IT GOVERNANCE DRIVERS, ENABLERS & INHIBITORS AT INDONESIAN STATE OWNED ENTERPRISES

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ABSTRACT

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 in SOEs. GCG also includes good governance on information technology, as I argue that there must be a need for appropriate frameworks.

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.

What is interesting is how SOEs bring value to the stakeholders (which include, of course, the government). In this sector, the implementation of 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.

The objective of this research is to find what drives these organizations to have good IT Governance. We also want to find the enabling and inhibiting factors of good IT Governance in the context of *delivering IT value* and *managing IT risks*.

The significance of this research is quite clear that the results can be used as input to prioritize policies or revise existing regulations. It can also serve as benchmarks for service users (the SOEs).

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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. SOEs are required to implement good corporate governance principles.

What is interesting is how SOEs bring value to the stakeholders (which include, of course, the government). In this sector, the implementation of 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.

1.2 Research Problem & Question

As we shall see later in the literature review in 2.3, we argue that this research problem has never been discussed nor thoroughly researched. For the time being, let us now define our problem in term of research question below:

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]?)
2. 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? What are the major ones?
3. In addition, we would like to know what drives good IT Governance in organizations. What are the major drivers?
4. Do number of drivers acting on a SOE correlates with the IT Governance level?
5. Do number of enablers and inhibitors acting on a SOE correlates with the IT Governance level?
6. Also, do higher IT Governance level leads to higher return value from IT investment and also lower number of risk?

[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).

1.3 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 (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.

1.4 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 eliciting from the original data source without changing the substance.
3. The mode of quantitative analysis shall use parametric test whenever possible, and may use transformation of dataset to conform the parametric test requirement.
4. Reliability test of quantitative dataset shall be done by the means of correlating variables with the same topic.

1.5 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, more than a decade 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.

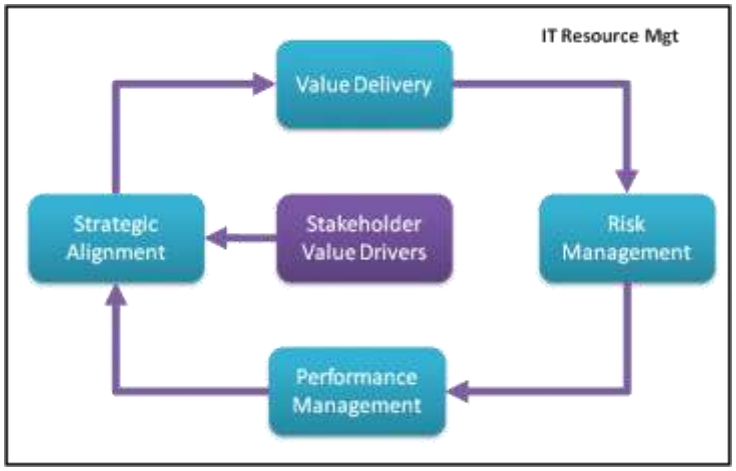


Figure 1. IT Governance Focus Area (ITGI, 2003)

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 Gremberen (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.

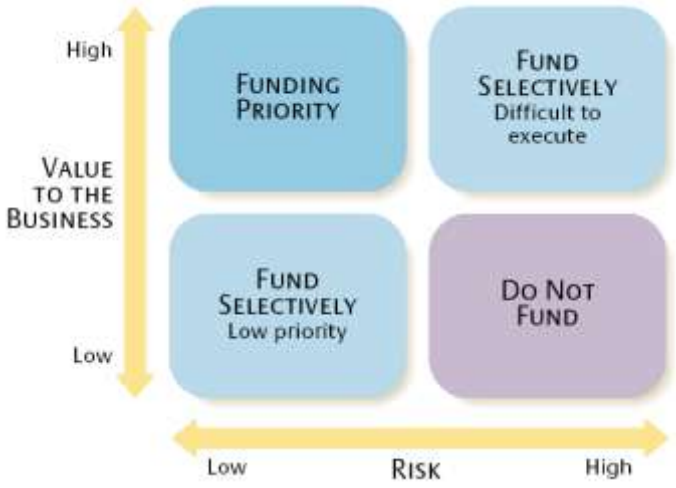


Figure 2. Jeffery & Leliveld's (2004) framework to prioritize IT investments

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.

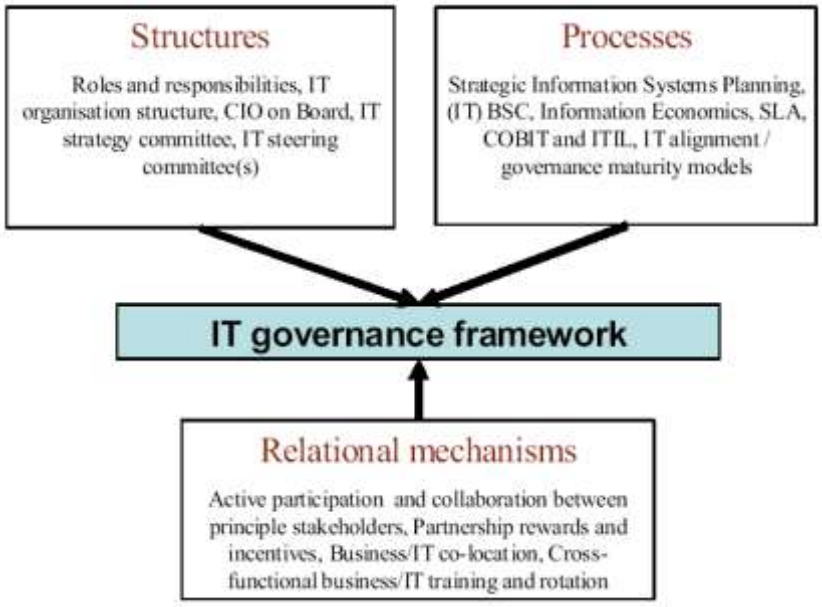


Figure 3. DeHaes & Van Grembergen's (2006) elements of IT governance framework

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.

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.

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 4.2 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.

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).

