EXPLORING THE ROLE OF THE GOVERNING BODY (BOARD) IN INFORMATION TECHNOLOGY GOVERNANCE: A STUDY OF AUSTRALIAN UNIVERSITIES

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Abstract

In this thesis, I advance the understanding of information technology (IT) governance research and corporate governance research by considering the question **"*How do boards govern IT?*"** The importance of IT to business has increased over the last decade, but there has been little academic research which has focused on boards and their role in the governance of IT (Van Grembergen, De Haes and Guldentops, 2004). Most of the research on information technology governance (ITG) has focused on advancing the understanding and measurement of the components of the ITG model (Buckby, Best & Stewart, 2008; Wilkin & Chenhall, 2010), a model recommended by the IT Governance Institute (2003) as 'best practice' for boards to use in governing IT.

IT governance is considered to be the responsibility of the board and is said to form an important subset of an organisation's corporate governance processes (Borth & Bradley, 2008). Boards need to govern IT as a result of the large capital investment in IT resources and high dependency on IT by organisations. Van Grembergen, De Haes and Guldentops (2004) and De Haes & Van Grembergen (2009) indicate that corporate governance matters are not able to be effectively discharged unless IT is being governed properly, and call for further specific research on the role of the board in ITG. Researchers also indicate that the link between corporate governance and IT governance has been neglected (Borth & Bradley, 2008; Musson & Jordan, 2005; Bhattacharjya & Chang, 2008). This thesis will address this gap in the ITG literature by providing the bridge between the ITG and corporate governance literatures.

My thesis uses a critical realist epistemology and a mixed method approach to gather insights into my research question. In the first phase of my research I develop a survey instrument to assess whether boards consider the components of the ITG model in governing IT. The results of this first study indicated that directors do not conceptualise their role in governing IT using the elements of the ITG model. Thus, I moved to focus on whether prominent corporate governance theories might elucidate how boards govern IT. In the second phase of the research, I used a qualitative inductive case based study to assess whether agency, stewardship and resource dependence theories explain how boards govern IT in Australian universities.

As the first in-depth study of university IT governance processes, my research contributes to the ITG research field by revealing that Australian university board governance of IT is characterized by a combination of agency theory and stewardship theory behaviours and processes. The study also identified strong links between a university's IT structure and evidence of agency and stewardship theories. This link provides insight into the structures element of the emerging enterprise governance of IT framework (Van Grembergen, De Haes & Guldentops, 2004; De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2009b; Ko & Fink, 2010).

My research makes an important contribution to governance research by identifying a key link between corporate and ITG literatures and providing insight into board IT governance processes. The research conducted in my thesis should encourage future researchers to continue to explore the links between corporate and IT governance research.

Keywords: Information technology, Information technology governance, corporate governance, boards of directors, governing bodies, agency theory, stewardship theory, resource dependence theory, critical realism, qualitative research, case study research.

Table of Contents

List of Tables

List of Figures

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: _____

Date: _____

List of Acronyms

Acronyms	Full Title
ITG Frameworks	
CobiT	Control objectives of information and related technology framework
Val IT	Enterprise Value: Governance of IT investments
BSC	Balanced Score Card
ITBSC	IT Balanced Score Card
Organisations	
CAUDIT	Council of Australian University Directors of IT
ITG	IT Governance
ITGI	The IT Governance Institute
ISACA	Information Systems Audit and Control Association
WOB	Women on Boards
University Networks	
ATN	Australian Technology Network
GO8	Group of Eight Universities Network
IRU	Innovative Research Universities Network
NGU	New Generation Universities Network
NN	No Network Affiliation
Interview Participants Positions	
HGB	Head of Governing Body
GBM	Governing Body member
VC	Vice-Chancellor
SDVC	Senior Deputy Vice Chancellor
DVCIT	Deputy Vice-Chancellor Information Technology or equivalent
HG	Head of Governance or equivalent
ITD	IT Director or equivalent
ITGM	IT Governance Committee member
OITM	Other IT management

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Chapter One

Introduction

1.1 Introduction

Organisations are becoming increasingly dependent on IT systems for their day to day operations (Van Grembergen, De Haes & Guldentops, 2004; Bart & Turel, 2009; Parent & Reich, 2009; De Haes and Van Grembergen, 2009). Consequently, organisations invest considerable capital into IT assets to support the IT needs of their employees and other stakeholders (Nolan & McFarlan, 2005; Van Grembergen & De Haes, 2009b; Wilkin & Chenhall, 2010). As a result *"corporate information assets can account for more than 50% of capital spending"* (Nolan & McFarlan, 2005, p.96). With the advent of the internet and online business, IT dependent business transactions and capital expenditure on IT software, hardware and infrastructure are expected to continue to grow exponentially (Gillies, 2005; Bart & Turel, 2009, 2010). Maintenance costs are also expected to continue to rise due to increased costs associated with power, storage, and staffing. In short, the contemporary global business environment is increasingly reliant on IT, which in turn needs to be governed effectively and efficiently (Van Grembergen, De Haes & Guldentops, 2004; De Haes & Van Grembergen, 2009).

Most current organisations are governed by a board of directors[1] (one type of governing body[2]). The board of directors is seen to be the ultimate decision-making body of an organisation (Psaros, 2009). The board is considered to be responsible for the major investment decisions, corporate governance and the strategic directions of the organisation (Psaros, 2009). Boards are said to play a critical role in the governance of an organisation which increases the overall health and wealth of the entity (Borth & Bradley,

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[1] The board of directors is defined as the "Governing body (called the board of an incorporated firm). Its members (directors) are elected normally by the subscribers (stockholders) of the firm (generally at an annual general meeting or AGM) to govern the firm and look after the subscribers' interests" (Business Dictionary, 2011).

[2] A governing body is defined as the persons (or committees or departments etc.) who make up a body for the purpose of governing a country or organization (Free Dictionary, 2011). The board of directors is one example of a governing body for an organisation. Other names for the governing body that are often used include Management Committees (Incorporated Associations), Partners (Partnerships) and Senate/Council (Educational Institutions).

2008). Hermalin and Weisbach (2003, p.9) consider boards to be "*part of the market solution to the contracting problems inside most organizations*". IT governance is considered to be the responsibility of the board and executive management (IT Governance Institute, 2003; Van Grembergen, De Haes & Guldentops, 2004; Bart & Turel, 2009) and is identified as forming an important subset of an organisation's corporate governance processes (Borth & Bradley, 2008). As the terms 'governing body' and 'board' are often used synonymously to refer to the governing body of an organization, both terms will be used in this thesis. The term 'board' will be used when referring to the governing body of organisations in the literature review and quantitative study in chapters 2 and 4. The term 'governing body' will be used when referring to the key body governing the operations of Australian universities in the qualitative study in chapters 5-8 because these organizations use different terminology for the governing group.

Despite this continued call for improved IT governance, there has been little research on how boards govern IT. Van Grembergen, De Haes and Guldentops (2004) and De Haes and Van Grembergen (2009) call for a specific focus on what boards do around IT governance as they consider that corporate governance cannot be effectively discharged unless IT is governed properly. This call is also supported by Musson and Jordan (2005), Borth and Bradley (2008) and Bhattacharjya and Chang (2008) who call for further research on the missing link between corporate and IT governance. This thesis will gather insight into how boards govern IT and in the process contribute to linking ITG and corporate governance research.

The remaining sections of this chapter provide a synopsis of my thesis research program. In section 1.2, I discuss the background to my research. This is followed by the identification of the research problem and the development of my research question in section 1.3. Section 1.4 presents my research approach and its justifications, which is followed by my thesis contributions in section 1.5. Delimitations of scope and key assumptions are presented in section 1.6 and the chapter concludes with a thesis outline in section 1.7.

1.2   Background to the research

IT governance is defined by the Australian Standard for Corporate Governance of ICT (AS8015-2005) and the International Standard for Corporate Governance of ICT (ISO/IEC 38500) 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 organization and monitoring this use to achieve plans. It includes the strategy and policies for using ICT within an organization.*" (Standards Australia, 2005, p.6; International Organization for Standardization, 2008, p.3).   The IT Governance Institute (2003, p.10) extend this definition to identify that ITG "*is an integral part of enterprise governance and consists of the leadership and organizational structures and processes that ensure the organization's IT sustains and extends the organization's strategies and objecti*ves".

The importance of IT governance has undoubtedly escalated over the last decade with research on IT governance starting in the late 1990s (De Haes & Van Grembergen, 2009). Board and ITG research is very descriptive and has focused primarily on explaining broadly what boards do (see for example Huff, Maher & Munro, 2004, 2005, 2006; Bart & Turel, 2009, 2010).   There has been a paucity of academic research which has focused on boards and ITG.   What research has been reported has focused on interviews and surveys with board chairs and chief information officers.   While these studies provide insight into board operations, they have not assisted the development of holistic ITG theories or frameworks.   Instead, they illustrate the lack of focus by board members on IT in their board work (Huff et al., 2004, 2005, 2006; Bart & Turel, 2009; Deloitte, 2009; IT Governance Institute, 2009).

Boards appear to be struggling to understand the state of IT within their companies (Andriole, 2009) and/or they do not have sufficient information to govern IT effectively (Gillies, 2005). Many board members display a lack of IT skills and interest in discussing IT at board meetings (Huff et al., 2004, 2005, 2006; Engen, 2006). Most boards tend to delegate their IT responsibilities to the audit committee (board sub-committee) and/or management (Huff et al., 2004, 2005, 2006). This evidence is corroborated by normative research and guidelines. One of the key normative guidelines released in the last decade (IT Governance Institute, 2003) suggests that all boards should consider governing IT by

focusing on the achievement of five key ITG focus areas namely: strategic alignment, value delivery, risk management, resource management and performance measurement. This ITG model is discussed further in chapter 2.

Despite the paucity of research on boards and ITG, considerable prior research on ITG has focused on understanding and measuring each of the individual components of the ITG model. This research, whilst adding valuable understanding to each of the components and their relationship to ITG, has resulted in little research which has tested the ITG model or developed any new holistic models of ITG. My research will go some way to filling this void.

1.3   The research problem

As a result of the paucity of research on boards and IT governance, I specifically focus on how boards are governing IT. Thus, the research in my thesis will fill a gap in the ITG literature by providing greater insight into this important aspect of board work. My research will also bridge the gap between ITG research and corporate governance research, an area which has been neglected (Musson & Jordan, 2005; Borth & Bradley, 2008). More formally, the overarching research problem for this thesis is:

How do boards govern IT?

I develop my research approach in chapter 3 to guide my research program. In the first phase of my research, I consider whether the established theoretical ITG model may provide an explanation to my overarching research question (IT Governance Institute, 2003). This involves assessing whether this model represents how directors conceptualise their role in governing IT. To assess this, I develop measures for each component of the model and undertake exploratory factor analysis to determine whether boards conceptualise governance of IT in this way. Chapter 4 documents my method and results which clearly indicate that the ITG model does not appear to represent a board's approach to IT governance.

Given the lack of empirical support for using the ITG model as a framework for understanding what boards do, it was clear a broader review of the governance research

field was required. Hence, in phase two of my research program (chapters 5 to 8), I seek to understand whether corporate governance theories might provide deeper insights into board governance of IT. Specifically I use the three predominant theories in corporate governance research (agency theory, stewardship theory, and resource dependence theory) as a frame for understanding how boards govern IT within Australian universities (Sundaramurthy & Lewis, 2003; Donaldson & Davis, 1991; Nicholson & Kiel, 2007; Lynall, Golden & Hillman, 2003; Tosi, Brownlee, Silva & Katz, 2003). Chapter 5 describes the theories and the method for this phase of my research.

The results of my case analyses (chapters 6-8) reveal that all 11 universities studied applied some combination of agency and stewardship theory mechanisms (behaviours and processes) to govern IT. The cases were found to cluster into four clear groups based on the evidence of the application of the mechanisms of the theories, that is, the primary agency theory group, the primary stewardship theory group, the combined agency theory/stewardship theory group and an insufficient information to analyse group. The cross-case analysis highlighted links between a university's IT structure (centralised, decentralised or federated) and the presence or absence of agency and stewardship theories.

1.4   The research method

A mixed method approach is adopted as the research approach for my thesis because it clearly links to my epistemological position of critical realism. As a critical realist, I consider that research methods should be determined by the nature of the research problem and not by a particular research paradigm (McEvoy & Richards, 2006). Thus, I chose a mixed method approach which combined quantitative and qualitative methods or techniques as the most effective strategy for my thesis (Perry, Reige & Brown, 1999; McEvoy & Richards, 2006). By applying both approaches, at different phases of my research program, I was able to collect different types of data on the same issue which could be triangulated together. This approach also reduced the weaknesses associated with using any one single method (Teddlie & Tashakkori, 2009). A mixed method approach also seemed to best suit the exploration of my broad research question *"How do boards govern IT?"* as the implementation of multiple methods over a number of studies assists to answer this type of broad question (Morse, 2003).

From a theoretical perspective, a mixed method approach gave me the best chance of discovering the theoretical mechanisms that underlay board governance of IT (Teddlie & Tashakkori, 2009). A combination of quantitative and qualitative methods was designed to lead to thicker and deeper understanding and descriptions of the research issue (Creswell & Plano Clark, 2007). My mixed method design develops as my research progresses, so that the results from the first phase (quantitative study) assist the development of a more insightful study of boards and ITG in the second phase of my research approach (qualitative study) (Teddlie & Tashakkori, 2009). This mixed method approach allows my methods to develop from the ITG and corporate governance literatures (Tashakkori & Teddlie, 2003) and to consider my research from a unified position (Leech, Dellinger, Brannagan & Tanaka, 2010). Thus, in my research program, I combine the strengths of quantitative research with the strengths of qualitative research to develop deeper insights into how boards govern IT (Kaplan & Duchon, 1988; Leech et al., 2010).

1.5   Thesis contributions

Despite the growth in corporate and IT governance research, no one has clearly established how boards govern IT within their organisation. The little research that does exist is largely descriptive and documents the lack of attention paid to IT in the boardroom. These studies have not led to the development of any holistic ITG theory or framework focused on the board. My thesis aims to address this gap in the literature by determining an explanation for how boards govern IT.

In so doing, I aim to link corporate governance and ITG research by determining whether boards use the ITG model to govern IT or whether the application of corporate governance theories provides a better explanation for how boards govern IT. The results of my quantitative study indicate that directors do not conceptualise their role in governing IT using the elements of the ITG model. However, in the first in-depth qualitative study of Australian university governance, I identify that universities appear to govern IT with a combination of agency and stewardship theory mechanisms (behaviours and processes) and that the IT structure of each university has a major impact on the behaviours and processes observed. Thus, I present new contexts in which corporate

governance theories are applicable and, for the first time, apply mainstream corporate governance theories to ITG.

The qualitative study also contributes to the debate on whether single corporate governance theories can effectively explain board processes or whether a multi-theoretic view provides a more comprehensive explanation of board work. My research identified that in all 11 cases more than one theory was needed to explain how boards govern IT. In six cases, evidence of the mechanisms of a single theory (either agency theory or stewardship theory) most prominently explained Australian university board's governance of IT and in another four cases a more even application of the mechanisms of two theories was evident and so neither theory provided a prominent ITG explanation. One case was excluded as it provided insufficient information to analyse. The study identifies that no one theory and its mechanisms explains how boards govern IT, and that varying degrees of the mechanisms of two theories, agency and stewardship theory, are evident in the ITG processes of Australian universities.

Finally, my research will also assists Australian university governing bodies to gain a greater insight into their governance of IT and the impact of IT structure on university ITG processes. This work will assist management and consultants to more clearly advise boards on ITG issues.

1.6   Delimitations of scope and key assumptions

Defining the boundaries of the research program (delimitations of the study) is crucial to an effective research approach (Perry, 1998). This thesis focuses on IT governance but considers the impact of corporate governance theories on IT governance. Despite corporate governance predominantly being applicable to *Corporations Act (2001)* companies, Australian universities are incorporated under an Act of State Parliament and so are a special form of public corporate entity. Thus the corporations in my research are limited to Australian public universities.

Second, the research is limited to the role of boards or governing bodies in relation to the governance of IT. There may be other significant factors including the Parliamentary Act under which the university operates, the general business environment, and

management's capability that may impact on the governance of IT processes within Australian universities, but these components were not the focus of my research approach.

Third, I limited my research to what boards or governing bodies do around IT. My research is focused on how they govern IT. I could have applied a broader approach to my research and considered the board's role in strategy and how IT was treated but considered my research would be more focused if it only considered how boards govern of IT.

Finally, I made the decision to limit my research to governing body members and other key executive management of the university. These participants were chosen for the qualitative study as they were knowledgeable on university and board IT governance processes, were likely to attend governing body meetings and were responsible for implementing IT governance processes within each university. This process assisted me to ensure I interviewed knowledgeable informants who viewed university board IT governance issues from diverse perspectives (different hierarchical levels, functional areas or are outside observers of the processes) to aid the richness (Eisenhardt & Graebner, 2007). This choice of participants was designed to increase the replication rigour of the case data and assists in ensuring comparisons across cases were valid (Yin, 1994).

1.7   Summary and thesis outline

In this chapter I establish the overarching theme of this thesis which is to explore ***"How do boards govern IT?".***   This research problem was identified as a clear gap in the limited research currently existing on boards and ITG. It supports the call by Van Grembergen, De Haes and Guldentops (2004) for increased research on boards and ITG and also supports the perceived need for research which links corporate governance and IT governance (Borth & Bradley, 2008; Musson & Jordan, 2005; Bhattacharjya and Chang, 2008).

I identify a mixed method approach as being the best research approach to assess this research question (chapter 3) and to identify clear contributions that will assist both practitioners and academics. I outlined in this chapter how I will assess the ITG model

using a quantitative approach as a possible theoretical explanation for how boards govern IT (chapter 4). As the results of this study find that directors do not conceptualise their role using the elements of the ITG model, I move back to the broader field of corporate governance to undertake a qualitative inductive case based study (chapters 5-8) which considers whether three corporate governance theories (agency, stewardship and resource dependence) provide elucidation on how boards govern IT. The study observes that boards of Australian universities appear to apply a combination of agency and stewardship theory mechanisms to govern IT and that no single theory appeared to provide a complete explanation of board governance of IT. The study also identifies that a university's IT structure is strongly linked to the application of agency and stewardship theories.

My thesis makes five key contributions. First my research aims to address a gap in the literature by establishing an explanation for how boards govern IT within their organisations. Second, my research provides the first application of corporate governance theory to ITG and in so doing provides insight into the links between corporate governance and ITG research. Third, my thesis provides the first in-depth study of university governance processes and identifies that universities govern IT with a combination of agency theory and stewardship theory behaviours and processes and that the IT structure of each university is clearly linked to the application of the two theories. This assists me to add to the context in which agency and stewardship theories are applicable and, for the first time, apply mainstream corporate governance theories to ITG. Fourth, my thesis contributes to the debate on whether single corporate governance theories can effectively explain board processes or whether a multi-theoretic view provides a more comprehensive explanation of board work. My research identifies that in all 11 cases, no one single theory explained how boards govern IT, but all universities relied on a mixture of agency and stewardship theory to achieve this governance. In six cases, the mechanisms associated with a single theory was the most prominent explanation for board's governance of IT but this did not provide a full explanation and in four cases, the mechanisms of two theories (agency and stewardship) combined in more equal proportions to provide the explanation. One case did not offer sufficient data to provide an explanation. Finally, my research may assist university boards to better

understand the governance of IT and allow them to consider the impact of IT structure on university ITG processes. Figure 1.1 outlines the structure of my thesis.

Chapter 1 **Introduction**
Chapter 2 **Review of Relevant Literature**
Chapter 3 **Research Approach**
Chapter 4 **Quantitative Study**
Chapter 5 **Investigating IT governance in Australian Universities: a return to the field**
Chapter 6 **Analysis of Agency Theory Mechanisms**
Chapter 7 **Analysis of Stewardship Theory & Resource Dependence Theory Mechanisms**
Chapter 8 **Cross-Case Analysis of Corporate Governance Theories**
Chapter 9 **Discussion and Conclusions**

Figure 1.1 **Structure of the thesis**

Chapter 2 will synthesise the relevant literature on boards and ITG and the components of the ITG model. Chapter 3 will present my research approach including my philosophical basis of critical realism and will justify the use of a mixed method approach in my thesis. Chapter 4 will present the quantitative testing of the ITG Model to determine whether boards are using this model to govern IT. Chapter 5 considers whether three key corporate governance theories provide a better explanation for how boards govern IT and presents a qualitative inductive case based method to investigate this. Chapter 6 and 7 will present the within-case results for the results of the analysis of each of the three corporate governance theories (agency theory, stewardship theory and resource dependence theory). Chapter 8 will present the cross-case results and discussion of the qualitative analysis and my thesis will conclude in Chapter 9.

Chapter 2

Review of Relevant ITG Literature

2.1   Introduction

Boards are considered to be legally responsible for all major corporate decisions that affect the wealth and health of their organisation. Bart and Turel (2009, p. 317) indicate that *"the board of directors is responsible for establishing their organisation's nature of corporate governance (i.e. structures, processes and behaviours used to control the organisation and manage the relationships among key organisational stakeholders)"*. Pressures associated with this responsibility have been increasing as a result of the spate of corporate collapses over the last two decades and the consequent increased focus on corporate governance processes. This pressure extends to a board's involvement in the governance of its IT assets (Bart & Turel, 2009, 2010; De Haes & Van Grembergen, 2009). There are increasing calls for boards to focus more on the governance of IT assets and processes given that so many board and executive decisions are reliant on information supplied by the organisation's IT systems (Van Grembergen, De Haes & Guldentops, 2004; Gedda & Pauli, 2006; Williams 2007; Borth & Bradley, 2008; Bart & Turel, 2009, 2010). This has led to the growth in interest and research on the governance of IT.

The purpose of this chapter is to review the relevant IT governance literature and develop a clear research question. This review first focuses on the board and IT governance literature in section 2.2. Next, section 2.3 reviews the more general IT governance literature by examining research on the individual components of the ITG model (IT Governance Institute, 2003). The chapter will discuss the development of research questions in section 2.5 and will conclude with a chapter summary in section 2.5.

2.2 Boards and the governance of IT

The current IT governance research agenda does not clearly establish a theoretical view for how boards govern IT. The research into board involvement in IT and ITG is largely descriptive and focused on explaining what boards do in relation to broad topics and IT activities. From an academic perspective there is a paucity of research on boards and ITG and research on the involvement of board members in ITG (Bart & Turel, 2010). The research that does exist involves interviews with board chairs and chief information officers across a number of medium to large companies. While many studies provide insight into what boards do, they have not led to the development of any holistic ITG theory or framework focused on the board or governing body (Huff et al., 2004, 2005, 2006; Bart & Turel, 2009, 2010; Parent & Reich, 2009; Andriole, 2009). Instead, they highlight the lack of attention paid to IT in the boardroom (Huff et al., 2004, 2005, 2006; Bart & Turel, 2009, 2010).

Even boards that do pay attention to IT are thought to not pay enough attention to the governance of IT (Parent & Reich, 2009; Bart & Turel, 2010). Some researchers conclude that this is due to board members struggling to understand the state of technology and its associated benefits in their organizations (Andriole, 2009; Bart & Turel, 2010), a condition reinforced by the reported lack of skills and interest in IT by board members (Huff et al., 2004, 2005, 2006; Engen, 2006). Consequently, most boards delegate their IT responsibilities to the Audit Committee and/or management (Huff et al., 2004, 2005, 2006).

Like the academic evidence, the normative research and guidelines are also largely descriptive. Normative research has focused mainly on surveys of what boards do in relation to ITG. These surveys reveal different activities by different boards but a common theme is that boards pay little attention to IT. This lack of attention to IT by board members may be due to their inadequate skills to appropriately govern IT processes. It may also be due to IT governance not being seen as important to board deliberations and/or being viewed as an operational issue only. For instance, Deloitte (2009) reports that nearly half of all boards rarely or never discuss IT issues. Similarly, just fewer than two out of three respondents in IT Governance Institute (2009) research do not routinely discuss IT governance. This pattern of responses has been corroborated over time by multiple researchers and research

teams (e.g. Deloitte, 2006a, 2006b, 2007, 2008, 2009; Huff et al., 2004, 2005, 2006; IT Governance Institute, 2008, 2009).

If boards are involved in the governance of IT, it appears to be on an ad hoc basis (Bart & Turel, 2010). For instance the IT Governance Institute (2009) reports IT is discussed on a case by case basis 58% of the time and boards champion IT governance in only 2% of cases (IT Governance Institute, 2008). This lack of attention supports the academic conclusion (e.g. Gillies, 2005) that boards lack the necessary information to govern IT appropriately.

A major focus of normative IT advice is developing guidelines for board members that appear to be based on practical experience, logic and common sense. Nolan and McFarlan (2005, p.98) indicate that there is "*no one-size-fits-all model for board supervision of a company's IT operations*". An example of the pattern of normative guidelines for boards can be found in the work of Nolan and McFarlan (2005) as well as Bjelland and Wood (2005) who suggest boards adopt a contingency model for board governance of IT. They develop specific actions, questions and recommendations on how boards should deal with ITG. A key guideline for boards over the last decade has been a board and ITG briefing document that suggests that boards adopt a model consisting of five key components (IT Governance Institute, 2003). A potential concern with all these guidelines however, is the lack of evidence supporting the normative suggestions.

One recurring piece of advice for boards is to have an appropriate board composition, but again the specific recommendations on board composition vary between researchers. Some argue for specific IT skills (Nolan & McFarlan, 2005; Gillies, 2005). Others suggest that being able to search for clarity in explanations of IT issues is the key; directors need self-confidence, some technical knowledge and experience in figuring out IT issues (Bjelland & Wood, 2005). Finally, some advise that no specific IT skills are required but rather a strategic understanding of IT is necessary (Trites, 2004).

In summary, the majority of the literature on boards and the governance of IT is normative in nature. It provides considerable advice on what boards should be doing and considering with respect to IT governance, but little empirical insight into how they are actually governing IT. Neither does it give any insight into what theories might underpin ITG board work. This research aims to address both issues.

2.3   The ITG model – a framework for understanding board involvement in ITG

Despite the scant evidence about how boards govern IT, the IT Governance Institute (ITGI) recommends that boards should apply their five component ITG model (IT Governance Institute, 2003). This advice focuses on five key areas of IT governance namely: strategic alignment, value delivery, risk management, resource management and performance measurement. The ITG model is shown in figure 2.1.
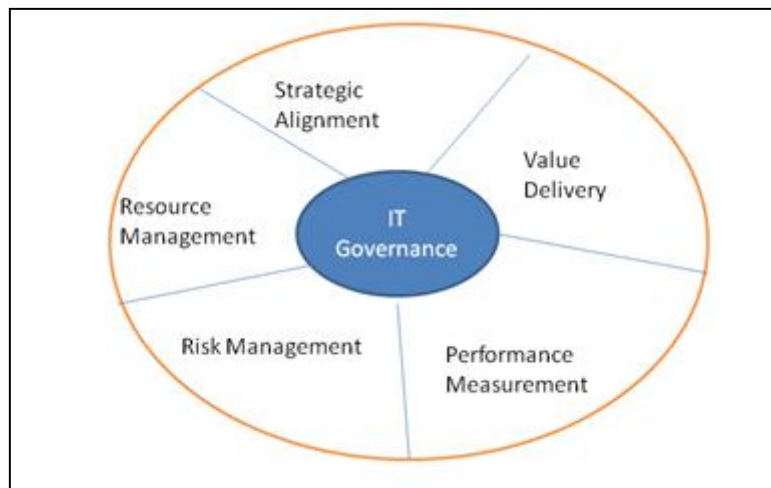
Figure 2.1   **IT governance model (adapted from IT Governance Institute, 2003)**

Most academic ITG research has focused on assessing the components of the model rather than the entire model itself. The following sub-sections present the research on each of these components.

2.3.1   *Strategic alignment*

Research on the strategic alignment component of the ITG model has been more extensive than research on the other four. Strategic alignment is concerned with the linkages between business strategy and processes and IT strategy and processes. It focuses on the level to which the goals and objectives contained in the business strategy are shared and supported by IT strategy (Reich & Benbasat, 1996). Many researchers suggest strategic alignment between business and IT is essential in order to improve organisational performance (Kearns & Sabherwal, 2006-7; Kearns & Lederer, 2003; Reich & Benbasat, 1996, 2000; Hirschheim &

Sabherwal, 2001; Sabherwal, Hirschheim & Goles, 2001; Tallon, Kraemer & Gurbaxani, 2000, Tallon & Kraemer, 2003).

The literature in this area can be summarized into three key themes. The first focuses on models developed to explain strategic alignment (section 2.3.1.1), the second focuses on the measurement tools used to assess an organisation's level of strategic alignment (section 2.3.1.2) and the third is centred on the links between strategic alignment and ITG (section 2.3.1.3).

2.3.1.1 Development and extension of explanatory models theme

Henderson and Venkatraman's (1991; 1993; 1999) strategic alignment model (SAM) is the most widely cited alignment model (Chan & Reich, 2007a, 2007b; Buckby, Best & Stewart, 2008). The SAM model posits that strategic alignment requires the alignment of business strategy and IT strategy (and the supporting infrastructure and processes of each strategy) (Henderson & Venkatraman, 1993, 1999). The model also suggests that IT governance (a component of IT strategy) must integrate with business governance (a component of business strategy) for strategic alignment to occur (Henderson & Venkatraman, 1993, 1999). The SAM model is silent on the role of the board in achieving strategic alignment. However, since boards do focus on strategy and strategic decision-making (Zahra & Pearce, 1989; Hillman & Dalziel, 2003), making business strategy decisions that align with IT strategy (strategic alignment) could quite conceivably be part of the board's work.

Development of the SAM model has diverged into several different streams. One stream focuses on the underlying IT requirements such as the technical and architectural requirements (Goedvolk, Van Schijndel, Van Swede & Tolido, 1997) or the information and communication layers (Maes, 1999; Maes, Risjsenbrij, Truijens & Goedvolk, 2000). Other work has concentrated on elaborating aspects of the model (Luftman, Lewis & Oldach, 1993; Venkatraman, Henderson & Oldach, 1993; Papp, 1995; Henderson, Venkatraman & Oldach, 1996; Luftman, 1996). In contrast, some have sought to test the SAM model (Broadbent & Weill, 1993; Burn & Szeto, 1999; Avison et al., 2004) or to integrate it with other important ITG work (Soetekouw, 2010).

Buckby et al. (2008) identified that researchers have developed alternative models to SAM (Kearns & Lederer, 2003; Bergeron, Raymond & Rivard, 2004; Strnadl, 2006; Beimborn, Wagner, Franke & Weitzel, 2007; Beimborn, Schloser & Weitzel, 2009) and there have been some criticisms of the SAM model (see for example Smaczny, 2001).

The extensions to the SAM and the alternative models of strategic alignment all focus on explaining the alignment between business and IT strategy. This research assists the board to understand IT governance by outlining the relationship between business strategy (goals and objectives) set by the board and IT strategy which is usually determined by the CEO and key IT management. The research does not, however, discuss how boards should include strategic alignment in their governance of IT.

2.3.1.2   Measuring strategic alignment

Van Grembergen and De Haes (2009a, p.77) indicate that *"there is no universal way to measure business/IT alignment in literature"*. Consequently, there has been a variety of measurement techniques developed to capture the complexity of this issue (Van Grembergen & De Haes, 2009a).

Measurement techniques identified by Chan and Reich (2007a) include the development of typologies and taxonomies (e.g. Chan, 1992; Sabherwal & Chan; 2001; Sabherwal & Kris, 1994), constructing fit models (e.g. Chan, Huff, Barclay & Copeland, 1997; Ma & Burn, 1998; Venkatraman, 1989, Bergeron, Raymond & Rivard, 2001, 2004; Cragg et al., 2002); developing survey items (e.g. Kearns & Lederer, 2003), conducting mathematical calculations (e.g. Day, 1996), implementing qualitative assessments (e.g. Reich & Benbasat, 1996, 2000) and developing psychological measures (e.g. Tan & Gallupe, 2006). To these groupings should be added the many works of Luftman (1996, 1997, 2000, 2003a, 2003b, 2003c, 2004); Luftman, Papp & Brier (1999); Luftman & Brier (1999); Luftman & Kempaiah, (2007) who was instrumental in the development of the strategic alignment maturity assessment measurement tool.

Luftman (1996, 1997); Luftman and Brier (1999) and Luftman, Papp and Brier (1999) used the key principles of the SAM Model to identify the key enablers and inhibitors to strategic

alignment, a precursor to the strategic alignment maturity assessment (SAMA) tool (Luftman, 2000; Luftman, 2003a, Luftman 2003b, Luftman 2003c). The SAMA tool measured an organisation's strategic alignment by assessing the maturity of alignment across six key criteria (communications, competency/value measurement, governance, partnership, scope and architecture and skills). The assessment uses five levels (initial/ad hoc, committed, established focus, improved/managed and optimized) and has been tested extensively (Luftman, 2004; Sledgianowski & Luftman, 2005; Luftman & Kempaiah, 2007; Van Grembergen & De Haes, 2009a; Brodbeck, Rigoni and Hoppen, 2009; Khaiata & Zualkernan, 2009). Recent research has extended Luftman's work on the enablers of strategic alignment to identify organisational architecture as a key enabler (Gregor, Hart & Martin, 2007) and to categorise enablers as people, process and/or organisational factors (Gartlan & Shanks, 2007).

Other measurement methods not discussed by Chan and Reich (2007a) include applying the balanced scorecard processes to measuring strategic alignment (Van der Zee & De Jong, 1999; Bricknall, Darrell, Nilsson & Pessi, 2007), establishing strategic alignment benchmarking (Papp, 1999), measurement of the links between strategic alignment and outsourcing (Schloser, Wagner, Beimborn & Weitzel, 2010), and further developments to the measurement of the social dimension of strategic alignment (Reich & Benbasat, 2000; Martin, Gregor & Hart, 2005).

Strategic alignment measurement research could assist a board to deal with IT governance by having a greater understanding of how strategic alignment is progressing and any resultant impact on organisational performance. The research also assists the board to deal with ITG by understanding what adds or detracts from strategic alignment when making business strategy decisions. However, the research does not provide boards with advice on how the measurement of strategic alignment should be implemented as part of their governance of IT.

2.3.1.3   *Linking strategic alignment to IT governance theme*

Recent research has placed a greater emphasis on the links between strategic alignment and IT governance. Much of this research (see Figure 2.2) has focused on an enterprise governance of IT framework consisting of governance structures, processes and relational

mechanisms (Van Grembergen, De Haes & Guldentops, 2004; De Haes and Van Grembergen, 2005; Van Grembergen, De Haes & Van Brempt, 2007; De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2009b).

This body of work suggests that governance structures include organisational units and roles responsible for making IT decisions and enabling links between business and IT management. The research also identifies that governance processes refer to the formalization of strategic IT decision-making or IT monitoring procedures and governance relational mechanism refers to active participation of and collaborative relationship among, corporate executives, IT management and business management (Van Grembergen & De Haes, 2004; Van Grembergen, De Haes and Guldentops, 2004; Van Grembergen & De Haes, 2009b; Ko & Fink, 2010). De Haes and Van Grembergen (2009) have in their research linked this implementation model to strategic alignment and have found a relationship between the choice of structures, processes and relational mechanisms and one component of the ITG model (see figure 2.2).

Adapted from De Haes & Van Grembergen (2009, p.124) and Van Grembergen & De Haes (2009c, p.6)
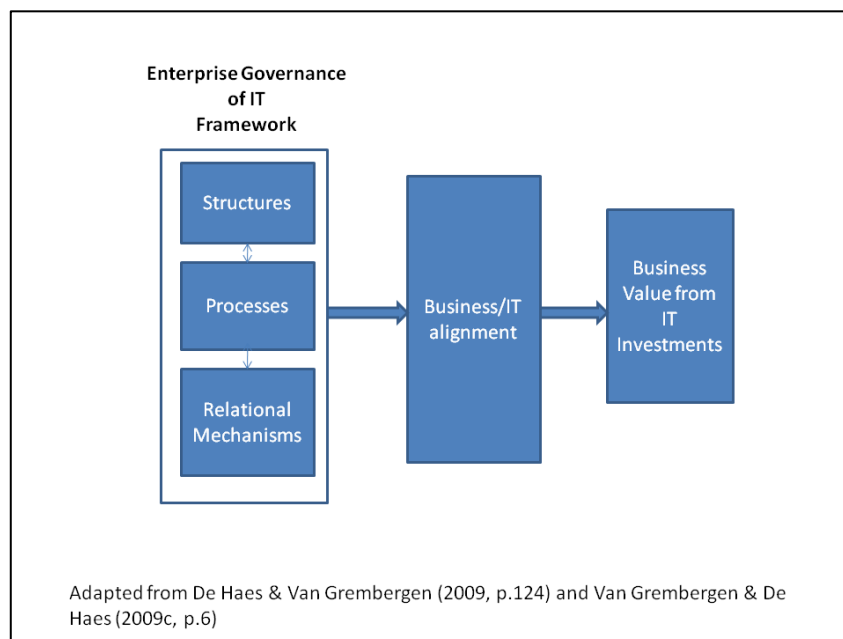
Figure 2.2   Linking the enterprise governance of IT framework to strategic alignment

2.3.1.4   Summary - strategic alignment

Whilst most of the research on strategic alignment originated from the SAM (Henderson & Venkatraman, 1991, 1993, 1999), the research has matured over time through the

development of extensions and alternative models. The development of measurement processes that attempt to measure and improve strategic alignment may also play an important role in assisting the board to deal more comprehensively with the governance of IT by providing further insight into the links between business and IT strategy and how the business strategy decisions made by the board can impact this relationship. However, it is the more recent developments exploring the links between strategic alignment and IT governance that are the most relevant to boards, as this research establishes a clear link between improved strategic alignment and the establishment and development of mature ITG processes. While the research suggests that strategic alignment is important to organisational performance (and thus should be important to boards) research into strategic alignment is silent on how boards should integrate this component of the model into their governance processes.

Chapter 4 aims in its quantitative study to determine whether boards use the ITG model and its components in conceptualizing their role in governing IT. Detailed tables of the research reviewed for this section are included in table 1 of Appendix 1. The research also forms part of the development of survey measures in Table 4.1 in chapter 4.

2.3.2 Value delivery

Research on the value delivery component of the ITG model has not been as extensive as the strategic alignment component. Value delivery focuses on the on-time and within-budget delivery of quality from IT resources in order to realize the benefits from IT assets identified at the time of implementation or purchase (IT Governance Institute, 2003). Delivery of value from IT resources has become increasingly important to boards with the growth in IT investments (Kohli & Devaraj, 2004; Nolan & McFarlan, 2005).

The literature related to this component can be summarized into three key themes. The first is focused on the explanation of value and associated measurement techniques, the second centres on normative research advising organisations on how to achieve value from IT and the third focuses on the link between IT governance and value delivery.

2.3.2.1 Explanation and measurement of IT value

Much of the value delivery research is focused on the explanation and measurement of IT value and has emanated from concerns raised about the information technology "*productivity*

paradox[1]" during the 1980s. As a result of these concerns, researchers focused on measuring the productivity payoffs or benefits realisation associated with IT resources during the following decade.

Development of measures associated with IT value has occurred in several different streams. One stream focuses on the measurement of IT value at various levels within the organisation (Ryan & Harrison, 2000; Tallon, Kraemer & Gurbaxani, 2000; Sircar, Turbow & Bordoli, 2000; Davern & Kauffman, 2000; Brynjolfsson & Hitt, 2000; Thatcher & Pingry, 2004; Kumar, 2004; Tallon, 2007). Other work has concentrated on determining whether IT value was dependent on changes in culture, business models and processes or share prices (Davern & Wilkin, 2010; Thatcher & Pingry, 2004). Despite these studies attempting to measure the delivery of value from IT, their results were conflicting and inconclusive (Sircar et al., 2000; Kohli & Devaraj, 2003).

As a result of the problems with IT value measurement in the studies above, the research on value delivery moved to developing IT value models (Davern & Kauffman, 2000; Kohli & Devaraj, 2004; Ward, Hertogh & Viaene, 2007) or investigating how IT contributes to firm performance (Tallon, 2007). Davern and Wilkin (2010) attempted to draw these disparate research streams together recently by developing an integrated measurement model.

The prior research on IT value is useful to boards in that it provides information on the measurement of value from IT. The studies also inform the board that successful value delivery from IT is linked to processes put in place by management. This research highlights that boards need to consider value delivery when making IT investment decisions. There is little guidance in the research on how boards should include value delivery in their governance of IT.

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[1] The productivity paradox focuses on the apparent contradiction between the strong advances in computer power and the relatively slow growth of productivity at the level of the whole economy, individual firms and many specific applications (Brynjolfsson, 1993).

2.3.2.2   Normative Advice on value delivery

Normative research on value delivery focuses on questioning whether investing in IT automatically adds value to an organisation (Carr, 2003, 2004). Carr (2003) suggests that organisations must be able to (1) separate essential IT investments from discretionary investments, (2) improve the effectiveness of IT assets by utilising more of the functionality of current resources instead of purchasing new IT resources and (3) not be IT innovation leaders, as this is a more costly and risk prone process.

Other normative advice suggests various ways of improving value delivery from IT including using an IT balanced scorecard to accurately measure and drive IT value, preparing business cases on proposed investments, setting value return targets that define, and quantifying expected benefits from IT (IT Governance Institute, 2005f). The ITGI also promulgates the control objectives for information and related technology (CobiT) framework and the enterprise value: governance of IT investments (VAL IT) framework as methods of accurately measuring, monitoring and optimising the realisation of business value from investment in IT (IT Governance Institute, 2000, 2005f, 2005g, 2006a, 2007).

While this theme provides the board with useful advice on measuring and delivering value from IT investments, it is not tried or tested. Nevertheless, it does help the board understand the issues associated with the delivery of value from IT and should assist deliberations on IT capital expenditure decisions. This research provides little evidence of board involvement in the delivery of value from IT as part of board governance of IT.

2.3.2.3   Linking value delivery to IT governance

Research by Weill (2004) and Weill and Ross (2004) emphasises the links between value delivery and the implementation of effective IT governance processes. Weill (2004) identifies that top-performing organisations proactively seek value from IT through a number of key business strategies. Weill and Ross (2004) identified that top performing organisations are proactive in seeking value from IT by clarifying business strategies and the role of IT, measuring and management of their spend on IT, assessing value received from the investment, assigning accountability for IT changes, learning from every implementation

and improving sharing and reusing of IT assets. Their work considered key ITG decisions and archetypes that assist with achieving value.

This research, while providing advice on how top-performing organisations seek value from IT, provides little guidance on how boards can be involved in value delivery from IT as part of board governance of IT.

2.3.2.4   Summary - value delivery

The literature on value delivery has focused on the explanation and measurement of IT value. Despite over a decade of studies on measurement, results are disparate and often inconclusive (Sircar et al., 2000; Kohli & Devaraj, 2003; Chan, 2000; Davern & Wilkin, 2010). The recent integrated model of Davern and Wilkin (2010) presents the best opportunity for future measurement of the delivery of value from IT. This research highlights to the board the difficulties associated with measuring value delivery from IT assets and also that comprehensive management processes must be in place to identify benefits from IT investments. This research should encourage the board to make more informed IT capital investment decisions by ensuring the establishment of value delivery processes are an important part of the investment process (Wilkin & Chenhall, 2010). The normative research on value also provides assistance to the board by increasing their knowledge on value delivery issues useful for their deliberations on IT capital expenditure decisions.

However, it is research by Weill (2004) and Weill and Ross (2004) which helps in defining how boards govern IT by providing empirical data on the link between effective ITG processes and the achievement of value from IT resources. Their research allows boards to see how the establishment of IT governance processes could have a positive impact on determining value from IT investments.

Chapter 4 presents the results of a quantitative study I conducted, which aims to determine whether boards consider value delivery when conceptualizing their role in governing IT. Detailed tables of the research reviewed for this section (used in the development of the value delivery survey measurement statements in table 4.1) are included in table 2 in Appendix 1.

2.3.3   Resource management

Research on resource management is not as prolific as strategic alignment or value delivery. Resource management of IT has been defined as *"the optimal investment, use and allocation of IT resources (people, applications, technology, facilities, and data) in servicing the needs of the enterprise"* (IT Governance Institute, 2003, p.28).   Resource management is considered important to the effectiveness of IT operations as it represents the structure of how IT operates and how decision-making on IT is distributed (IT Governance Institute, 2003).

The research on resource management can be broken into two main themes. The first is related to how organisations structure their IT processes and manage their resources. The second centres on the links between resource management and IT governance.

Sambamurthy and Zmud (1999) provide robust descriptions of the alternative resource management (IT) structures (centralised, decentralised and federation/hybrid) and the contingency factors (corporate governance, economies of scope and absorptive capacity) that most impact on the choice of a particular IT structure. These descriptions are related to prior research on IT structures (King, 1983; Brown & Magill, 1994). Peterson, O'Callaghan & Ribbers (2000) extend the work of Sambamurthy and Zmud (1999) by identifying the different lead roles and responsibilities for IT decision-making in each IT structure. Their work also examines the complexities of hybrid IT resource management configurations (a mix between centralization and decentralization). Van Grembergen, De Haes and Guldentops (2004) and De Haes & Van Grembergen (2004) extend this work further by identifying that IT governance needs to be implemented with a mix of IT structures, processes and relational mechanisms to be successful. The study (Van Grembergen, De Haes & Guldentops, 2004) indicates that IT structure focuses on where IT is located in the organisation structure and the location of IT decision-making authority.   The IT organisational structure chosen by an organisation reflects the power structure and determines important relationships within the organisation (Johnson & Scholes, 2002; Ko & Fink, 2010). The study by Van Grembergen, De Haes and Guldentops (2004) proposes that four key structural mechanisms are needed by organisations to effectively implement ITG namely: resource management of IT, IT steering committees for IT projects, the CIO being part of the board, and establishment of an IT strategy (ITG) committee.

The research of Sambamurthy and Zmud (1999, p. 261) also provides a link between resource management and IT governance by indicating that *"IT governance arrangements refer to the patterns of authority for key IT activities including IT infrastructure, IT use and project management"*. They refer to IT structures discussed in the section above as modes of IT governance.

The research on resource management assists the board to be more informed on resource management structures and their impact on IT operations but provides little guidance on how resource management should form part of board governance of IT.

The quantitative study in chapter 4 aims to determine whether the resource management component of the ITG model assists boards to conceptualise their role in governing IT. Detailed tables of the research reviewed for this section (applied in the development of resource management survey measurement statements in table 4.1) are included in table 3 of Appendix 1.

2.3.4   Risk management of IT

Risk management of IT systems has been defined as *"the extent to which IT assets are protected and the level of assurance required"* (IT Governance Institute, 2003, p.27) and has become increasingly important with the rise in dependency on IT resources.

While there have been examples of IT specific risk management research (e.g. Young, 2002), the field has largely adopted and adapted general risk management frameworks. Two influential frameworks are the COSO enterprise risk management model (Committee of Sponsoring Organisation of the Treadway Commission (COSO), 2004) and the Australia standard on risk AS/NZS 4360:2004 (Standards Australia, 2004).

Following this trend, risk management of IT has concentrated on providing normative advice (Broadbent, Kitzis and Hunter, 2004; IT Governance Institute, 2005c) and/or exploring the major IT failure points specifically outsourcing (IT Governance Institute, 2005b, Bahli and Rivard, 2005, Gewald & Helbig, 2006) and IT security (IT Governance Institute, 2005c,

2005d, 2006b). Examples of this work include Benvenuto and Brand's (2005) generic risk model for outsourcing or Pironti's (2006) governance process for IT security.

The research on risk management focuses on the development of risk management frameworks and normative advice on risk management, particularly outsourcing and IT security. While this research provides the board with a comprehensive understanding of the issues associated with risk management, it does not provide the board with clear guidance on how to govern IT related risk at a board level. My study aims to overcome this lack of guidance.

Chapter 4 aims to assess whether boards employ the risk management component of the ITG model to govern IT. Detailed tables of the research reviewed for this section (used in the development of risk management survey measurement statements in table 4.1) are included in table 4 of Appendix 1.

2.3.5 Performance measurement of IT

Performance measurement is concerned with *"tracking project delivery and monitoring IT services"* (IT Governance Institute, 2003, p.29) to determine whether IT systems have achieved the goals set for them by the board and senior management. In the ITG model, performance measures should be linked to and measure strategic alignment, value delivery, risk management and IT resource management.

A review of the literature on performance measurement identifies that there are various normative frameworks used to measure the performance of IT. Some, such as the balanced scorecard (BSC) are drawn from mainstream management literature (e.g. Kaplan & Norton, 1992) while others such as the ITBSC are adapted from the mainstream frameworks (Van Grembergen, 2000; Van Grembergen & Amelinckx, 2002, 2004; Van Grembergen, Saull & De Haes, 2003; 2004; Van Grembergen, De Haes & Amelinckx, 2003; Van Grembergen, De Haes & Moons, 2005; Van Grembergen & De Haes (2005b); Blumenberg & Hinz, 2006; Van Grembergen & De Haes, 2009d).

There are also some IT specific measurement frameworks such as the control objectives of information and related technology framework (CobiT) (IT Governance Institute, 2000; 2005a, 2006a, 2007), information technology infrastructure library (ITIL) (Hanemann, Sailer & Schmitz, 2004; Stevenson & Romney, 2004; Moura, Sauve, Jornada & Radziuk, 2006; Tiong, Cater-Steel & Tan, 2008) and the ITG maturity framework (Simonsson, Johnson & Ekstedt, 2010; Dahlberg & Lahdelma, 2007; Guldentops, 2003; Pederiva, 2003; Guldentops, Van Grembergen & De Haes, 2002).

All of the frameworks concentrated on the operations and management of IT, not the governance of IT and therefore provide little guidance to boards on how they should include performance measurement in their governance of IT. While a few studies have attempted to extend performance measurement past measuring IT to measuring the effectiveness of ITG, they have not established a definitive method of doing so (Bowen, Cheung & Rhode, 2007; Ali & Green, 2007; Dahlberg & Kivijarvi, 2006). Thus boards have little to assist them when attempting to measure the performance of IT as part of their board governance of IT. The study in chapter 4 aims to determine whether the performance measurement assists boards to govern IT. The detailed tables of the research reviewed for this section and also used in the development of survey measures in table 4.1 are included in table 5 of Appendix 1.

2.4   Development of research questions

The research discussed in this chapter identifies little research that directly investigates how boards govern IT. Instead, the literature on boards and ITG is predominantly normative in nature, providing considerable advice on what boards should be doing and considering with respect to the governance of IT, but providing little insight into what boards are actually doing. The review of literature identifies a clear gap in the research with respect to the lack of knowledge on board governance of IT.

Instead, much of the research on IT governance focuses on the components of the ITG model, namely strategic alignment, value delivery, resource management, risk management and performance measurement. The ITG model research provides little evidence of how boards incorporate each ITG model component into their governance processes and little guidance on how boards should be implementing each component as part of their governance of IT.

What is evident from the research is that the ITG model is recommended for board use (IT Governance Institute, 2003) and is established and accepted by business and IT professionals as an appropriate holistic model of ITG. Hence the aim of my thesis is to enhance understanding of *"How do boards govern IT?"* and determine whether the ITG model, as assumed by the field, is an appropriate theoretical model for board governance.

To determine how boards govern IT, the first phase of my research will consider whether existing ITG theory (ITG model discussed in section 2.3) can provide an explanation for my research question. This first phase will conduct a quantitative study (chapter 4) to assess the links between the ITG model and board members conceptualisation of their role in the governance of IT. My assessment will consider the perceptions of board members and executives who are familiar with board ITG processes. The literature reviewed in section 2.3 and Appendix 1 highlighted the use of the ITG model and its components within the ITG field. I used the themes from this literature as the basis for the quantitative study in chapter 4. Specifically, literature distinguishing each component is used to develop the survey items and constructs to examine if board members conceptualise their ITG role in the way the model is presented. I will determine whether boards apply the theoretical ITG model to how they govern IT by addressing a subordinate research question to my main question *"Does the ITG model represent how directors conceptualise their role in governing IT"* in the quantitative study.

2.5   Summary

This chapter focuses on a review of the relevant ITG literature associated with how boards govern IT. The research that exists on boards and ITG is primarily normative. While it provides advice on what boards should be doing and considering in regard to ITG, it provides little insight into what boards are actually doing in governing IT. Research on the components of the ITG model, while increasing the understanding of each component, also provide little guidance on how boards should implement these issues in board IT governance. The paucity of research on how boards govern IT highlights a key gap in the literature. My thesis aims to fill this gap by addressing the overarching research question *"How do boards govern IT?"* through the implementation of a two phase mixed method design.

To assess board governance of IT, my research first aims to assess the link between the perceptions of how board members conceptualise their role in the governance of IT and the existing ITG model and its components. Specifically, this first study will address a subordinate research question to my main question: ***"Does the ITG model represent how directors conceptualise their role in governing IT?".***

The next chapter (chapter 3) presents my philosophical and methodological approach for the entire thesis research program by outlining how a mixed method approach combining both quantitative and qualitative studies provides me with the opportunity to gain deeper insights into how boards govern IT. Chapter 3 will discuss the research approach for the remainder of my thesis.

Chapter 3
Research Approach

3.1 Introduction

With the research questions for the first stage of the research program developed in chapter 2, this chapter presents my philosophical and methodological approach for the thesis. This chapter outlines how a mixed methods approach (Creswell, 2003; Creswell & Plano Clark, 2007) combining both quantitative and qualitative studies allows me to gain a deeper understanding of how boards govern IT. The chapter does not provide a detailed review of the methods or techniques involved in each of the two studies (this is outlined in chapters 4 and 5 respectively) but instead aims to outline my overall thesis research approach. My philosophical approach will justify my research design decisions.

The remainder of the chapter is structured as follows. Section 3.2 discusses the research approach of the thesis; section 3.3 provides an overview of my philosophical approach to the research program within the philosophy of science; while section 3.4 highlights the strengths of a mixed method approach and justifies its adoption across the two studies. Section 3.5 provides a review and summary of the overall methodology.

3.2 Research approach

To investigate how boards govern IT, I employ a two stage mixed method approach that evolved over time. This approach is illustrated in Figure 3.1. Initially, my thesis was designed with the quantitative study in chapter 4 as the focus of the thesis. However, since the findings failed to support the use of the ITG model (IT Governance Institute, 2003), my thesis evolved into a mixed method approach. As a result of the limited response to the survey and the inability of the findings to support board use of the ITG model, my thesis evolved over time into a mixed method approach. Thus the quantitative study was followed by a qualitative study. This allowed me to broaden the theoretical perspectives of the thesis and incorporate corporate governance theories into the research problem. The research

questions for the quantitative and qualitative phases of my thesis are related but evolved as the research program unfolded (Teddlie & Tashakkori, 2009). The overall research approach changed from an IT governance theory focus to a consideration of corporate governance theories. This required me to utilize two different research methods to explore the theoretical principles that underlie how boards govern IT. Between them, the two studies evaluate whether current IT governance theory (the ITG model) or corporate governance theories (agency, stewardship and resource dependence theories) provide a superior explanation of the generative mechanisms that underlie how boards govern IT.
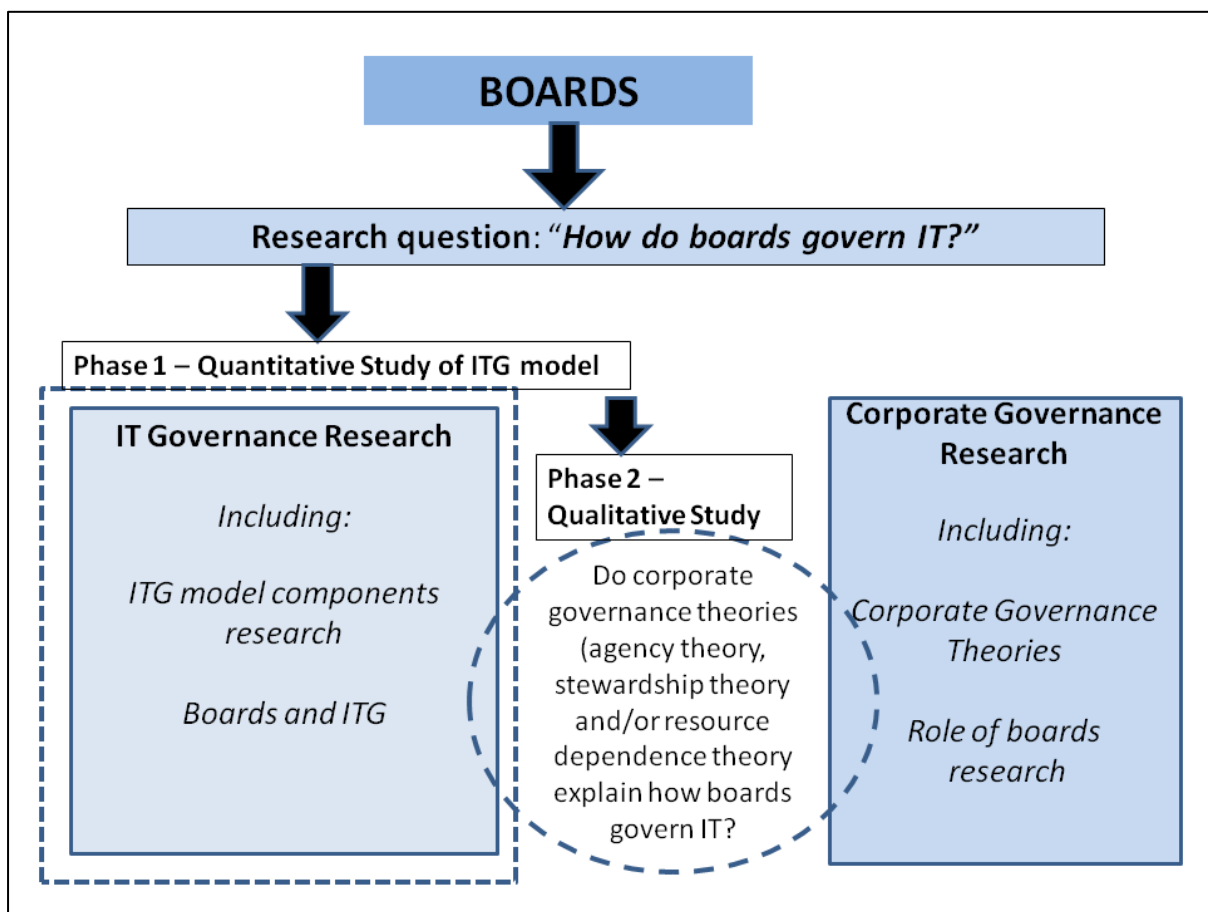
Figure 3.1 **Research approach**

A mixed method research approach provided the most appropriate methodological tools for the research questions (Teddlie & Tashakkori, 2009) and resulted in a clear understanding of the problem being studied (Clark, Creswell, Green & Shope, 2008). Furthermore, mixed methods allow for methodological triangulation, that is, results are triangulated across both quantitative and qualitative data to assist the validity of research findings, no matter what the philosophical paradigm (Jick, 1979; Teddlie & Tashakkori, 2009; Mathison, 1988). Miles

and Huberman (1984, p.235) indicate that *"triangulation is supposed to support a finding by showing that independent measures of it agree with it or, at least don't contradict it"*. Similarly, using a variety of research methods and techniques provides an opportunity to overcome any bias in the results due to the use of any single method (Teddlie & Tashakkori, 2009). Mixed method research also assists with elimination of the deficiencies associated with using quantitative methods (lack of understanding of context and process) and qualitative methods (lack of generalisability) individually (Tashakkori & Teddlie, 2003).

My approach provides an alternative theoretical understanding of the role of the governing body with respect to ITG in Australian universities (chapter 8). Figure 3.1 depicts the two phase research design I used. In phase 1, I undertook a review of existing ITG theory (boards and ITG and the components of ITG model), and identified that no research had used the entire model as a framework for understanding how boards govern IT (chapter 2). Given the ITG model was a well developed holistic framework within the literature, I conducted a quantitative study to assess whether the ITG model provides a potential theoretical explanation for how boards govern IT (chapter 4).

The lack of support for the ITG model in the quantitative study caused me to reassess my methods and approach. Instead of continuing with what appeared to be a flawed research approach, I decided to conduct a second study to further explore the theoretical principles that influence a board's approach to ITG. This provided an answer to the research problem of how boards govern IT. Since this reversion to a broader research question uses theories from outside the ITG field, I chose a qualitative inductive case study technique. This allowed me to gather richer, more insightful data on board governance of IT. The second study focused on Australian universities because I wanted a sample that had a large investment in, and dependence on, information technology. By studying a limited number of theoretically selected cases within this sector, I aim to consider which of three prominent corporate governance theories (agency theory, stewardship theory and/or resource dependence theory) are able to explain the generative mechanisms that underlie my research question.

3.3 Philosophical basis of the thesis

Ontology, epistemology, methodology and methods are the four key components of any research approach (Sobh & Perry, 2006; Gaffikin, 2008). Crotty (2003, p.17) indicates that it is important to establish the philosophical basis for any research effort as it defines the "*assumptions about human knowledge and assumptions about realities encountered in our human world*". This philosophical basis defines the "*basic belief system or worldview that guides the investigator*" (Guba & Lincoln, 1989, p.105) and provides "*an overall conceptual framework within which a researcher may work*" (Sobh & Perry, 2006, p.1994). This is often referred to as the researcher's paradigm.

Ontology is "*the theory of being, it is designed to determine the nature of the fundamental kinds of things that exist*" (Gaffikin 2008, p.6) and represents a researcher's beliefs about the nature of reality. A researcher's ontological position drives her or his epistemological beliefs because it shapes the relationship between "*reality and the researcher*" (Sobh & Perry, 2006, p.1194) to define how knowledge about reality is sought. Epistemology informs a choice of methodology or the practice of how researchers discover that reality (Sobh & Perry, 2006). Finally, the methodological approach drives the research methods, for example the use of qualitative or quantitative methods or a combination of methods to gather data about an issue (Gaffikin, 2008; Crotty, 2003).

I subscribe to a realist ontological position. Thus, I consider reality has its own inherent order, exists independently of the mind and independently of our adoption of theories, conceptual frameworks or paradigms (Fay, 1996; Boyd, 1992). My research "*is searching towards an understanding of the common reality of an economic system in which many people operate inter-dependently*" (Sobh & Perry, 2006, p.1199-1200). As a realist I believe that there is a "*real*" world "*out there*" to "*discover*" and social science is capable of discovering and knowing reality. My ontological position also acknowledges that we cannot know the real world with certainty (Reige, 2003). Realists recognize the differences between their particular view of the world and the real world and so assume a differentiated and stratified world which includes real, actual and empirical domains (Bhaskar, 1978; Harre & Madden, 1975). Applying this notion to my thesis topic, my ontological position is that the

board's role in the governance of IT encompasses a real and unique set of activities and relationships that exist independently of the consciousness and experience of all researchers.

My ontological position of realism in turn leads to my epistemological position of critical realism (Crotty, 2003; Gaffikin, 2008). Epistemological approaches range along a continuum from realism to anti-realism (Crotty, 2003) or from objectivity to subjectivity. See Figure 3.2 for an overview of possible epistemological approaches and my position.
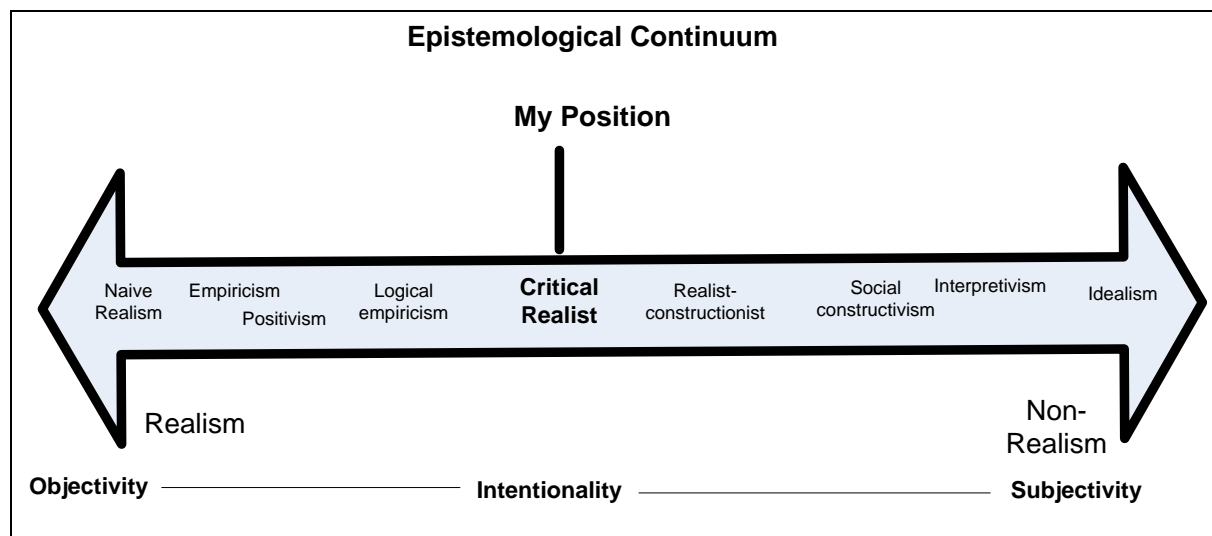
Figure 3.2 **Representation of the epistemological continuum**

Critical realism is a relatively new perspective that has developed from the work of Bhaskar (1978; 1979) and Harre (Harre & Madden, 1975). It posits that there is an inherent order of things, that "*reality exists independently of the researcher's mind*" (Sobh and Perry, 2006, p.1199) and is "*a philosophy of science that is open to practical application through reference to any individual theories, methods and tools that can be combined in order to reveal causal mechanisms and context*" (Fox, 2009, p.466). Critical realists maintain that the intransitive dimension of reality (enduring structures and processes) produces a point of reference against which theories can be tested (Bhaskar, 1978; McEvoy & Richards, 2006).

Critical realists believe there is only one reality made up of three different ontological domains, namely the empirical, the actual and the real (Perry, Reige & Brown, 1999). The empirical domain represents aspects of reality that can be experienced directly or indirectly, the actual domain represents aspects of reality that occur, but may not necessarily be able to

be experienced while the real domain represents the real or deep structures and mechanisms that generate phenomena (Perry et al., 1999; McEvoy & Richards, 2006; Tsoukas, 1989). This journey from the real domain to the actual domain to the empirical domain is contingent on intrinsic and extrinsic conditions (Tsoukas, 2000). The generative mechanisms (causal powers) may not be able to be identified directly as they are not always able to be observed, but are able to be inferred through a combination of empirical research and theory construction (Tsoukas, 1989). For critical realists, the ultimate goal is to develop deeper levels of explanation and understanding about an issue (McEvoy & Richards, 2006). My aim through this research program is to develop deeper levels of elucidation and understanding of the generative mechanisms (or theory) that underpin how boards govern IT. Figure 3.3 provides a graphical representation of the domains of critical realism (Bhaskar, 1978; Tsoukas, 1989, Sobh & Perry, 2006).

Real Domain (Mechanisms, Events and Experiences)	**Actual Domain (Events & Experiences**	**Empirical Domain Experiences**
The real or deep structures (generative mechanisms/causal powers) that may generate patterns of events and experiences in the actual domain	Activation of the generative mechanisms in the real domain may give rise to patterns of events in the actual domain	The patterns of events when identified in the actual domain may be linked to direct or indirect experiences in the empirical domain

Figure 3.3   **Critical realism domains**

Bhaskar (1979) argues that within the critical realism paradigm it is possible to link ideas to causal effects in the physical world. Critical realism is not seen as being in competition with existing theories, methods and tools but rather it provides a unifying direction for a combination of theories, methods and tools to reveal causal mechanisms and technological and social contexts that achieve outcomes (Fox, 2009). Thus, it sits well with my choice of a mixed method approach to the research. Sobh and Perry (2006) believe that critical realism research is about asking why a result has been observed and investigating the deeper unobserved and unobservable reality (generative mechanisms) that underlies the observed result (experience).

When designing research within the critical realism paradigm, a number of issues need to be considered. Generative mechanism may exist in the real domain independently of the events and experiences that are observed (Tsoukas, 1989). Thus observing experiences in the empirical domain may not be completely indicative of an event in the actual domain and/or a generative mechanism in the real domain and vice versa (Perry et al., 1999). It is necessary to gather experiences from a wide range of sources across a number of cases to triangulate the experiences in order to produce stronger indications of generative mechanisms in the real domain (Perry et al., 1999; Sobh & Perry, 2006). Critical researchers also often enter the field with prior theories and use the literature on a research issue to guide the research approach. This allows the triangulation of various perceptions of reality arising from different contexts (Sobh & Perry, 2006). My thesis research program will use the established ITG model from ITG literature and three rival corporate governance theories to potentially identify the generative mechanisms associated with boards' governance of IT.

3.4 Justification of the mixed method approach

Methodology "*is the framework of the means for gaining knowledge. Methodology investigates and evaluates methods of inquiry and thus sets the limits of knowledge*" (Gaffikin, 2008, p.7). The mixed method approach to this study was adopted for four key reasons: (1) it fits well within the critical realism epistemology; (2) it is appropriate to broad research questions and theoretically oriented research; (3) it provides rigour and depth to my research approach and (4) it is pragmatic.

First, the mixed method research approach involving a quantitative study followed by a qualitative study fits well within the critical realism epistemology. Critical realists believe that the choice of research methods should be dictated by the nature of the research problem and not by the research paradigm (McEvoy & Richards, 2006). Further, since multiple experiences (empirical domain) occur as a result of events (actual domain), the most effective research strategy is often a mixed method approach that combines quantitative and qualitative methods or techniques (McEvoy & Richards, 2006). Using both approaches at different stages of my research program allowed me to collect different types of data from different sources on the same overall research issue to try and triangulate on relevant events and

generative mechanisms. Collecting a variety of data allows a greater depth of understanding of the research issue to develop compared to using single research methods (Bonoma, 1985).

Second, when answering a broad research question, such as that posed in my thesis, a mixed method approach is most appropriate. Broad questions most often require multiple methods over a number of studies (Morse, 2003). A mixed method approach is also appropriate from a theoretical perspective as Teddlie and Tashakkori (2009) indicate that theory does not respect methodological boundaries and using different methods provides multiple sources of evidence about the research issue. Reliance on just one method can be problematic due to the limitations of each method and the inability of one method to necessarily capture the deeper insights associated with the research issue (Irwin, 2008). Thus having a combination of methods leads to thicker and deeper understanding and descriptions of the research issue (Creswell & Plano Clark, 2007; Plano Clark, Creswell, O'Neil Green & Shope, 2008).

Third, the mixed method design allows for continued development of the research questions and approach so that the results from phase 1 inform the second phase of the research program (Creswell & Plano Clark, 2007). This continued development allows the second stage of the research program, a qualitative study, to produce greater depth and rigour as a result (Adler & Adler, 1994).

Fourth, Tashakkori and Teddlie (2003) argue that the research questions should drive the methodological approaches and that research is best viewed from a unified perspective. Researchers who follow this approach are often referred to as pragmatic researchers as they are flexible in their research techniques (Leech, Dellinger, Brannagan & Tanaka, 2010). Pragmatic researchers fit with the epistemology of critical realism (Leech et al., 2010). I consider I am a pragmatic researcher, who has combined the strengths of quantitative research with the strengths of qualitative research to develop insights into the generative mechanisms underlying board governance of IT (Kaplan & Duchon, 1988; Leech et al., 2010).

3.4.1 Justification of the quantitative study

The literature on IT governance in chapter 2 identifies clear support for the components of the ITG model and establishes this model as a potential theoretical model for how boards govern IT. The quantitative stage of my research program will assess whether this model might explain how boards govern IT by considering a sub-question of the main research question *"Does the ITG model represent how directors conceptualise their role in governing IT?"* The aim of the study is to develop measures of how directors perceive their role based on the ITG model. Colquitt and Zapata-Phelan (2007) indicate that early tests of a theory typically aim to establish the validity of the theory's core propositions. In the case of the ITG model, my first study is trying to establish that directors perceive their role in ITG as consisting of five key mutually exclusive components: strategic alignment, value delivery, risk management, resource management and performance measurement.

A quantitative study was chosen for this stage of the research as I was assessing an accepted theory (ITG model) with considerable prior support. A survey approach (online questionnaire) assessing respondents perceptions of board processes in relation to the governance of IT appeared an appropriate quantitative choice (Czaja & Blair, 2005; Teddlie & Tashakkori, 2009). A number of measures of each ITG model component were developed. The literature suggests that each component of the ITG model is independent of the other components and thus the measures of each component should link (i.e. factor) to that component exclusively. During the pilot study the measures and expert reviewers considered the survey an appropriate application of the ITG model. I used exploratory factor analysis to test whether director perceptions of their role matched the ITG model.

Full details of the method including sampling, measures, analysis and limitations are included in chapter 4. The results of the factor analysis did not support the measures of each component of the ITG model.

3.4.2 Justification of the qualitative study

Given the findings of the quantitative study, the second phase of the research was designed to explore the theoretical principles underlying board governance of IT. Yin (1994) indicates

that a qualitative method allows for greater understanding of the context in which the process(es) operate through the collection of richer data from which to draw conclusions. I decided to focus my research on Australian universities as they had a large investment and dependence on IT.

The objective of this second phase was to move beyond investigating the accepted ITG model to consider whether corporate governance theories would more clearly explain how boards govern IT. I considered three prominent corporate governance theories: agency theory, stewardship theory and resource dependence theory in this study. Specifically, I sought to understand what theoretical principles best explain how boards govern IT. The methods applied include semi-structured interviews and archival data reviews to triangulate within and across cases. Governing body members, Vice-Chancellors and key IT executives were selected for interviews as they had in-depth knowledge of board IT governance issues (Eisenhardt & Graebner, 2007, Fox, 2009).

I chose a qualitative inductive case based research (Christie, Rowe, Perry & Chamard, 2000; Glaser & Strauss, 1967; Locke, 2007) to explore these theoretical principles (Eisenhardt, 1989c; Dooley, 2002; Ravenswood, 2010). The results of the qualitative study are generalisable to the university sector as the cases were selected using a purposeful sampling approach which ensures the sample is representative of the population by including maximum variation between the cases. Full details of the method, including the sample, protocols and instruments, and analysis are provided in chapter 5.

3.5 Summary

This chapter established the methodological foundations for my thesis research program. It provides a detailed explanation of the philosophical underpinnings of the research (critical realism) and justification for the key decisions made in the research design including the use of a mixed method approach and development of two phases of research. Details of each specific method are provided in chapters 4 and 5 respectively. On these foundations, my thesis can proceed with a detailed description of the first stage of the research approach - the quantitative study in the next chapter (chapter 4).

Chapter 4

Measuring Directors' Perceptions of the Application of the ITG Model

4.1   Introduction

In this chapter, I empirically investigate the ITG model and its relevance to boards. The ITG model posits that the boards need to focus on establishing IT governance processes across the five key focus areas: (1) strategic alignment, (2) value delivery, (3) resource management, (4) risk management and (5) performance measurement (IT Governance Institute, 2003). The remainder of the chapter is structured as follows. Section 4.2 outlines the research approach and questions for this stage of my research program. Section 4.3 outlines the quantitative approach and justifies my choice of method. This is followed by a discussion of the method and results for the pilot study in section 4.4 and the method and results for the main study in section 4.5. The chapter finishes with conclusions and implications in section 4.6.

4.2   Research approach and research questions

The ITG literature analysed in section 2.3 and appendix 1 clearly identified the ITG model as a well-accepted theoretical model in the field. This view is supported by the recent meta-analysis of ITG research presented by Wilkin & Chenhall (2010) which applied the structure of the ITG model as the theoretical approach on which to classify and discuss 496 ITG research papers. Thus, the first stage of my research involved a quantitative investigation of whether boards use the ITG model to conceptualise their role in governing IT. Given the prevalence of research on the components of the IT model (Buckby et al., 2008) and the lack of prior research outlining how boards govern IT (e.g. Van Grembergen, De Haes & Guldentops, 2004; Bart & Turel, 2009, 2010; Gedda & Pauli, 2006), the first step was to attempt to measure board member perceptions of their roles. Thus, I decided to employ a quantitative method to assess directors' perceptions of the ITG model. Specifically, the study aimed to measure board member perceptions of each of the components of the ITG model. This would allow me to address my main research question (see section 2.4). To determine

whether the ITG model provides the explanation for how boards govern IT, my quantitative study will address a sub-ordinate research of my main question:

"Does the ITG model represent how directors conceptualise their role in governing IT?"

As the ITG model comprises five components (IT Governance Institute, 2003), there are five subordinate research questions which link to the question above:

- Do directors consider "strategic alignment" when governing IT?
- Do directors consider "value delivery" when governing IT?
- Do directors consider "risk management' when governing IT?
- Do directors consider "resource management" when governing IT?
- Do directors consider "performance measurement" when governing IT?

4.3   Quantitative method

Quantitative studies are generally highly structured investigations that yield numerical information for statistical analysis (Polit & Hungler, 1995). Here, I developed a survey instrument to gather self-assessed measurements of components of the ITG model. I chose a survey method because I was interested in board member and senior executives' perceptions of the board's role in governing IT.   This provided a sample of participants from well-defined populations with knowledge of both board and IT governance processes (Weisberg, Krosnick & Bowen, 1996; Czaja & Blair, 2005).

4.3.1   *Justification of the method*

Since prior literature indicates that that the ITG model components were well researched and subject to extensive quantitative research, measuring perceptions of the components of the ITG models using a survey approach seemed a logical next step.

The survey involved participants drawn from four sources. The first group of participants was used to pilot test the survey instrument and three further samples drawn from different relevant populations were used to empirically test the ITG model. The targeted populations included board members and senior executives (e.g. IT auditors, business chief information officers) who have knowledge of board ITG processes.

The survey instruments were developed in two phases. The first instrument (See Appendix 2) was developed for pilot-testing while the second online survey instrument (See Appendix 2) was used to gather the data for the empirical testing process.

4.4 Pilot study

Pilot testing is a survey design mechanism used to test the survey instrument on a group similar to the main target population (Czaja & Blair, 2005). The pilot testing process conducted on the ITG model is described in the following sub-sections.

4.4.1 Participants

Pilot testing was conducted on a group of 100 IT professionals that included board members, chief executive officers, executive management, IT directors/chief information officers, business professionals and IT auditors who attended a seminar on IT governance in Brisbane Australia in July 2006. The seminar included a discussion on IT governance by a prominent international ITG expert and an ITG research focused session that I conducted.

4.4.2 Survey instrument

The pilot-testing survey had two sections (see Appendix 2). The first section contained general information including the aims of the survey, a definition of IT governance, the length of time the survey would take, who should participate and how the answers would be used. This section also included key ethical information and indicated the survey process was approved by QUT university ethics processes (Approval No. 0600000459).

The second, substantive section asked the participants a series of questions about IT governance within their organisation and within their business sector. It also elicited information on whether participants thought ITG had become more important, the difficulties in achieving ITG, the level of the organisation where IT was governed and how often IT governance occurred.

The major focus of the survey instruments used in the pilot test and the subsequent main study was to measure perceptions of the components of the ITG model. To do so, participants were asked to rate twenty-nine items on a five point likert scale from not important to very important. Development of the items was based on the literature outlined in chapter 2 and appendix 1. Themes were identified in the literature under each ITG model component and sub-research question. Statements were developed as measures of the themes based on my understanding of the indicative literature within each theme. The purpose of this likert scale was to sum the scores of each respondent to calculate a mean for each item. These means are reported in the results in section 4.3.5. Participants were also given the option to add other statements or topics not included in the survey but considered important. Participants were asked to rate these additional items using the same five point scale.

For each component of the ITG model, I established subordinate research questions (See section 4.2). I then drafted a series of 29 questions designed to tap into the five underlying components of the model. Table 4.1 provides details of the process by linking each research question to the themes indentified in indicative literature and the items developed from the literature used in the survey processes. Table 4.2 provides a summary that links each survey measure (item) to each ITG component.

4.4.3 Data collection

Data collected during the pilot-testing phase involved seeking responses from attendees at a seminar on IT governance in Brisbane Australia in July, 2006. The attendees were provided with a paper copy of the survey in their attendance documents and were asked to participate in the survey at the conclusion of the seminar. Participants lodged the completed survey in a box as they exited the seminar. Participation was voluntary and attendees were not compensated for their participation. One hundred survey instruments were provided to seminar participants and thirty-five responses were collected and deemed usable.

4.4.4 Analysis

Since I was interested in understanding the validity of the survey, I limited the analysis of the pilot study to descriptive statistics. These are reported in Table 4.4.

Table 4.1   **Development of the survey measures/constructs**

ITG Model Component & Related Research Subordinate Question	Themes Identified	Indicative Literature	Item No.	Statement
Strategic Alignment **Research Question** *Do directors consider "strategic alignment" when governing IT*	**Strategic alignment explanatory models & extensions:** Alignment of business and IT strategy; operational alignment of operational BIT, alignment of tactical BIT	Henderson & Venkatraman (1991, 1993); Luftman et al. (1993); Venkatraman et al. (1993); Broadbent & Weill (1993); Papp (1995); Henderson et al. (1996); Teo & King (1996); Chan et al. (1997); Smaczny (2001); Avison et al. (2004); Strnadl (2006); Chan & Reich (2007a, 2007b); Tarafdar & Qrunfleh (2009); Soetekouw (2010)	**1**	Alignment of business & IT strategy is evident across the organisation
			18	Business and IT divisions are well aligned and focus on achieving business objectives together
	Linking strategic alignment to ITG	De Haes & Van Grembergen (2005); De Haes & Van Grembergen (2006);Van Grembergen et al. (2007); De Haes & Van Grembergen (2009); Van Grembergen & De Haes (2009a, 2009c)	**2**	The IT department is strategically aligned with organisations' mission and goals
	Strategic alignment measurement processes: Enablers of strategic alignment; strategic alignment maturity assessment, measurement of the social dimension of strategic alignment.	Luftman (1996); Reich & Benbasat (1996); Luftman (1997); Avison et al. (2004); Luftman (1998); Maes (1999); Luftman & Brier (1999); Luftman et al. (1999); Maes et al. (2000); Reich & Benbasat (2000); Luftman (2003a, 2003b, 2003c); Martin et al. (2005); Coughlan et al. (2005); Chan & Reich (2007a); Kearns & Sabherwal (2006-7); Gregor et al. (2007); Gartlan & Shanks (2007);	**3**	Information technology is a key component in every business initiative and development
			4	Executives are supportive of the IT division and regularly communicate with the head of this division
			5	The IT division has clearly defined roles and responsibilities within the organisation and communicates these well to the community

ITG Model Component & Related Research Subordinate Question	Themes Identified	Indicative Literature	Item No.	Statement
Value Delivery **Research Question** *Do directors consider "value delivery" when governing IT*	**Explanation and measurement of IT value :** Realising value from IT investments	Davern & Kauffman (2000); Brynjolfsson & Hitt (2000); Sircar et al. (2000); Tallon et al. (2000); Ryan & Harrison (2000); Lee & Menon (2000); Chan (2000); Dedrick et al. (2003); Kohli & Devaraj (2003); Thatcher & Pingry (2004); Kumar (2004); Kohli & Devaraj (2004); Kwon & Watts (2006); Thorp (2006); Thatcher & Pingry (2004, 2007); Ward et al. (2007); Tallon (2007); Davern & Wilkin, (2010)	**16**	The board focuses on delivery of value from organisations IT systems and ensures this issue is addressed in organisations IT strategic plans
			17	Senior management have established processes to deliver value from IT resources
	Normative research on value delivery: How to measure value, identifying essential investments	Carr (2003, 2004); IT Governance Institute (2005f, 2005g, 2006a)	**20**	The board regularly seeks stakeholder assessment of value delivery from IT systems
	Linking value delivery to IT	Weill (2004); Weill & Ross (2004)		
Resource Management **Research Question** *Do directors consider "resource management" when governing IT*	**IT resource management structures:** IT division focused on resource management; IT resource management structures	Broadbent & Weill (1997); Sambamurthy & Zmud (1999); Peterson et al. (2000); Hamaker (2000); Karimi et al. (2000); Peterson (2001); Mukherji (2001); Ribbers et al. (2002); Schwarz & Hirschheim (2003); Beauchamp (2003); Broadbent (2003b); Sarup (2003); Young & Jordan (2003); Sherer (2004); Rau (2004a); Peterson (2004a); Brown & Grant (2005); Bedell (2005); De Haes & Van Grembergen (2006); Wilcocks et al. (2006); Robinson (2007); Bushell (2007); Simonsen (2007); De Haes & Van Grembergen (2009); Van Grembergen & De Haes (2009b)	**23**	The IT division takes regular inventory of its IT resources and reports this to the board
			24	The IT division is well structured to achieve optimal IT decision-making
			26	The IT division has a good system of coordination of organisations IT resources
			22	The board is focused on managing its IT resources effectively and efficiently
			27	The board has established suitable policies and processes for replacement or upgrading of IT resources

ITG Model Component & Related Research Subordinate Question	Themes Identified	Indicative Literature	Item No.	Statement
	Linking resource management to ITG	Robinson (2007)	**28**	The board ensures that all IT projects have clear budgets and timelines and that projects are regularly monitored for excess costs or time overruns
			25	The board has established a sub-committee to focus on effective management of IT resources
	IT resource management structures: IT steering committee focuses on managing IT resources	Weill (2004); Doughty (2000); Karimi et al. (2000); Sohal & Fitzpatrick (2002); Meyer (2004); De Haes & Van Grembergen (2004); Van Grembergen & De Haes (2004)	**19**	The board has established an IT steering or other board sub-committee to focus on IT Governance issues
Risk Management **Research Question** *Do directors consider "risk management" when governing IT*	**Normative research on risk management:** IT risks are an important consideration for boards and senior executives	Hadden et al. (2003); Broadbent et al. (2004); Committee of Sponsoring Organisation of the Treadway Commission (COSO) (2004); Standards Australia (2004); Gerber & Von Solms (2005); Hinz & Malinowski (2006); IT Governance Institute (2006b); Pareek (2006)	**7**	The board ensures a business organisation-wide enterprise risk assessment is conducted each year
			8	The board is conversant with enterprise risk models and their suggested risk management policies
			9	Executives consider IT risks separately from other organisational risk assessment processes
	Development of risk management frameworks: Risk management processes are important to minimize IT risks Business continuity is a key component of risk management	Young & Jordan (2003); Ataya (2003); Levine (2004); Committee of Sponsoring Organisation of the Treadway Commission (COSO) (2004); Standards Australia (2004); IT Governance Institute (2005b); Du et al. (2006); Johnstone et al. (2006) IT Governance Institute (2006b); Ross (2006)	**10**	The board ensures the organisation has appropriate IT internal controls and procedures in place to minimize IT risks
			11	Senior management and the board regularly review and monitor organisations IT risks
			13	The board and executives regularly reviews business organisation IT continuity plans
			14	Executives ensure security and business continuity plans are regularly tested and monitored

ITG Model Component & Related Research Subordinate Question	Themes Identified	Indicative Literature	Item No.	Statement
	Risk management & IT security: IT security is a key component of risk management of IT	Wiederkehr (2003); Stewart (2004); Von Solms & Von Solms (2004); Chapin & Akridge (2005); IT Governance Institute (2005a); Von Solms (2005): Pironti (2006); Ross (2006); Williams (2007)	**12**	The board ensures that the organisation has a sound IT security framework in place
Performance Measurement **Research Question** *Do directors consider "performance measurement" when governing IT*	**Performance measurement methods:** Performance measurement of all ITG processes is important	Van Der Zee & De Jong (1999); Papp (1999); Luftman (2000); Hirschheim & Sabherwal (2001); Luftman (2003a); Luftman (2003b); Luftman (2003c); Van Grembergen et al. (2003); Sledgianowski & Luftman (2005); Van Grembergen et al. (2005); Bricknall et al. (2007); Silvius (2007); Brodbeck et al. (2009)	**6**	The board has established performance measurement processes to regularly monitor the level of strategic alignment
		Murray (2004); Weill (2004); IT Governance Institute (2005f); Bowen et al. (2007); Ali & Green (2007)	**21**	The board has established suitable performance measurement processes to regularly monitor value being delivered from organisations IT resources
		Van Grembergen et al. (2003); Fairchild (2004); Warland & Ridley (2005); Van Grembergen & De Haes (2005a); Van Grembergen & De Haes (2005b); Dahlberg & Lahdelma (2007)	**29**	The board has established suitable performance measurement processes to regularly monitor the management of IT resources
		Guldentops (2003); McKinney (2005); ITGI (2006b); Broadbent et al. (2004); Committee of Sponsoring Organisation of the Treadway Commission (COSO) (2004); Standards Australia (2004)	**15**	The board has established suitable performance measurement processes to regularly monitor the level of IT risk within the business organisation

Table 4.2 **Summary of survey items by ITG components**

ITG Model Component	Survey Item No.
Strategic Alignment	1,2,3,4,5,18
Value Delivery	16,17,20
Resource Management	19,22,23,24,25,26,27,28
Risk Management	7,8,9,10,11,12,13,14
Performance Measurement	6, 15, 21,29

4.4.5 Results

Table 4.3 provides a breakdown of the participants in the pilot-testing survey by position. Only two participants were board members (six percent), while 16 participants (46%) were executive management, IT directors and IT auditors who were familiar with board ITG processes. This indicates that participants were suitably qualified.

Table 4.3 **Demographics of pilot study participants**

Position	Number of participants	Percentage
Board members	2	6
Chief executive officers	1	3
Executive management	6	17
IT director/CIO	3	9
Business professionals	11	31
Technology services staff	2	6
IT Auditors	6	17
Non response	4	11
Total	**35**	**100%**

Table 4.4 provides summary statistics of the pilot survey ITG model items. This table indicates 16 items (55%) had an item mean of between 4 (important) and 5 (very important) and 12 items (41%) had an item mean of between 3 (neither) and up to 4 (important). The remaining 1 item (4%) had an item mean of less than 3. Thus, just over half of the items developed for the ITG model were rated as important or higher. Table 4.5 presents the results by grouping the survey items based on importance and linking them back to the ITG model components. The results of this process appear to indicate that directors may consider the strategic alignment and risk management ITG model components are more important than the risk management, performance measurement and resource management components when conceptualizing ITG.

Table 4.4 **Descriptive pilot study statistics**

Item No.	Item mean	Standard deviation	Range		Responses
			Lower	Upper	N
1	4.4	0.66	3	5	34
2	4.3	0.67	2	5	34
3	3.8	0.79	2	5	33
4	4.1	0.65	2	5	34
5	4.2	0.58	3	5	34
6	4.2	0.82	2	5	34
7	3.8	0.97	1	5	34
8	3.9	0.98	1	5	34
9	2.9	1.18	1	5	33
10	4.0	0.83	2	5	34
11	4.1	0.74	2	5	33
12	4.3	0.87	1	5	34
13	3.8	1.15	1	5	34
14	4.0	0.87	2	5	34
15	4.1	0.61	3	5	33
16	4.2	0.58	3	5	31
17	3.8	0.92	1	5	32
18	4.4	0.66	3	5	32
19	4.0	0.85	2	5	33
20	3.6	0.98	1	5	32
21	3.7	1.04	1	5	32
22	3.6	0.90	2	5	32
23	3.5	1.11	1	5	33
24	4.0	0.88	2	5	33
25	3.6	1.13	1	5	32
26	3.8	1.13	1	5	32
27	3.9	0.87	2	5	31
28	4.2	0.64	2	5	31
29	4.1	0.73	2	5	31

Table 4.5 **Summary of survey items by importance rating (Pilot Study)**

ITG Model Component	Survey Items rated as important (4)or higher	Survey items rated as less than important (<4)
Strategic Alignment	1,2,4,5,18	3
Value Delivery	16	17,20
Resource Management	19,24,28	22,23,25,26,27
Risk Management	10,11,12,14	7,8,9,13
Performance Measurement	6,15,29	21

4.4.6   Implications and changes

The results of the pilot study provided support for the continued use of the 29 survey items in the main empirical study of the ITG model. Participants did not indicate in the pilot testing process that there were any problems with the number of survey items or the development of the items. The descriptive results identified in Table 4.4 indicate that participants considered the items included in the survey were important to how directors conceptualise their role in governing IT. Thus, my quantitative study moved to the main empirical study of the ITG model.

4.5   Empirical study of the ITG model

The main study of this quantitative phase of my thesis assesses whether boards use the ITG model to conceptualise how they govern IT. A description of this study and its results is provided in the following sub-sections.

4.5.1   Participants

Participants for the main study were drawn from three groups. I chose three target groups to limit any sample frame bias. The three groups were (1) Women on Boards Association (WOB) (female board members of public and private sector boards across Australia); (2) Information Systems and Control Association (ISACA) Australian chapters (which includes IT auditors, CIOs, and board members); (3) IT directors/CIOs who make up the Council of Australian University Directors of Information Technology group (CAUDIT). The strength of this approach was that while drawn from different sectors, all three groups had members familiar with board IT governance processes and behaviours.

4.5.2   Survey instruments

The second survey process adopted an online survey methodology (see Appendix 2). Online surveys are considered to have three major advantages (1) the survey is easier for the participant to follow as the questions are set out in a clear order, (2) it improves the quality of the collected data as the answers are automatically collected in a database and (3) it takes considerably less time to process the survey data and produce results (Bethlehem, 2009). This method was deemed appropriate for this purpose as IT

professionals and other professionals are online for a large majority of their working day and are familiar with answering online surveys for work and other purposes.

Since participants had answered all items and no additional or alternative items were raised during the pilot-testing process, the 29 items related to the ITG model components used in the pilot study formed the basis for the measurement items in the online survey instrument. The only changes were some slight wording refinements to the 29 items. The online survey instrument administered to WOB and ISACA members referred to boards, whereas the online survey instrument administered to CAUDIT members referred to councils/senates to ensure the survey was more relevant to the processes of university governing bodies.

4.5.3   Data collection

For the main empirical study, I gained support from the WOB chairperson and the Queensland chapter president of ISACA in November, 2006 for their organisations to be part of my online survey process. Each of these bodies endorsed the survey to their members and provided a link to the online survey processes. In the case of WOB, the online survey was promoted to approximately 5000 members via a regular monthly newsletter. This promotion occurred three times, at the release of the survey initially and via two follow-up requests in later newsletters. The ISACA Queensland chapter president also promoted the survey link to approximately 200 Queensland ISACA members with a brief outline of the survey and its objectives. The Queensland president also sent the survey and its link to all the other chapter presidents in Australia requesting them to send the survey link onto their members. The total number of ISACA members to receive the survey (other than in Brisbane) was not able to be determined. Finally, the link to the survey and a brief outline of its objectives was sent out by the CAUDIT president as preparation for an ITG focus group presentation at their annual general meeting. The survey was sent to 39 CAUDIT members as part of this process.

Response rates varied between the groups. Overall, I received 44 usable responses. Some 22 responses came from the CAUDIT members (response rate 56%). The other 22 responses came from 14 ISACA members and eight WOB members. The response rate for WOB was less than 1%. As the response from ISACA was most likely to have come

from Brisbane Chapter members, the response rate for this group was likely to be approximately 7%. Overall the response to the survey appears poor (see limitations section 9.5). There were, however, sufficient responses to conduct an exploratory factor analysis.

4.5.4   Analysis

In the main study, I was interested in establishing whether board and senior executives' perceptions of how directors conceptualize their role in the governance of IT matched the ITG model. Factor analysis is an appropriate technique to explore construct structure as it is "*a method of modeling the co-variation among a set of observed variables as a function of one or more latent constructs*" (Bandalos & Finney, 2010, p.93). I used exploratory factor analysis (EFA) principal components analysis (PCA) using varimax rotation (Costello & Osborne, 2005). This type of analysis aims to extract as much variance between the variables as possible with the least amount of factors (Costello & Osborne, 2005).

4.5.5   Results

Descriptive statistics for the main empirical study including item means, standard deviations, and ranges of responses are presented in Table 4.6. Fourteen of the measurement items (48%) had mean ratings between important (4) and very important (5). A further 14 items (48%) had a mean ratings of between 3 (neither) and 4 (important) while one item (4%) had a rating of less than 3. Thus, just under half of the items developed for the ITG model were rated as important or higher. This pattern of responses was consistent with the pilot test results. The results were further analysed in Table 4.7 which links the rating of items back to their related ITG model component based on their importance. This further analysis of the results of the empirical study appears to indicate that directors appear to consider the strategic alignment and risk management components of the ITG model are more important than the other three components when conceptualizing the governance of IT. This result is also consistent with the pilot test results.

Table 4.6   **Descriptive empirical study statistics**

Item No	Item mean	Standard deviation	Range		Responses
			Lower	Upper	N
1	4.57	0.79	2	5	44
2	4.57	0.77	1	5	42
3	3.89	0.97	1	5	44
4	4.23	0.74	1	5	44
5	4.02	0.95	1	5	44
6	4.11	1.02	1	5	44
7	4.59	0.73	2	5	44
8	4.16	0.91	2	5	44
9	2.80	1.17	1	5	44
10	4.09	1.03	1	5	44
11	3.77	1.01	2	5	44
12	4.00	0.99	1	5	44
13	3.70	1.09	1	5	44
14	3.93	1.09	1	5	44
15	3.91	0.98	1	5	44
16	4.02	1.17	1	5	44
17	4.21	0.86	1	5	44
18	4.18	1.02	1	5	43
19	4.00	1.08	1	5	44
20	3.57	1.0	1	5	44
21	3.64	1.24	1	5	44
22	3.43	1.25	1	5	44
23	3.43	1.13	1	5	44
24	3.91	0.97	1	5	43
25	3.30	1.30	1	5	44
26	3.75	1.10	1	5	44
27	3.84	1.14	1	5	44
28	4.05	1.19	1	5	43
29	3.90	1.16	1	5	42

Table 4.7   **Summary of survey items by importance rating (Empirical Study)**

ITG Model Component	Survey Items rated as important (4)or higher	Survey items rated less than important (<4)
Strategic Alignment	1,2,4,5,18	3
Value Delivery	16,17	20
Resource Management	19,28	22,23,24,25,26,27
Risk Management	7,8,10,12	9,11,13,14
Performance Measurement	6	15,21,29

Factor analysis identifies common variation across a group of items – it provides a statistical measure of items that covary (Costello & Osborne, 2005). Factor loadings of 0.5 or higher indicate the item loads onto a factor (Tabachnick & Fidell, 2001; Schultz & Whitney, 2005) and each item should preferably load onto only one factor (Tabachnick & Fidell, 2001). Items are said to cross load if they show a factor score of .32 or higher on

two or more factors (Tabachnick & Fidell, 2001). The results of the exploratory factor analysis are presented in Table 4.8. The solution produced six factors instead of the five factors expected (i.e. one for each of the ITG model's components). More than half (15) of the twenty-nine items displayed problems with cross loading.

The literature suggests that the components of the ITG model are independent and so items should load onto one component exclusively. The large number of cross-loading items suggests that this was not the case. Furthermore, the factors that did emerge all contained items linked to different components of the model (see column 3 of table 4.9). Consequently, these results provide little support for the ITG model and its use by boards to conceptualise how board members govern IT.

Table 4.8 **Factor analysis for the empirical study**

ITG Component	Measure No.	Pattern Matrix					
		Factor 1	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**	**Factor 6**
Performance	**Q6**	**.897**	-.009	.099	-.004	-.080	.020
Value	**Q16**	**.741**	.053	.256	-.055	.092	.416
Risk	**Q14**	**.625**	.339	.141	.392	.352	-.076
Performance	**Q21***	**.563**	.200	**.553**	-.203	.409	.076
Risk	**Q11***	**.560**	.165	.142	**.511**	-.316	.186
Risk	**Q12***	**.541**	.167	.052	.421	.446	-.315
Performance	**Q29***	**.519**	.304	.424	-.164	.455	.169
Strategic	**Q4**	.063	**.843**	.116	-.128	.366	.128
Strategic	**Q3**	.122	**.811**	.277	-.235	.002	-.039
Strategic	**Q5***	.260	**.683**	.088	.060	.479	.179
Resource	**Q24***	-.079	**.609**	.268	**.516**	.270	-.035
Value	**Q17***	.000	**.564**	.198	.371	.155	-.485
Risk	**Q13**	.380	**.556**	.310	.434	.188	.020
Strategic	**Q18***	.151	**.510**	.416	.429	.210	-.331
Resource	**Q25**	.048	.240	**.885**	.148	.041	.112
Value	**Q20***	.291	.153	**.746**	-.036	.450	.027
Resource	**Q22***	**.520**	.208	**.641**	.041	.307	.070
Resource	**Q19***	.094	.041	**.593**	-.030	**.557**	.114
Resource	**Q23***	.379	.424	.479	.310	.206	.106
Risk	**Q9***	.341	.246	.474	.086	.042	-.161
Risk	**Q8**	.014	-.044	-.085	**.884**	-.062	.074
Risk	**Q7**	.035	-.067	-.002	**.880**	.003	-.052
Resource	**Q26**	-.078	.396	.410	**.598**	.276	-.120
Risk	**Q10***	**.561**	-.254	.078	**.567**	.275	.331
Strategic	**Q2**	-.042	.335	.192	.115	**.747**	-.083
Resource	**Q28**	.078	.311	.311	.008	**.625**	.379
Performance	**Q15***	**.616**	.167	.224	.005	**.622**	-.038
Resource	**Q27**	.206	.391	.262	.248	**.591**	.349
Strategic	**Q1**	.137	.054	.078	.072	.131	**.769**

* Denotes cross loading item which is not clearly loading onto one factor

Table 4.9 was developed to summarise the relationship between the factor loadings and the five ITG model components. The table highlights that no consistent relationship between the ITG model components and the items exists. For instance, resource management items were particularly haphazard in terms of loading, with half the items cross loading and the remaining items loading onto three different factors. The fact that so many items were cross loading across a number of factors tends to indicate that the components of the model are not mutually exclusive and that items may have been measuring more than one component. The results of the factor analysis provide a clear indication that the ITG model does not appear to represent how directors conceptualise their role in the governance of IT. Despite further statistical analyses being conducted, such as removing heavily cross-loading variables and forcing the model to present a statistical analysis across five factors, the factor analysis results did not attain a better outcome than the original analysis shown in table 4.8.

Table 4.9   **Factor loading analysis for the empirical study**

ITG Model Component	Items expected to load to each factor	Single loading items	Cross-loading items
Strategic Alignment	1,2,3,4,5,18	3, 4 (Factor 2) 2 (Factor 5) 1 (Factor 6)	5, 18
Value Delivery	16,17,20	16 (Factor 1)	17,20
Resource Management	19,22,23,24,25,26,27,28	25 (Factor 3) 26 (Factor 4) 27,28 (Factor 5)	19,22,23,24
Risk Management	7,8,9,10,11,12,13,14	7,8 (Factor 4) 13 (Factor 2) 14 (Factor 1)	9,10,11,12
Performance Measurement	6, 15, 21,.29	6 (Factor 1)	15, 21,29

4.5.6   Discussion of Results

Research on boards to date has failed to develop a clear agreement about the role of board directors in adding value to their organisations (Daily, Dalton & Cannella, 2003). The role of board members is viewed very differently by many researchers (Mintzberg, 1983; Hung, 1998; Zahra & Pearce, 1989; Johnson, Daily & Ellstrand, 1996; Hillman & Dalziel, 2003). The range of roles for a board and its members identified in prior research range from seven (Mintzberg, 1983) to two roles (Hillman & Dalziel, 2003). This prior

research tends to illustrate the difficulties associated with identifying and agreeing on the role of the board and its directors and the potential for board members conceptualisation of their role within the board to vary accordingly.

The results of my research on the measurement of board members perceptions of their role, in relation to the governance of IT, indicate that board members appear to have difficulty discerning what is important to their ITG role. The factor analysis results presented in Table 4.8 and 4.9 indicate that board members perceptions of their ITG role are not thought of cleanly, hence the high degree of cross-loading within the model's measurement items. The factor analysis supports the notion that governing body members do not think of their role as portrayed by the ITG model. Specifically, issues associated with one component of the model are actually statistically similar to other components of the model. For instance, the items strongly loading to Factor 1 represent a mix of risk, value and performance measurement items. However, two of these items, Q21 and Q11, also strongly loaded on factor 3 (predominantly resource management items) and factor 4 (predominantly risk management items). Consequently, this means that board members may not mean the same thing when they think of or discuss a single component of the ITG model. The results indicate that the components of the ITG model are hard to measure clearly and concisely.

As director's perceived ITG role does not appear to align with the components of the ITG model, may be an indication that the model may not be appropriate to what board members perceive their role in the governance of IT to be. The lack of support for the ITG model may indicate that the topics (components) and activities associated with the ITG model do not align with the director's view of their ITG board role (Nicholson & Newton, 2010).

4.6   Conclusion

This chapter presents the quantitative phase of my thesis. It involved the development and testing of a survey instrument designed to measure director and senior executive perceptions of how boards conceptualise their role in governing IT.

The results of the study revealed that the items did not cleanly load to the ITG model components.   This indicates that the ITG model does not appear to represent how directors conceptualise their role in governing IT.   This may be due to the fact that the topics and activities associated with the ITG model are not representative of director's views of their board role in relation to the governance of IT.   Given the lack of support for the ITG model, I considered it necessary to conduct a qualitative study of boards and ITG to enhance understanding of how boards govern IT.   Specifically I turned to the predominant corporate governance theories.   The following three chapters (5-8) present this second phase of my research approach.

Chapter 5

Investigating IT Governance in Australian Universities: A Return to the Field

5.1   Introduction

Given the lack of empirical support for using the ITG model as a framework for understanding how boards conceptualise their role in governing IT, it was clear a broader review of the governance research field was required. I sought to base any new work on alternative theoretical approaches to corporate governance. Specifically, my focus shifted from IT governance processes back to my broader question of **"How do boards govern IT?"** Thus, I sought to understand whether existing corporate governance theories might provide deeper insights into understanding board governance of IT. This study seeks to link corporate governance research with ITG research.

This chapter presents my approach to a qualitative, inductive study designed to provide insight into how the governing body of a university deals with IT. Specifically, I am interested in understanding how, if at all, traditional corporate governance theories apply to ITG in the university environment. I use a case based test and follow the exhortation of Van Grembergen, De Haes and Guldentops (2004) who call for a specific focus on what boards do around IT governance as they consider corporate governance cannot be discharged effectively unless IT is being governed properly.   I take up this call by examining how Australian university boards deal with the governance of IT.

Corporate governance theories focus on how corporations are governed and the role of the boards in corporate governance processes. The board of directors in an organisation (board) is the *"ultimate decision-making body of an organization and is responsible for major investment, financial and operation policies, and strategic directions of the company. It provides an important supervisory role of company executive management."* (Psaros, 2009, p.67).   The board plays a central role in the organisation's corporate

57

governance processes by setting the tone of these processes (Psaros, 2009) and governing a corporation's IT assets, systems and processes forms part of these responsibilities (Van Grembergen, De Haes & Guldentops, 2004; Nolan & McFarlan, 2005).

While interest in the boards has grown over the past 30 years, there is no universally agreed theoretical basis for what boards do. In fact, several key theories have developed, each with their own particular take on the role or function of boards. Agency theory dominates academic research and practice (Daily et al., 2003; Stevens & Thevaranjan, 2010). As an alternative to agency theory, stewardship theory has become prominent in the management literature (Donaldson & Davis, 1991; Davis, Schoorman & Donaldson, 1997; Sundaramurthy & Lewis, 2003) and in the sociology and management literatures resource dependence theory has been identified as being a prominent alternative theory to agency theory (Hillman, Withers & Collins, 2009).

Agency theory focuses on the relationship between the principal and the agent where the principal delegates decision-making authority to the agent in return for the performance of some service on his/her behalf (Jensen & Meckling, 1976; Eisenhardt, 1989a; Hendry, 2002; Dalton, Hitt, Certo & Dalton, (2007). The theory assumes that agents are self-interested actors who maximize their own personal gain, sometimes at the expense of the principal, as a result of information asymmetry and uncertainty (Jensen & Meckling, 1976; Eisenhardt, 1989a). The theory identifies that agency costs are incurred by an organisation as a result of the conscious and unconscious self-interest of the agent and principal's problems. Davis, Schoorman and Donaldson (1997) indicate that losses to the principal from interest divergence (agency costs) may be reduced by imposing control structures upon the agent. The board's primary role in agency theory is to discipline and monitor management (Eisenhardt, 1989a; Hendry, 2002; Sundaramurthy & Lewis, 2003) and enforce the contract between the principal and agent (Jensen & Meckling, 1976).

In contrast, stewardship theory asserts that managers are not motivated by individual goals, but rather are good stewards whose motives are aligned with their principals (Davis et al., 1997). Essentially, managers just want to do a good job and look after the corporate assets (Donaldson & Davis, 1991). Stewardship theory suggests that the steward is not motivated by wealth but instead identifies personally with the corporation

(Sundaramurthy & Lewis, 2003). This theory is linked to empowering management rather than controlling them (Davis et al., 1997). Owners establish an involvement oriented management philosophy that reflects high levels of trust between the board, management and the owners (the collective) (Davis et al., 1997). In stewardship theory, the primary role of the board is to provide service and advice to management (Sundaramurthy & Lewis, 2003; Van Slyke, 2006). The board forms part of the collective (owners, board and management) within the organisation and is thus accountable to this collective for decisions made (Davis et al., 1997).

Resource Dependence theory (RDT) considers the corporation to be an open system dependent on the environment (Hillman & Dalziel, 2003) which was established to allow increased understanding of the inter-organisational relationships that affect organisational failure (Pfeffer & Salancik, 2003). RDT proposes that organisations lacking in essential resources seek to establish relationships with (be dependent upon) others in order to obtain needed resources (Pfeffer & Salancik, 2003; Hillman et al., 2009). That is, they use boundary spanners to ameliorate the environment. Problems arise not because organisations are dependent on their environment but more because their environment is not dependable in providing necessary resources (Pfeffer & Salancik, 1978). Thus, organisations attempt to minimize their dependence on others by increasing the dependence of other organisations on them (Pfeffer & Salancik, 1978). The theory considers boards to be an integral component of the effective firm and that boards are used to gain access to scarce resources and information (Boyd, 1990). These three theories are central to corporate governance research and I use them as the basis for possible generative mechanisms for how boards govern IT.

The remainder of this chapter is structured as follows. Section 5.2 discusses the three prominent corporate governance theories that I use in this study along with their potential links to ITG processes and boards. Section 5.3 explains the qualitative inductive case study method I used to explore the issue of boards and ITG processes within the Australian university sector. Section 5.4 summarises the chapter.

5.2   Corporate governance theories

Governing information technology in organisations is challenging.   There are many unknowns when governing any major function particularly one undergoing constant change like IT. Managing unknowns and their consequences becomes a key function of an organisation's governance system.

There is no universal approach to governance and several key theories have developed to explain what governing bodies do to govern their organisations. Corporate governance theories have developed over time under many different disciplines including economics, management and sociology. The overwhelming dominant theoretical perspective applied in corporate governance research to date has been agency theory (Hendry, 2005; Daily et al., 2003) which sees the role of the board as monitoring and controlling management. Despite this dominance, there is a long tradition in corporate governance research that recognizes no single role for the board. Thus, stewardship theory (Donaldson, 1990a, 1990b; Davis et al., 1997) and resource dependence theory (Pfeffer & Salancik, 1978; Hillman & Dalziel, 2003; Hillman et al., 2009) seek to explain the board's role as a support and supplier of resources to senior management. Empirical research into all three theories has been mixed (e.g. Davis et al., 1997; Dalton et al., 2007; Hillman et al., 2009) with no single theory receiving unambiguous support (Abdullah & Valentine, 2009). This means that board studies need to consider multiple perspectives.   Thus agency theory, stewardship theory and resource dependence theory may complement each other and operate together simultaneously (Donaldson & Davis, 1991; Sundaramurthy & Lewis, 2003; Nicholson & Kiel, 2007).

This thesis focuses on whether these three theories (agency theory, stewardship theory and resource dependence theory) explain the generative mechanisms that underlie board behavior with respect to the governance of IT. As indicated in chapter 3, critical realists believe there is only one reality made up of three different ontological domains, namely the empirical, the actual and the real (Perry et al., 1999).   Generative mechanisms represent the real or deep structures and mechanisms that generate phenomena in the real domain (such as board behaviour). Generative mechanisms are identified from the links between the aspects of reality that can be experienced directly or indirectly in the

empirical domain (experiences) which are linked up to aspects of reality that occur in the actual domain (events) (Perry et al., 1999).

Since there is no clear singular role for boards within the literature, I am interested in understanding if the three theories collectively can help explain what boards do with respect to ITG within the university sector. I chose the Australian public university sector because it relies heavily on IT. The next section outlines the role of boards within the three key theories that form the basis my analysis.

5.2.1 Agency theory

Agency theory is the "*pantheon of conceptual/theoretical foundations that inform research in corporate governance*" (Dalton et al., 2007, p.2). Developed from the economics literature, agency theory owes a debt to many notable economics and managerial scholars (e.g. Smith, 1776; Berle & Means, 1932; Alchian and Demsetz, 1972, 1973; Coase, 1937, 1960; Demsetz, 1964, 1966, 1967, 1983; Holmstrom, 1979; Ross, 1973, Dalton et. al, 2007). Researchers generally agree that Jensen and Meckling (1976) were instrumental in establishing agency theory as an important corporate governance research theory in the twentieth century (Dalton et al., 2007). Specifically, Jensen and Meckling (1976) built on the work of transaction cost economists (e.g. Coase, 1937; Alchian and Demsetz, 1972; 1973) to mathematically model the loss in efficiency that occurs when one party delegates work to another (Dalton et al., 2007). This provided theoretical clarity to the problems associated with the separation of ownership from control that had long been recognised in the literature (e.g. Berle & Means, 1932; Smith, 1776).

Agency theory has developed along both principal-agent and positivist avenues (Eisenhardt, 1989a). The principal-agent avenue is a broad, predominantly mathematical approach concerned with the general theory of principal-agent relationships across a broad range of settings (Ross, 1973; Eisenhardt, 1989a). The positivist avenue is a narrower, less mathematical approach that focuses on the problem caused by the separation of ownership from control in corporations. It is based on human assumptions of the agent displaying self-interest, bounded rationality, honest incompetence and risk aversion (Eisenhardt, 1989a). Assumptions of this theory include goal conflict, distrust

and information asymmetry occurring between the principal and the agent (Eisenhardt, 1989a; Dalton et al., 2007). The board's primary role is to discipline and monitor (Eisenhardt, 1989a, Hendry, 2005, Sundaramurthy & Lewis, 2003) and enforce the contract between the principal and agent (Jensen & Meckling, 1976).

Agency theory is based on a general agency relationship, defined by Jensen and Meckling (1976, p.5) as a *"contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent"*. Dalton et al., (2007, p.1) posit that the central tenet of agency theory is

> *"that there is potential for mischief when the interests of owners and managers diverge. In those circumstances, and for a variety of reasons, managers may be able to exact higher rents than are reasonable or than the owners of the firm would otherwise accord them"*.

The theory assumes that if both parties are utility maximisers, the agent will not act in the best interests of the principal (Jensen & Meckling, 1976). This self-interested behaviour generally occurs when the agent possesses superior information (information asymmetry) and it is difficult or expensive for the principal to verify what the agent is actually doing (Eisenhardt, 1989a, Shapiro, 2005). Thus, *"the model of the man underlying agency theory is that of a self-interested actor rationally maximising their own personal economic gain"* (Donaldson & Davis, 1991, p.51, Jensen & Meckling, 1976).

As a result of this divergence of interests, the principal introduces mechanisms that reduce the likelihood of self-interested behaviour by the agent (Davis et al., 1997). The costs associated with implementing these mechanisms are termed agency costs (Jensen & Meckling, 1976; Eisenhardt, 1989a; Shapiro, 2005; Hendry, 2005). The mechanisms include offering incentives to the agent to act in conformance with the goals of the principal (incentives), observing and analyzing the agent's actions (by the board or audit committee) to ensure they are acting in the best interests of the organisation (monitoring costs), contracting in such a way that there is goal congruence between the principal and the agent, for example, incentive contracts (bonding costs). For completeness, there are

also residual costs when management does act self-interestedly despite these mechanisms (Jensen & Meckling, 1976; Fama & Jensen, 1983; Eisenhardt, 1989a; Shapiro, 2005; Dalton et al., 2007).

Agency costs usually occur as a result of one of three problems, namely: conscious self-interest of the agent, unconscious self-interest of the agent and principal's problems (Eisenhardt, 1989a; Hendry, 2002). Conscious self-interest (moral hazard) arises where the agent will act in his/her own best interests rather than in the interests of the principal or the board representing the principal; it is self-interest with guile (Jensen & Meckling, 1976; Eisenhardt, 1989a, Shapiro, 2005). An example of this kind of agency cost is shirking, where the agent puts in less effort than agreed toward achieving the principal's objectives (Eisenhardt, 1989a; Hendry, 2002; Stevens & Thevaranjan, 2010). This conscious self-interest occurs mostly where information asymmetry between the principal and the agent is high (Eisenhardt, 1989a; Hendry, 2002). Information systems and monitoring mechanisms are often put into place in situations of high information asymmetry and agent self-interest to align the agent's behaviour back to the goals of the principal (Jensen & Meckling, 1976; Eisenhardt, 1989a). Bonding may be another mechanism that the principal may use to align the agent (Shapiro, 2005).

The second agency problem of unconscious self-interest occurs because the principal and the agent have differing risk preferences (risk asymmetry) (Jensen & Meckling, 1976; Ross, 1973) also called self-interest without guile (Williamson, 1975; Shapiro, 2005). Risk asymmetry occurs because the principal is risk neutral (they have a diversified approach to investment) and the agent is risk averse because they have all their eggs in one basket (they want to protect their employment security, income and reputation which is inextricably linked to one firm) (Jensen & Meckling, 1976; Fama & Jensen, 1983; Eisenhardt, 1989a; Wiseman & Gomez-Mejia, 1998; Shapiro, 2005). In the case of universities, the principals (state and federal governments jointly) have developed a diversified portfolio of universities across Australia. Due to this diversified state, the principal wants universities to be competitive and take up opportunities which grow the sector but might include more risk for any individual university. In contrast, management within each university (the agent), wants to protect their particular university and their personal employment prospects and so will seek to take a conservative, risk averse approach to operations. Management will only take up opportunities that are low in risk

and may even encourage the governing body to take a similar position on risk to protect the reputation of the university. This difference in risk preference between the principal and agent results in the agency problem of risk differential or mis-alignment (Sundaramurthy & Lewis, 2003; Wiseman & Gomez-Mejia, 1998). The principal may use supervisory and incentive alignment mechanisms such as remuneration to senior management to encourage the agent to have a different attitude to risk and align with the principal's risk profile (Eisenhardt, 1989a). There is also support that establishing certain governance structures may assist with risk alignment between the principal and agent (Wiseman & Gomez-Mejia, 1998).

The third agency problem centres on principal/board problems. Often the agent's behaviour may not align with the interests of the principal/board, because the principal/board is unable to clearly specify their interest or objectives to the agent (Hendry, 2002). This may be due to the principal/board having insufficient information or understanding to be able to clearly specify the actions of the agent (Eisenhardt, 1989a; Hendry, 2002). For instance, the situation may be contingently complex so the principal can not accurately specify his/her objectives to the agent (Eisenhardt, 1989a; Hendry, 2002). This miscommunication between the agent and the principal, not the inability of the agent to perform the role, is termed honest incompetence (Eisenhardt, 1989a, Hendry, 2002). These situations often occur as a result of poor communication between the principal and agent or multitasking. Multitasking is a problem where the principals' objectives are complex or multifaceted and thus difficult to specify and capture in an outcome based contract with the agent (Holmstrom & Milgrom, 1991; Hendry, 2002). These problems result in misunderstanding between the principal and agent which is costly to the principal as his/her objectives are unable to be achieved. These costs can be overcome by the principal providing more detailed specification of their objectives and stronger communication processes (Eisenhardt, 1989a; Hendry, 2002).

The principal problem also occurs when the principal selects management or even board members who can not perform the role required of them (adverse selection) (Eisenhardt, 1989a; Hendry, 2002). In this situation, the principal may invest in guidance or mentoring mechanisms to assist in developing the competence of the agent and may more

precisely specify objectives to limit the scope for an incompetent agent to under-perform (Eisenhardt, 1989a; Hendry, 2002).

In summary, agency theory focuses on the relationship between the principal (the owners) and the agent (management) and identifies that agency costs occur where the objectives of the agent do not align with the objectives of the principal. This misalignment occurs due to three agency problems, the conscious self-interest of the agent, the unconscious self-interest of the agent and principal's problems. Agency costs are said to be reduced by the implementation of monitoring and bonding mechanisms. These elements of agency theory form the basis of analysis for this aspect of my study.

In an agency theory situation, I would expect the governing body would focus on monitoring the potential self-interested behavior of IT management. I would envisage that the governing body would aim to ensure that management takes enough risk, for instance, innovates around IT and so aligns management's risk profile more closely with the risk profile of the principal. I would expect that governing bodies may have insufficient information or understanding to be able to clearly specify to the agent how the principal would like IT to be governed. This may be due to poor communication between the principal and agent. Evidence of these elements is likely to indicate how agency theory mechanisms provide an appropriate explanation for board governance of IT.

5.2.2 Stewardship theory

Stewardship theory developed within the management literature as a means of explaining relationships and behaviours between management and owners that reflects collective, pro-organisational behaviour. It focuses on goal convergence rather than self-interest (Van Slyke, 2006). This theory explains situations in which *"managers are not motivated by individual goals but rather are stewards whose motives are aligned with the objectives of their principals"* (Davis et al., 1997, p.21). The assumptions of stewardship theory include human traits of collectivist, cooperative, naturally trustworthy individuals who are motivated by intrinsic values who seek goal alignment, whose aim is to protect and maximize shareholder wealth through firm performance and seek to develop cohesive trusting relationships with the board and the owners (state and federal governments

jointly) (Davis et al., 1997; Sundaramurthy & Lewis, 2003). Stewards develop trust, goal alignment and good communication (information symmetry) between themselves, the board and the owners. Under this theory, the primary purpose of the board is to provide service and advice to management (Sundaramurthy & Lewis, 2003; Van Slyke, 2006). The board forms part of the collective (owners, board, and management) within the organisation and is thus accountable to this collective on decisions made (Davis et al., 1997). Faced with a choice between self-interested and pro-organisational behaviour, the steward will support the organisation's interests and the owner's goals (Davis et al., 1997).

Analogous to agency theory, there are three key mechanisms expected in a stewardship relationship, namely a conscious stewardship focus, an unconscious stewardship focus and owner-manager alignment. The first mechanism of conscious stewardship focus suggests that *"The executive manager, under this theory, far from being an opportunistic shirker, essentially wants to do a good job, to be a good steward of the corporate assets"* (Donaldson & Davis, 1991, p.51). This is supported by Sundaramurthy and Lewis (2003) who argue that the steward is not motivated by wealth but instead identifies personally with the organisation. The steward is motivated to protect and maximise organisational performance in order to maximise his or her personal reputation (Davis et al., 1997).

Stewardship theory is linked to empowering management within the organisation rather than controlling them. This allows for a stronger relationship between the steward, the board and owners (Davis et al., 1997; Sundaramurthy & Lewis, 2003). Tosi, Brownlee, Silva and Katz (2003) indicated that the use of control mechanisms by owners (e.g. the monitoring and incentives suggested by agency theory) may inhibit the motivation of the steward and be counter-productive. To achieve this conscious stewardship focus, you would expect to see the steward choosing actions that align himself/herself with the goals of the board and owners.

The second mechanism of stewardship theory focuses on the unconscious stewardship focus. This mechanism is concerned with the actions of the steward in achieving risk alignment with the owners. Risk alignment is where owners who are risk neutral (they have a diversified approach to investment) communicate, interact and develop trust with

the steward to encourage her/him to move to a risk-taking approach rather than a more conservative risk averse approach (Davis et al., 1997; Wiseman & Gomez-Mejia, 1998). The vision of the steward also unconsciously assists this alignment to occur as the steward believes that by *"working toward organizational, collective ends, personal needs are met"* (Davis et al., 1997, p.25). Risk symmetry is more likely to occur where there is strong owner-manager alignment (Davis et al., 1997). In the case of universities, the owners (state and federal governments jointly) have a variety of investments in universities across Australia and want universities to be competitive and grow the sector. Owners, board members and management would seek to become a cohesive team which focuses on cooperative decision-making and risk alignment. Encouraging management to identify with the success of more risk taking decisions may increase the steward's sense of personal satisfaction (Davis et al., 1997). Intrinsic rewards such as increasing the university's reputation in the marketplace and attracting more students may also encourage management to undertake riskier decisions (Davis et al., 1997; Wiseman & Gomez-Mejia, 1998).

The third mechanism of stewardship theory is owner-manager alignment which involves the owners achieving clarity of goal explanation. In this mechanism, the stewards have a closer relationship with the board and owners through an involvement-oriented management philosophy that reflects high levels of trust and clear communication processes between the owners and managers and allows management to have maximum participation in decisions and a supportive governance structure (Davis et al., 1997). Allowing management to behave more autonomously (being trusted) and having a corporate governance structure that provides them with high authority and discretion (little monitoring or control) assists in developing closer, trusting and cohesive relationships with stewards and leads to stronger owner-manager alignment (Davis et al, 1997)

To assist owner-manager alignment, owners must accurately and unambiguously communicate their objectives to management via the board and must encourage management to continuously seek clarification on any misunderstandings. This breaks down any complexity to enable management to clearly understand how to achieve the owner's goals and objectives (Sundaramurthy & Lewis, 2003). The provision of full and

frank disclosure of information from the stewards on management processes and achievements (information symmetry) assists owners to more clearly specify how they want management to achieve their goals and objectives.

To ensure clear goal explanation can be achieved, the owners must carefully choose management and even board members who have skills, knowledge and personal traits which will assist them to achieve their prescribed goals and objectives (Sundaramurthy & Lewis, 2003). Under stewardship theory, owners may place managers on contracts or trial employment to be sure they have selected appropriately competent staff.

In summary, stewardship theory is characterised by managers (stewards) who are essentially trustworthy individuals and reliable custodians of the resources entrusted to them (Nicholson & Kiel, 2007; Donaldson, 1990a, 1990b; Donaldson & Davis, 1991). This theory emphasizes that managers are more likely to align with the objectives of the owners as they display collective pro-organisational behaviour focused on organisational goal achievement rather than self-interest (conscious stewardship focus) (Van Slyke, 2006). Stewards are more likely to unconsciously align with the risk profile of the owners through cooperative decision-making between the owners, board and management (unconscious stewardship focus) (Sundaramurthy & Lewis, 2003). Owners are able to clearly specify how their goals and objectives should be implemented as a result of an involvement-oriented management philosophy that reflects high levels of trust and clear communication processes between owners, the board and stewards (owner-manager alignment) (Davis et al., 1997). These three elements of stewardship theory form the basis of analysis for this aspect of my study.

In a stewardship theory situation, I would expect to see the governing body (board) empower management rather than control them, which allows for a stronger relationship between the members of the collective (steward, board and owners). I would envisage that as management act as stewards of the organisation, no monitoring by the governing body would be required. As the role of the governing body under stewardship theory is to advise/support management, I would expect to see evidence of this stronger working relationship between the members of the collective. This advice and support should result in management taking greater risks in relation to IT decision-making, for example,

supporting innovative IT acquisitions and thus synergizing their risk profile with that of the owners. In this theoretical situation, owners are able to more clearly specify their goals and objectives in relation to the governance of IT as a result of an involvement-oriented management philosophy. Evidence of these elements of stewardship theory may provide me with a potential explanation for how boards govern IT.

5.2.3   Resource dependence theory

Resource dependence theory (RDT) is the most prominent sociological theory applied to boards of directors (Hillman et al., 2009). Popularized by Pfeffer and Salancik (1978) RDT considers the corporation to be an open system dependent on the environment (Hillman & Dalziel, 2003). It was originally developed to provide an alternative to economic theories for mergers and board interlocks so as to enhance understanding of the inter-organisational relationships that affect organisational failure (Pfeffer & Salancik, 2003). RDT posits that organisational survival depends on the firm's ability to acquire and maintain resources. This would be simple if organisations were in complete control of their access to resources, but no organisation is completely self contained and in control of its destiny (Pfeffer & Salancik, 2003). Instead, organisations depend on other organisations for many of the resources they require (Pfeffer & Salancik, 1978). Problems arise not because organisations are dependent on their environment, but more because their environment is not dependable in providing necessary resources (Pfeffer & Salancik, 2003). Consequently, RDT suggests that organisations use a number of tactics to restructure their dependencies and reduce these dependencies (Davis & Cobb, 2009; Casciaro & Piskorksi, 2005).

Sociology researchers have concentrated on three key resources that the board provides to an organisation, namely links to the country's business elite; access to capital; and links to competitors (Useem, 1984; Mizruchi & Stearns, 1988, 1994; Stearns & Mizruchi, 1993; Mizruchi, 1992, 1996). In contrast management researchers have viewed the key resource provided by the board to be a more general link to external environments (Hillman, Cannella & Paetzold, 2000; Palmer & Barber, 2001; Nicholson & Kiel, 2007; