers, enablers & inhibitors, apart from visually analyzing their respective bar charts, we can also use statistical test. In the questionnaire, each of those three variables was broken down into list of factors, where the respondent supplied tick marks on relevant factors in their organization.

For our purpose, we can assume dichotomous property with two kinds of values (‘1’ and ‘0’) for each factor. Note also, that those factors contributed to the value of IT Governance level, which have a ratio scale. Looking up at the statistical test selection table provided by Leech et.al (2004), if we have a ratio or interval dependent variable (IT Governance level), with all dichotomous independent variable (the factors), we can use the multiple regression technique to find main factors. We shall start with the analysis of IT Governance drivers,

5.2.4.1 Major factors of IT Governance drivers

The analysis of drivers is shown below. We use stepwise selection which is the most popular method used. According to Cooper & Schindler (2006), it

combines forward selection (which starts with the constant and adds variables that contribute in the largest R^2 increase) with backward elimination (which begins with all independent variables and eliminating them that changes R^2 the least).

Statistical analysis:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,346(a)	,120	,111	1,30025[a]
2	,467(b)	,218	,202	1,23179[b]
3	,541(c)	,292	,271	1,17788[c]
4	,566(d)	,320	,292	1,16012[d]

a Predictors: (Constant), External audit
b Predictors: (Constant), External audit, Free market competition
c Predictors: (Constant), External audit, Free market competition, Corporate governance regulations
d Predictors: (Constant), External audit, Free market competition, Corporate governance regulations, Core system or enterprise-wide ERP implementation

Dependent Variable: IT Governance Control Objective Maturity Level (COBIT ME4)

Table 10. Multiple Regression Analysis of Driving Factors

The fourth model consist of the main driving factors. In the summary statistics for the first model, we see that external audit explains 12% of the IT Governance level, therefore quite low. There is about 7-10% increase of R^2 in each successive model. But the fourth model, the four factors mentioned in point (d) could explain about 32% of IT Governance level, thus a only a small increase from the third model (29%).

Therefore we may conclude that the four major driving factors for IT Governance at Indonesian SOEs are: external audits, free market competition, corporate governance regulations and core system/enterprise-wide ERP implementations. The statistical analysis of major factors is relatively similar with the descriptive visual bar chart representation of driving factors in figure 11

5.2.4.2 Major factors of IT Governance enablers

Statistical analysis:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,499(a)	,249	,242	1,20104

a Predictors: (Constant), High awareness of risk management in all parts of the company

The summary statistics model, we see that high awareness of risk management in all parts of the company explains approximately 25% of the IT Governance level. Re-running the statistical test using forward and backward method also yields the exactly the same results, therefore we are quite certain of this result.

We may conclude that the 'high awareness of risk management in all parts of the company' is the major enabling factor for IT Governance at Indonesian SOEs. Confirming with previous IT Governance enabler frequencies diagram in Figure 12, it places second.

5.2.4.3 Major factors of IT Governance inhibitors

As we have found that the association IT Governance maturity level and number of inhibitor is not significant (no association), therefore for the sake of consistency we are not going to further analyze the major factors if IT Governance inhibitors.

5.2.5 Supplementary Data Analysis

In this section, we discuss several more data analysis based on questions also asked in the questionnaire but not represented in our conceptual hypothesis. This supplementary data analysis might be of interest of policy makers.

We start by testing the relationship between privatization status of a SOE with its IT Governance level. However, we found out that there are only 13 privatized SOEs in our sample, and upon further analysis with SPSS it was found that it is not normally distributed nor symmetrically shaped. Therefore we cannot use parametric test, and must opt for non-parametric approach, such as chi square

(χ^2). Chi square analysis can be conducted to test association between to two nominal variables (Siegel & Castellan, 1988).

This requires recoding of IT Governance level, in this case, dividing it into two groups: documented IT Governance process (upper half of the IT Governance level, ≥3) and undocumented IT Governance process.(where IT Governance level < 3). The crosstabs between privatization status and documentation status is presented below, along with its chi square (χ^2) test.

		Documented IT Governance		Total
		Undocumented process	*Documented process*	
Privatization status	*Unprivatized*	69	20	89
	Privatized	3	10	13
Total		72	30	102

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by Nominal	Phi	,399			,000
	Cramer's V	,399			,000
	Contingency Coefficient	,370			,000
N of Valid Cases		102			

Table 11. Crosstab between privatization status vs. IT Governance documentation status, along with its corresponding χ^2 test.

The crosstabs somehow indicates differences between privatized and unprivatized companies, where a larger portion of privatized SOEs have better IT Governance, indicated by their well documented IT Governance process. The advance statistical analysis, using contingency coefficient *C*, which is a measure of association based on chi-square. The value ranges between zero and 1, with zero indicating no association between the row and column variables and values close to 1 indicating a high degree of association between the variables.

The contingency coefficient value is 0,370, although not so strong, it is still significant. Although we cannot conclude that privatization causes better IT Governance, we can suggest that privatization can be associated with the improvement of IT Governance level.

CHAPTER 6
ANALYSIS OF RESEARCH RESULTS

6.1 Summary of Quantitative Data Analysis

For ease of analysis, we first construct the summary of the quantitative data analysis in form of a table. The result is shown below:

No.	Association hypothesis	Relevant theory	Crosstab indicates association?	χ^2 significant?	Φ indicates association?	Direction significant?
1.	Number of drivers and IT Governance maturity	Standards Australia, 2005	Yes	Yes	moderate	No
2.	Number of enabler and IT Governance maturity	Luftman, Pap & Brier (1999)	Yes	Yes	More than moderate	No
3.	Number of inhibitors and IT Governance maturity	Luftman, Pap & Brier (1999)	No	No	N/A	N/A
4.	IT Governance maturity & value from IT investment	ITGI (2003) and Van Grembergen, De Haes & Guldentops (2004)	Yes	Yes	Rather strong	Yes
5.	IT Governance maturity & IT risk	ITGI (2003) and Van Grembergen, De Haes & Guldentops (2004)	Inconclusive	No or not cannot be calculated	N/A	N/A
6.	IT Governance & bottom-line company	(Weill & Ross, 2005)	Yes	Yes	Less than moderate	No

	performance					

Table 12. Summary of associative test data analysis

In addition, we also have found that the major IT Governance drivers are:

- external audits,
- free market competition,
- corporate governance regulations and
- core system/enterprise-wide ERP implementations

The only major IT Governance enabler proven is 'high awareness of risk management amongst staff'. However, we did not find any association between number of IT Governance inhibitors with IT Governance maturity level, therefore we did not conduct any statistical test to find major factors of it.

6.2 Summary of our conceptual model

To allow consistency with previous conceptual model hypothesis, we shall now also present our final conceptual model in visual form, as depicted below:

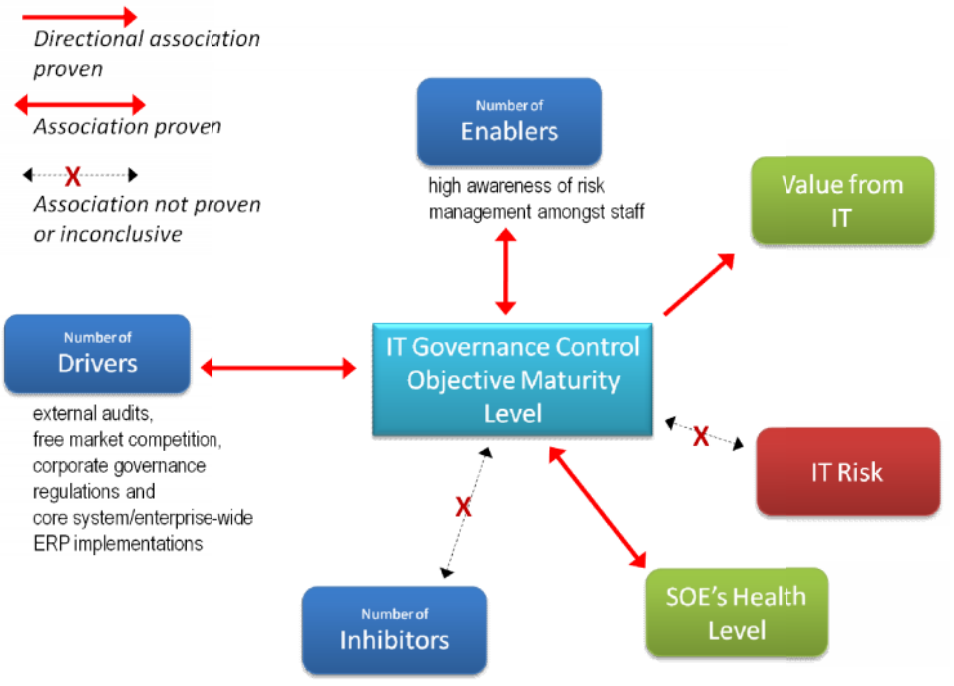

Figure 16. Final conceptual model

6.3 Interpreting research results

While the number of drivers and number of enablers clearly associates with IT Governance maturity level, we fail to prove their directional association. As statistics are mathematical tools, I believe that it cannot be relied on alone for judgment. I still believe, the results as shown by the crosstab analysis, can still be interpreted as at least a sign that number of drivers and number of enabler has a positive effect on IT Governance. On the other hand, the inhibiting factors actually do not play role at determining IT Governance maturity, their forces are simply insignificant.

One interesting thing is that our research definitely showed that IT Governance has an impact on how IT investment is felt by the organization. The better the IT Governance in the SOE, the value from IT investment is being felt stronger by the organization. While we did not find prove that better IT Governance leads to better SOE's health status/level (as the bottom-line performance indicator), our research clearly shows association between them.

6.4 Implications for SOEs in Indonesia

Following Becker, Bryman & Sempik (2006) paper, in this paper we can suggest to the policy maker, in this case Ministry of State Owned Enterprise, that probably it is best to focus on putting as much drivers (read: pressures) on SOEs, which for example in practice privatization puts plenty of pressures. In turn, this will hopefully increase the IT Governance maturity level of the organization.

However, because higher IT Governance does lead to better value attained (or at least being felt) from IT investment, there is nothing wrong in enforcing SOEs to have Good IT Governance in place. Though the directional association was not proven, still there is a strong association between Good IT Governance and bottom-line SOE's performance (SOE health status). Chances are implementing good IT Governance may impact SOE's health in a positive manner.

For the SOEs themselves, to increase IT Governance maturity level indirectly, they may want to consider increasing the risk management program throughout the whole organization, as it will become the enabling factor of good IT Governance later. Although not proven in the statistical test, based solely on descriptive analysis, I believe that awareness of IT benefits from top executive also somehow play role as one of the major enabling factor of good IT Governance.

6.5 Agreement with Other Studies

Post data processing, we took the liberty again to examine whether any similarities exist with other studies on IT Governance drivers or motivationis. Jafaar & Jordan (2009) also indicated in their case study at a government-linked company in Malaysia, that IT investment issue is one of the reasons for having IT Governance. (matched with ours: ‘accountability of huge IT investments’).

While explaining the differences between IT Governance in public and private sector, Campbell et.al. (2009) mentioned that market influences IT Governance in private sector. (quite similar with ours: ‘free market competition’)

Robb & Parent (2008) in their study of IT Goverance in two financial mutuals, one in Australia and one in Canada, denoted important contextual differences due to countrie’s regulatory environment. In other words, they imply that regulations help shaped IT Governance. Closer look at some of the drivers that we found, such as ‘transparency requirement of Public Information Access Act’ and ‘industry sector regulations’ (as 7 of the respondents were banks), definitely also shaped the IT Governance at SOEs. Nothing is more evident than central bank’s Bank of Indonesia’s Regulation (Peraturan Bank Indonesia) no.9/15/PBI/2007 regarding ‘Implementation of Risk Management in the Use of Information Technology by Banks’ which explicitly mandates many IT Governance practices to be conducted by banks (Bank Indonesia, 2007).

Although not truly the same, a survey by Ali & Green (2005) showed that IT Governance effectiveness is positively related with the involvement of senior

management, ethics/culture of compliance in IT, and corporate communication systems. The last one, also mimics the findings of Willson & Pollard (2009) IT Governance case study on an Australian organization, where it encourages communition and collaboration betweem business & IT. Our findings of IT Governance enablers have some similarities, which corresponds to Ali & Green's (2005) findings: 'awaremess of IT benefits from top executives', 'high level of risk management amongst staff'. Note also, we found that 'sorts of communication problems' was among the top three inhibitors.

Additionally, Willson & Pollard (2009) also mentioned several IT governance contigents that are quite similar to our findings such as historical context ('previous Y2K problem' in our finding is in past form). Also, they mentioned that IT Governance is also influenced by their performance management system implemented across variety of leves in the company. This is similar to our finding that 'the use of objective and performance based management systems' as the third ranked IT Governance enablers.

It seems that the top four IT Governance drivers we found in this research is not similar to the latest ITGI (2011) research where ensuring IT functionality aligned with business need ranks as the top driver, and second is the issue to manage (IT) costs. Probably these differences occur because the sampling frame we use are different than ITGI (2011) used.

We found the fact that association between IT Governance maturity level and bottom-line SOE performance. This fact is somehow reflected also in the ITGI (2011) research where 37.3 percent of respondents mentioned improved delivery of business objectives as an outcome of IT Governance.

Lunardi et.al. (2009) studed the financial impact of IT Governance mechanisms adoption in Brazil. They surveyed companies listed at Sào Paulo Stock Exchange (BOVESPA). They measured each of the companies' financial performance such as profitability measures, i.e. ROE, ROA and PM (profit margins). They found that companies which have adopted IT governance practices improved their performance when compared to the control group,

especially regarding about profitability measures. Furthermore, they found that effects of IT governance mechanisms adoption on financial performance are stronger in the year following adoption than in the year which IT governance was adopted.

Marrone et.al (2010) conducted an international survey of 113 firms using COBIT. They examined the users satisfaction, impact on Business-IT alignment and perception on the benefits realized. Findins indicated that companies that have achieved higher implementation levels of IT Governance experienced high positive impacts on their Business-IT alignment. They also proved that different levels of maturity show that the higher the maturity levels the greater the benefits realized.

Another striking similarity was also explained by Milne & Bowles (2009), where they surveyed 389 organizations in the United States, United Kingdom and Australia. Most of the respondents were IT executives. They found that IT Governance maturity is linked to higher performance of the organization. The higher the maturity is, the higher the performance.

Those studies, ITGI (2011), Lunardi et.al (2009), Marrone et.al. (2010) and Milne & Bowles (2009) study, supports our finding that the better the IT Governance maturity level, so is the bottomline corporate perforemance (SOE health status), and the value felt from IT investment increased also.

Quite interesting that a research on Malaysian senior executives (Lin, Arshad, Haron, Yap, Yusoff, & Mohamed, 2010) showed that business managers appears to exhibit awareness but IT Governance is partially practiced. There was also a positive correlation between awareness and IT Governance practice. The keyword that I would like to underline as the similarities here is how IT awareness (whatever angle it sees) relates with IT Governance practice.

CHAPTER 7
CONCLUSION

As van Grembergen (2004) of University Antwerpen School of Management defines, IT Governance is the organizational capacity exercised by the board, executive management and IT management to control the formulation and implementation of IT strategy and in this way ensure fusion of business with IT. It consists of leadership, organizational structures, and processes that ensure that the organization's IT sustains and extends the organizational strategy and objective.

The objective of this research is to find what drives these organizations to have good IT Governance, which we found to be: external audits, free market competition, corporate governance regulations and core system/enterprise-wide ERP implementations. The IT Governance enabler proven is 'high awareness of risk management amongst staff. Also, the larger the number of the enablers, the better the IT Governance. Inhibiting factors of IT Governance do not play part in influencing IT Governance maturity level.

Our measurement showed that the average IT Governance control objective maturity of domain ME4 'Provide IT Governance' at Indonesian SOEs is 2,22, with Strategic Alighment as the least practiced (maturity level was 2,06) and Performance Management practices as the most used (maturity level of 2,39). It is a pitty that SOEs pay the least attention on Strategic Alignment practices. While we measured IT Governance maturity through questioning of ME4 'Provide IT Governance' control objectives, we believe that the results cannot be used to judge higher IT Governance level is *always* better. We believe that

companies will try to find and optimum level of IT Governance maturity. Debreceny & Gray (2009) also held the same view as ours in this matter.

What is interesting is that in this sector, the implementation of IT governance is the answer to organization need to ensure IT value creation and may influence bottom-line SOE's performance. However, IT risks are somehow not related to IT Governance, or at least we are unable to prove it in this research.

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APPENDIX A
SURVEY QUESTIONNAIRE 2010

APPENDIX B
SURVEY QUESTIONNAIRE 2011