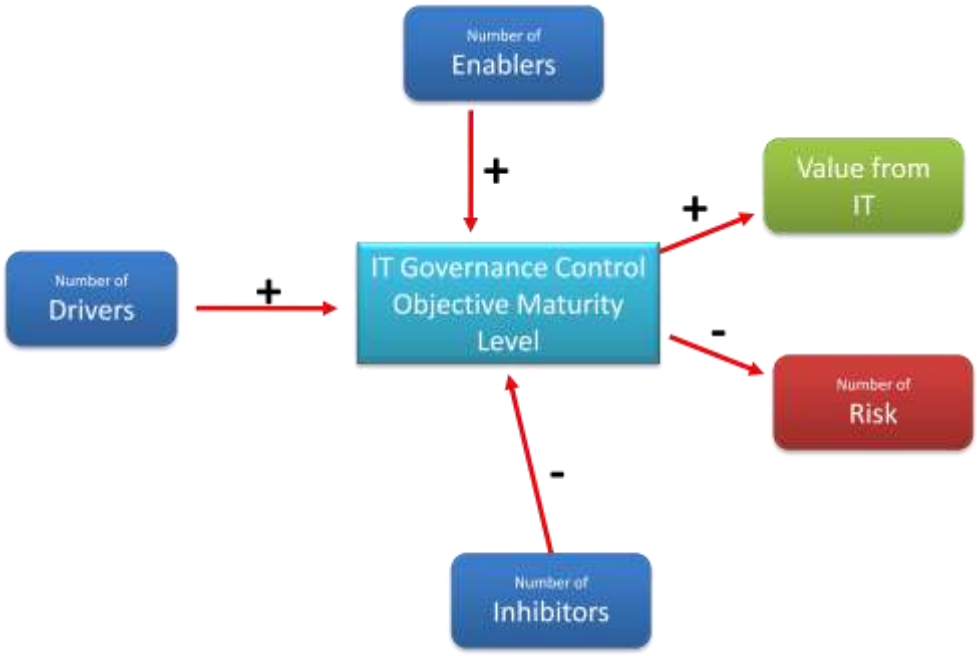


Figure 4. Conceptual model hypothesis of our research question

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 several 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.

4.2 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.

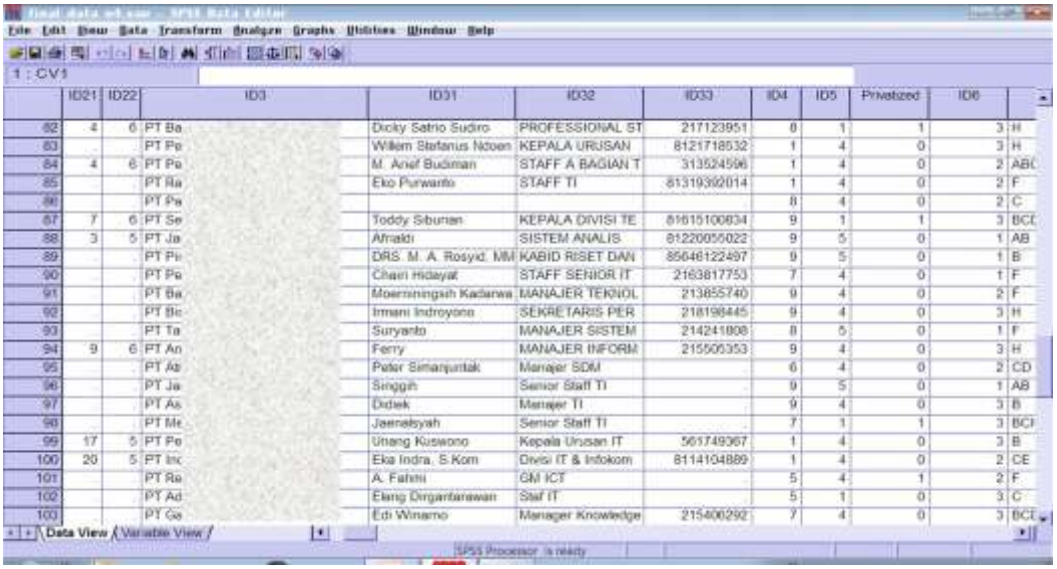


Figure 5. Data were analyzed using SPSS. SOEs name are obscured to hide company names.

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.

CHAPTER 5
DATA ANALYSIS

5.1 Qualitative Data Elicitation

Following the methodology mentioned earlier in section 4.2 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 4.2, 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 4. 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 5. 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 6. 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 4.2. 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 7. 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).

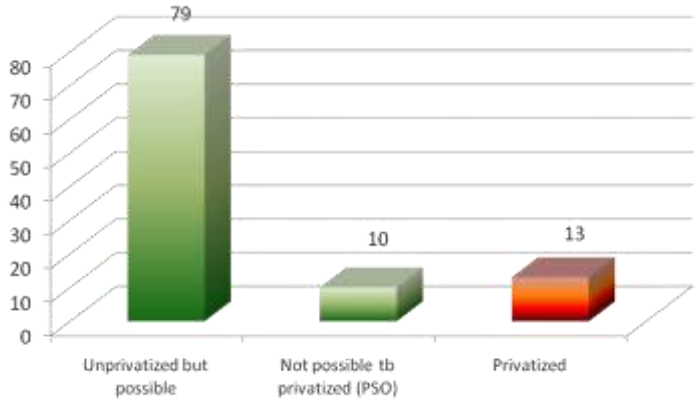


Figure 6. Composition of cases based on privatization status

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.

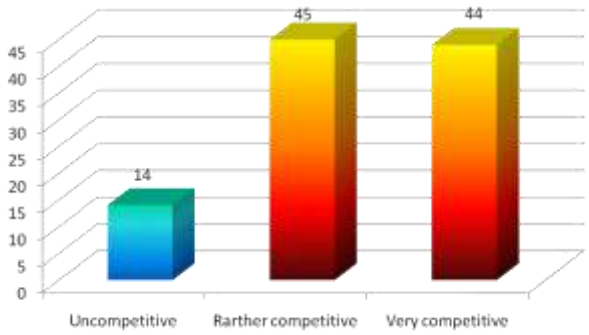


Figure 7. Composition of cases based on their market environment

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. At first, we thought that these four cases where IT has not created value are at SOEs where IT is not important. To our surprise, based on the cross tabulation between importance of IT and how IT has created value, we see that our assumption is not true. Surprisingly the four cases were found at companies where IT is important.

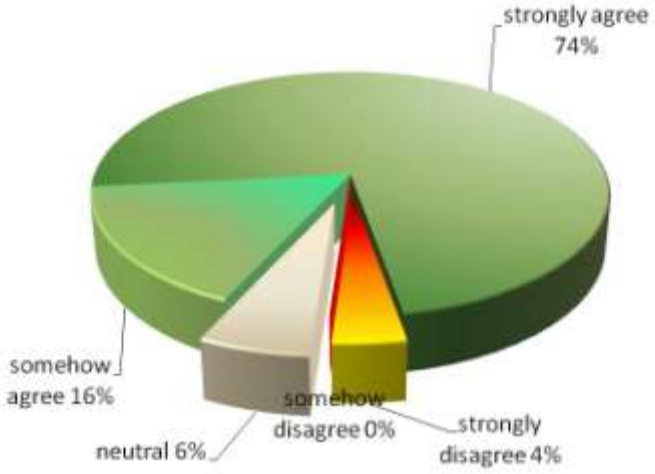


Figure 8. Perception scales on whether IT investment has brought value to the organization

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.

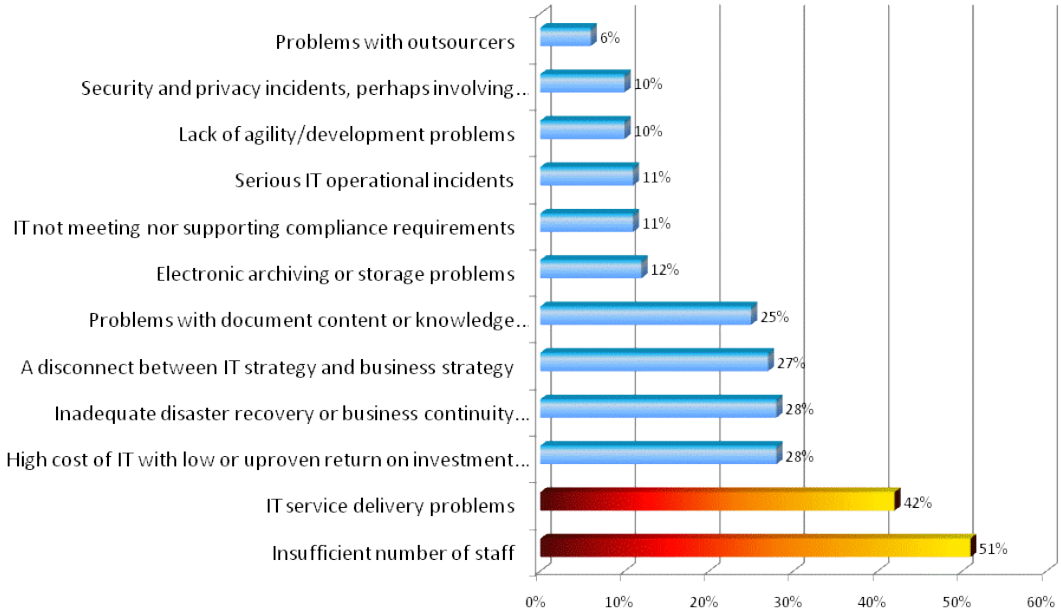


Figure 9. Problems/risks claimed experienced by respondents

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.

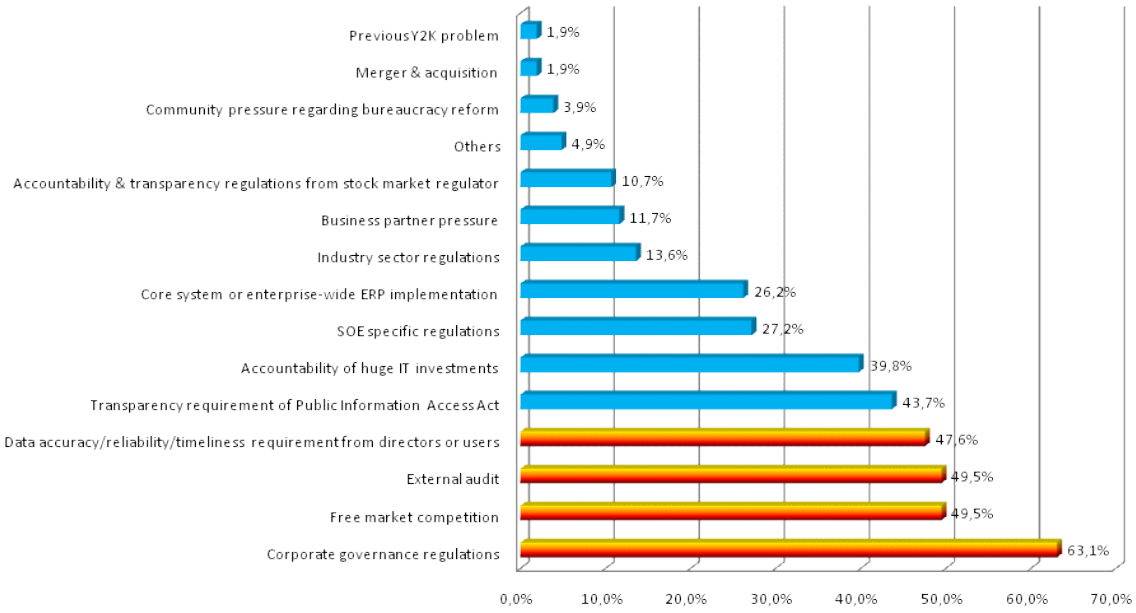


Figure 10. Drivers of IT Governance at SOEs

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.

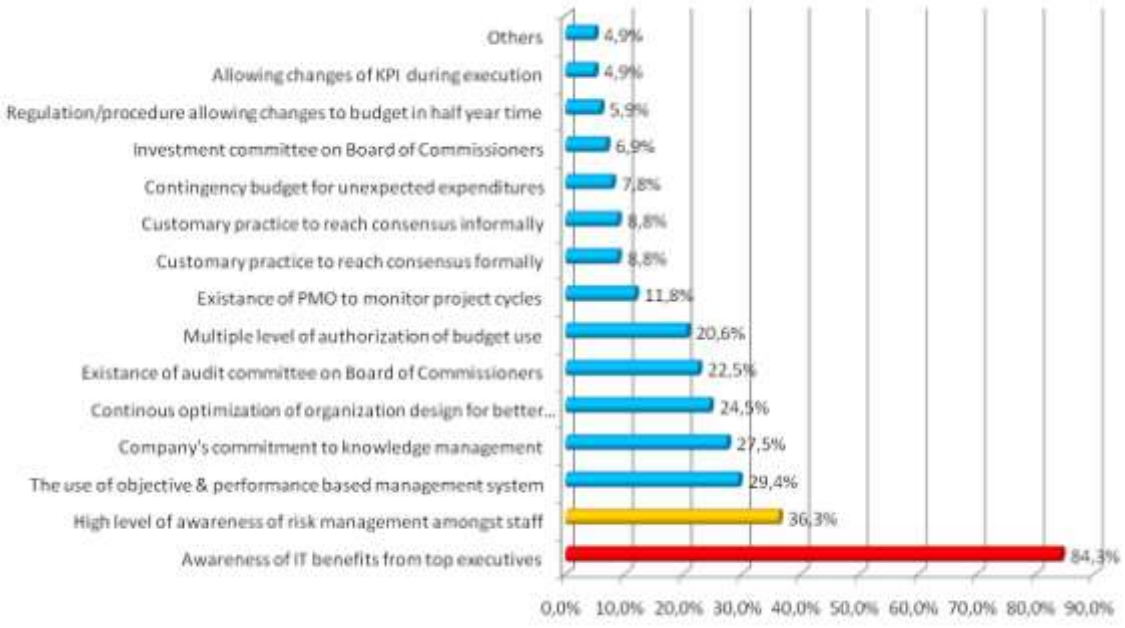


Figure 11. Enablers of IT Governance

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

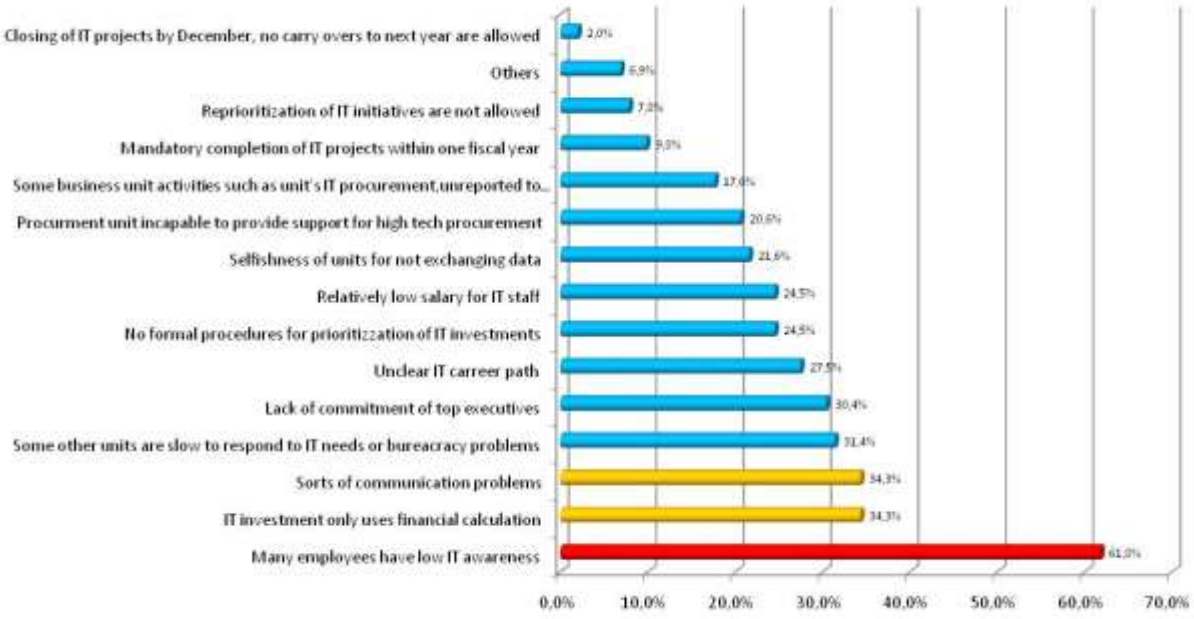


Figure 12. Inhibitors of IT Governance

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.

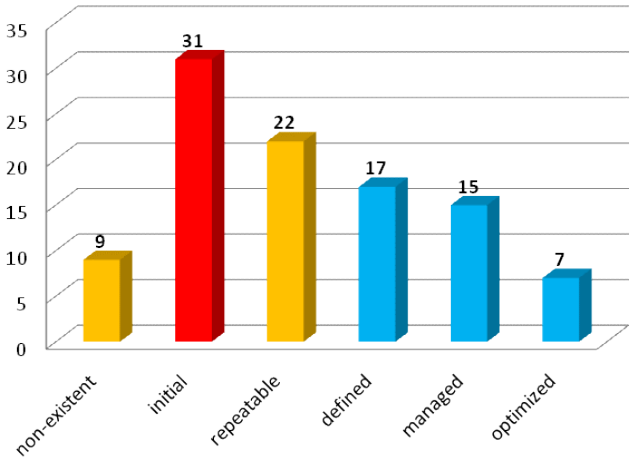
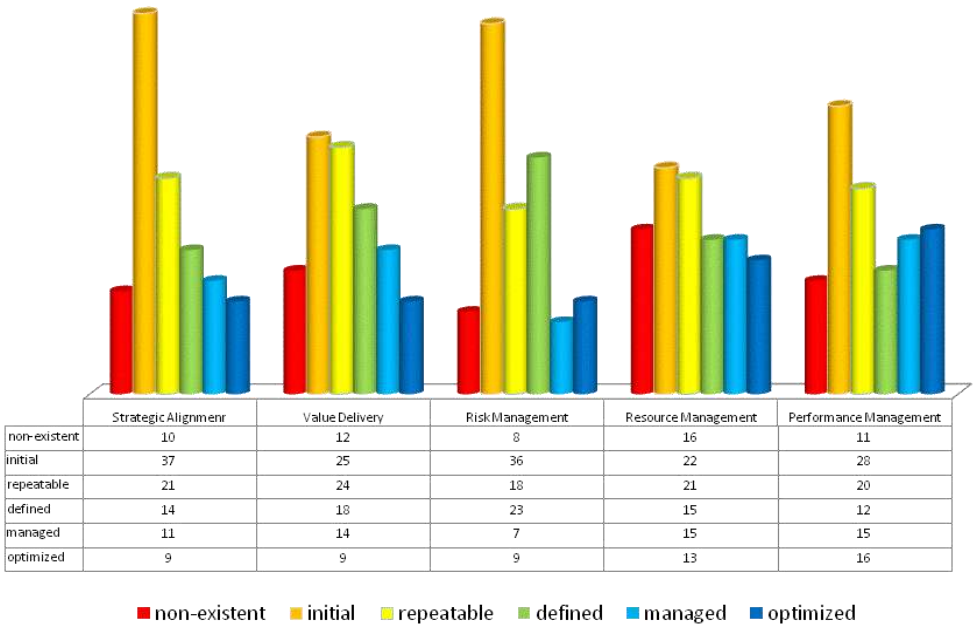


Figure 13. Overall case count of Control Objective Maturity Level

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.



	Strategic Alignmenr	Value Delivery	Risk Management	Resource Management	Performance Management
non-existent	10	12	8	16	11
initial	37	25	36	22	28
repeatable	21	24	18	21	20
defined	14	18	23	15	12
managed	11	14	7	15	15
optimized	9	9	9	13	16

Figure 14. Case count of Control Objective Maturity Level by focus area

5.2.3 Parametric Assumptions: Test of Normality

This section and the following section discuss the data exploration & preparation for use with statistical parametric tests used later for correlation analysis. Parametric test is considered more powerful for prediction than non-parametric test, but special assumptions must be met. One of the important issues to consider using parametric test is the normality of the sample being used (Cooper & Schindler, 2006).

To visually test normality the sample, we can use normal probability plot. In addition, to make sure, we can also test the normality of the sample using Kolmogorov-Smirnov test (Field, 2009). Below we analyzed the variables of our interest.

5.2.3.1 IT Governance maturity

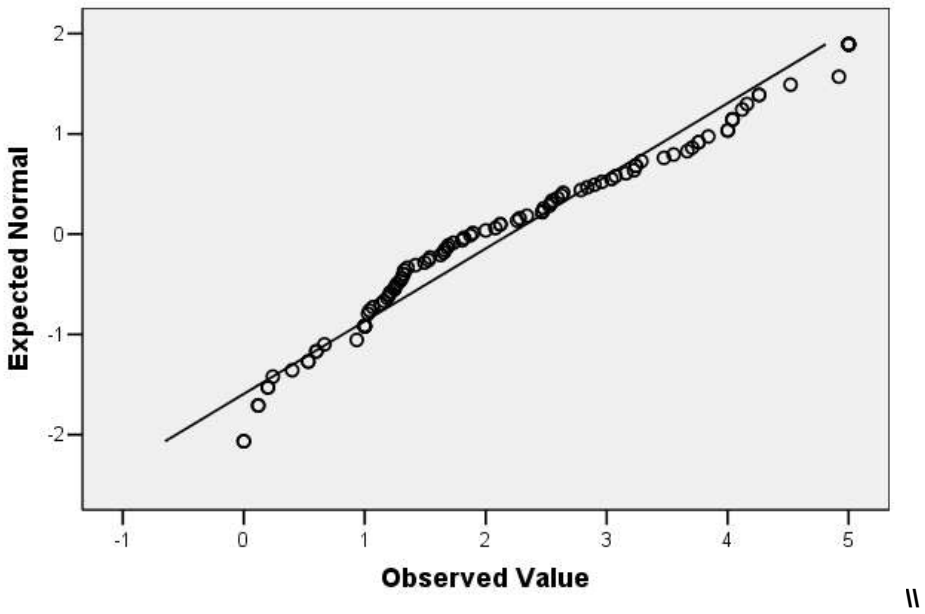


Figure 15. IT Governance level normal probability plot

		IT Governance Control Objective Maturity Level (COBIT ME4
N		102
Normal Parameters(a,b)	Mean	2,1985

	Std. Deviation	1,37913
Most Extreme Differences	Absolute	,104
	Positive	,104
	Negative	-,062
Kolmogorov-Smirnov Z		1,047
Asymp. Sig. (2-tailed)		,223

Table 8. IT Governance maturity level normality test

The normal probability plot of IT Governance level seems to indicate that this variable data set is normally distributed, as most of the plot lands near the straight line. Further Kolmogorov-Smirnov analysis using SPSS showed that the *p*-value (labeled 'Asymp. Sig. (2-tailed)') is 0,233, which is larger than the 0,05 significance level when the confidence level is set to 95%. Therefore we conclude that the variable IT Governance level is normally distributed.

5.2.3.2 Number of Drivers

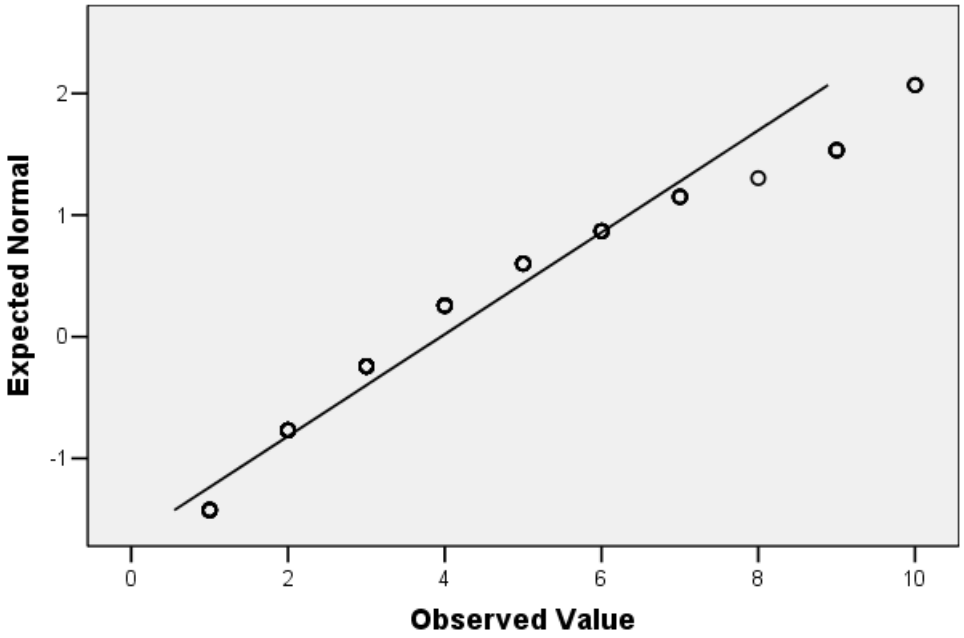


Figure 16. Number of drivers normal probability plot

	Number of Drivers
N	103

Normal Parameters(a,b)	Mean	3,95
	Std. Deviation	2,386
Most Extreme Differences	Absolute	,181
	Positive	,181
	Negative	-,108
Kolmogorov-Smirnov Z		1,839
Asymp. Sig. (2-tailed)		,002

Table 9. Number of drivers normality test

The normal probability plot of Number of Drivers seems to indicate that this variable data set is not normally distributed, as many of the plot lands far from the straight line. Further statistical normality test indicated that the *p*-value is 0,002, which is much smaller than the 0,05 significance level when the confidence level is set to 95%. Therefore we conclude that the variable IT Governance level is not normally distributed. Normally we cannot use parametric techniques on this variable, but in section 5.2.4 below we shall show that by transforming the data set, we can still use parametric techniques.

5.2.4 Transformation of Data Sets

As we can see from the analysis above, the sample 'number of drivers' variable is not normally distributed. In order to use parametric test, the original data set of the variable of interest must be transformed (Field, 2009). The transformation can use several kind of mathematical function, including square root or logarithmic function. Several variables transformations which were originally not normal in this study are discussed below.

5.2.4.1 Number of Drivers

In this case, we use square root sqrt() function to transform 'number of drivers' variable into 'sqrt_number of drivers'. Again, Kolmogorov-Smirnov test is applied to the new variable.

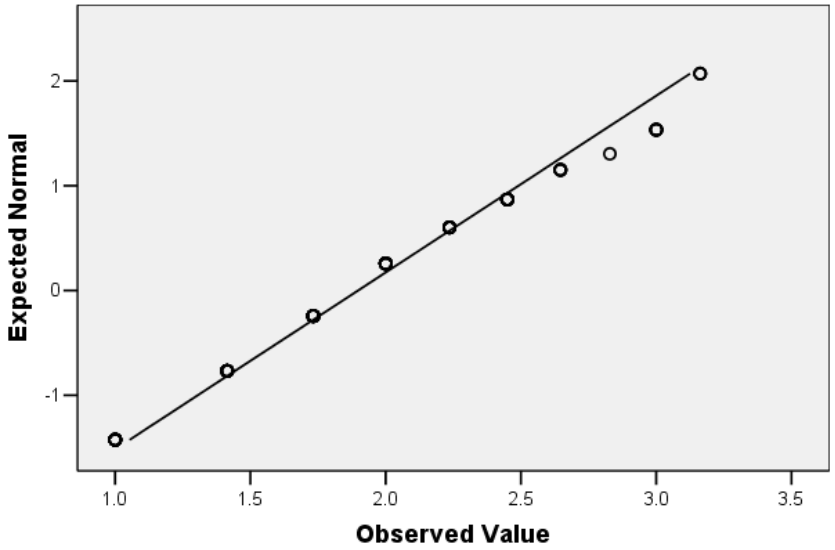
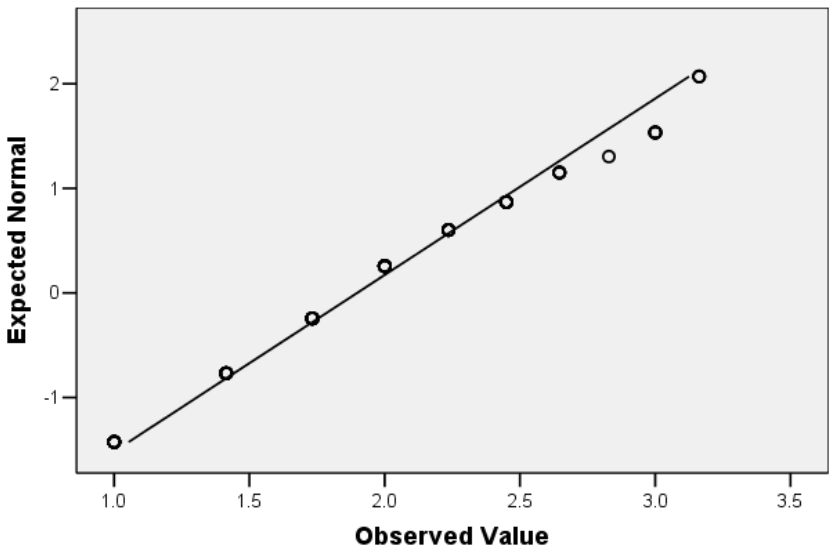


Figure 17. Square Root of Number of drivers normal probability plot

		Square Root (Number of Drivers)
N		103
Normal Parameters(a,b)	Mean	1,8983
	Std. Deviation	,59262
Most Extreme Differences	Absolute	,125
	Positive	,125
	Negative	-,098
Kolmogorov-Smirnov Z		1,269
Asymp. Sig. (2-tailed)		,080

Table 10. Number of drivers normality test

The visual comparison of normal probability plot of Figure 16 with the plot



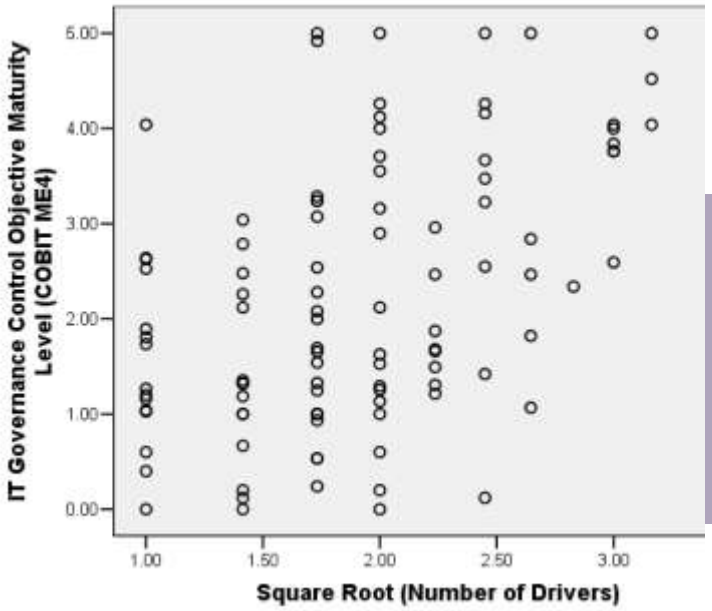
in

Figure 17 showed that the transformed dataset is now slightly plotted better along

the straight line. Calculation showed that the new variable's *p*-value is 0,08, which is slightly larger than the 0,05 significance level. The data set is now normally distributed, thus parametric test can be applied to it.

5.2.5 Correlation Using Linear Regression

In this section, we shall analyze correlation among variables as described in the conceptual model hypothesis. We shall start first by relating number of driver to the IT Governance level. Scatter diagram can be used to allow us to visually demonstrate the relationship between two variables and the extent which they covary (Hair et al, 2007). The following figure depicts the scatter plot of square root number driver versus IT Governance level. It seems from the scatter plot that as the number of drivers that presses on an organization increase, the IT Governance level also gets higher. However we have to statistically calculate the relationship to make sure of the relationship.



"…the more the number of drivers acting on an organization, it is likely that its IT Governance maturity level will be higher."

Figure 18. Scatter plot of square root number of drivers vs. IT Governance level

Analyzing further with SPSS, we calculate the strength of the relationship using Pearson correlation coefficient (Van Zanten, 1994). The correlation reported in the table is positive (0,465) and the *p*-value of 0,000 is smaller than 0,01 significance level. This suggests that the more the number of drivers acting on an

organization, it is likely that its IT Governance maturity level will be higher. Based on his fact probably it is much better for the government to focus on pushing the drivers rather than imposing direct requirement for IT Governance to increase IT Governance maturity at SOEs

		IT Governance Control Objective Maturity Level (COBIT ME4)	Square Root (Number of Drivers)
IT Governance Control Objective Maturity Level (COBIT ME4)	Pearson Correlation	1	,465(**)
	Sig. (2-tailed)		,000
	N	102	102
Square Root (Number of Drivers)	Pearson Correlation	,465(**)	1
	Sig. (2-tailed)	,000	
	N	102	103

** Correlation is significant at the 0.01 level (2-tailed).

Table 11. Correlation analysis between IT Governance Levcel and square root of number of drivers

5.2.6 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.

The analysis 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 add 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).

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 12. 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%).

"Major driving factors include external audits, free market competition, corporate governance regulations and core system/enterprise-wide ERP implementations."

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 10.

5.3 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 13. 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.

"Privatized SOEs have higher IT Governance maturity level than unprivatized SOEs"

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 Agreement with Other Studies

This section is to be completed later.

6.2 Implications for SOEs in Indonesia

This section is to be completed later.

6.3 More General Implications of Research Results

This section is to be completed later.

CHAPTER 7
CONCLUSION

This section is to be completed later.

REFERENCE

Babbie, Earl (1998). The Practice of Social Research, 8th edition. Wadsworth Publishing Company, Belmont, CA.

Badan Pusat Statistik (2009). Peraturan Kepala Badan Pusat Statistik Tentang Klasifikasi Baku Lapangan Usaha Indonesia. Badan Pusat Statistik, Jakarta.

Becker, Saul, Alan Bryman & Joe Sempik (2006). Defining 'Quality' in Social Policy Research: Views, perceptions and a framework for discussion, Social Policy Association, Lavenham, Suffolk. Also available at htpp://www.social-policy.com.

Boland, Richard J. Jr. (1991). 'Information Systems Use as a Hermeneutic Process' in H.E. Nissen, H.K. Klein & R. A. Hirschheim (eds.) Information Systems Research: Contemporary Approaches and Emergent Traditions. International Federation of Information Processing Working Group 8.2. North-Holland, Amsterdam.

Brown, C. V., & Magill, S. L. (1994). 'Alignment of the IS function with the enterprise: Toward a model of antecedents', in MIS Quarterly, 18(4).

Cooper, Donald R. & Pamela S. Schindler (2006). Business Research Methods, 9th ed. McGraw-Hill, New York.

Csaszar, Felipe, Eric Clemons (2006). Governance of the IT Function: Valuing Agility and Quality of Training, Cooperation and Communications. In Proceedings of the 39th Hawaii International Conference on System Sciences.

De Haes, Steven & Wim Van Grembergen (2005). 'IT Governance Structures, Processes and Relational Mechanisms: Achieving IT/Business Alignment in a Major Belgian Financial Group', in Proceedings of the 38th Hawaii International Conference on System Sciences.

De Haes, Steven & Wim Van Grembergen (2006). 'Information Technology

Governance Best Practices in Belgian Organisations' in Proceedings of the 39th Hawaii International Conference on System Sciences.

Dahlberg, Tomi, Hannu Kivijärvi, (2006). An Integrated Framework for IT Governance and the Development and Validation of an Assessment Instrument. In Proceedings of the 39th Hawaii International Conference on System Sciences.

Field, Andy (2009). Discovering Statistics Using SPSS (Introducing Statistical Methods). Sage Publications, Los Angles.

Glaser, B. & A. Strauss. (1967). The Discovery of Grounded Theory. Aldine , Chicago.

Gottschalk, P. (2003). 'Managing IT functions'. In W. Van Grembergen (Ed.), Strategies for Information Technology Governance. Hershey, PA: Idea Group Publishing.

Harvey, L. J., & Myers, M. D. (1995). Scholarship and research: the contribution of ethnography to bridging the gap. In *Information, Technology & People.* MCB University Press.

Hair, Joseph F. Jr., Arthur H. Money, Phillip Siamouel, Mike Page (2007). Research Methods for Business. John Wiley & Sons, Chichester, West Sussex.

Henderson, J.C. and Venkatraman, N. (1993), 'Strategic Alignment: Leveraging Information Technology for Transforming Organization', in IBM Systems Journal, 32(1)

Hodgkinson, S.I. (1996). 'The role of corporate IT function in the federal IT organization', in M.J. Earl, ed., Information Management: The Organizational Dimensions, Oxford University Press, New York.

ITGI, (2003). 'Board Briefing in IT Governance, 2nd edition', IT Governance Institute, available at http://www.itgi.org.

ITGI, (2006). 'Enterprise Value: Governance of IT Investments, The Val IT Framework', IT Governance Institute, available at http://www.itgi.org.

ITGI, (2006b). 'IT Governance Global Status Report – 2006', IT Governance Institute, available at http://www.itgi.org.

ITGI, (2007). 'COBIT 4.1', IT Governance Institute, available at

http://www.itgi.org.

ITGI, (2008). 'IT Governance Global Status Report – 2008', IT Governance Institute, available at http://www.itgi.org.

Jeffery, M. and I. Leliveld (2004). 'Best Practices in IT Portfolio Management', in MIT Sloan Management Review, Vol.45 No.3, Spring 2004.

Kan, A.H.G. Rinnooy, (2004). 'IT Governance and Corporate Governance at ING', in Information Systems Control Journal, Vol. 2.

Kementrian BUMN (2010). Official website http://www.bumn.go.id.

Leech, Nancy L., Karen C. Barrett, George A. Morgan (2004). SPSS for Intermediary Statistics: Use and Interpretation. Routledge Academic.

Lewis, K. (1985) *Social anthropology in perspective,* Cambridge University Press, Cambridge.

Luftman, J., (2000). 'Assessing Business-IT Alignment Maturity', in Communications of the Association for Information Systems. Vol. 4, Article 14, December 2000.

Luftman, J., (1996). Competing in the Information Age – Strategic Alignment in Practice, ed. by J. Luftman, Oxford University Press, 1996.

Luftman, Jerry N., Raymond Papp and Tom Brier, (1999), 'Enablers and Inhibitors of Business-IT Alignment', in Communications of the Association for Information Systems. Vol. 1, Article 11.

Luftman, Jerry N., Paul R Lewis, Scott H Oldach, (1993). 'Transforming the enterprise: The alignment of business and information technology' in IBM Systems Journal; Vol. 32, No. 1, 1993

Neuman, W. Lawrence, (2003). Social Research Methods: Qualitative and Quantitative Approaches, 5th edition, Allyn and Bacon, Boston, Massachusetts.

Peterson, Ryan (2001). 'Configurations and Coordination for Global Information Technology Governance: Complex Designs in a Transnational European Context' in Proceedings of the 34th Hawaii International Conference on System Sciences.

Peterson, Ryan (2004), 'Integration Strategies and Tactics for Information

Technology Governance', In W. Van Grembergen (Ed.), Strategies for Information Technology Governance. Hershey, PA: Idea Group Publishing.

Peterson, Ryan (2004b), 'Crafting Information Technology Governance', In Information Systems Management; Vol.21 no.4, Fall 2004.

Rau, Kenneth G, (2004). 'Effective Governance of IT: Design Objectives, Roles and Relationships', Information Systems Management; Fall 2004.

Ribbers, Pieter M.A., Ryan R. Peterson & Marylin M. Parker, (2002). 'Designing Information Technology Governance Processes: Diagnosing Contemporary Practises and Competing Theories', in Proceedings of the 35the Hawaii International Conference on System Sciences (HICCS), 2002.

Rockart, J. F., Earl, M., & Ross, J. W. (1996). 'Eight imperatives for the new IT organization', in Sloan Management Review, 38(1).

Saha, Pallab, (2005), 'IT Governance Survey: Knowing, But Not Doing', in MIS Asia, December 2005.

Schwarz, A. & R. Hirschheim, (2003). 'An extended platform logic perspective of IT governance: managing perceptions and activities of IT' in Journal of Strategic Information Systems, Vol.12 (2003) 129–166

Sekaran, Uma (1992), Research Methods for Business: A Skill Buuilding Approach, 2nd ed, John Wiley & Sons, Inc., New York.

Siegel, Sidney & N. John Castellan, Jr. (1988). Nonparametric Statistics for the Behavioral Sciencee, 2nd ed. McGraw-Hill Book Company, New York.

Standards Australia (2005). Corporate governance of information & communications technology, AS-8015:2005, Sydney, New South Wales.

Van Grembergen, (2004). 'Strategies for Information Technology Governance: An Interview with Wim Van Grembergen', in Information Management; 17, 1/2, Spring 2004.

Van Grembergen, Wim, Steven De Haes & Erik Guldentops (2004), 'Structures, Processes and Relational Mechanisms for IT Governance'. In W. Van Grembergen (Ed.), Strategies for Information Technology Governance. Hershey, PA: Idea Group Publishing.

Van Grembergen, Wim & Steven De Haes (2008), Implementing Information

Technology Governance, IGI Publishing, Hersey, Pennsylvania.

Van Zanten, Wim (1994). Statistika untuk Ilmu-ilmu Sosial, edisi kedua. Gramedia Pustaka Utama, Jakarta.

Weill, P. and J. Ross, (2005). 'A Matrixed Approach to Designing IT Governance', in MIT Sloan Management Reviesw, Vol.46 No.2, Winter 2005.

Weill, P. and J. Ross, (2004). IT Governance: How Top Performers Manage IT Decision Rights for Superior Results, Harvard Business School Press, Boston.

Yin, R. (1994). Case study research: design and methods, 2nd edition, Sage Publications, Thousand Oaks.

APPENDIX A
SURVEY QUESTIONNAIRE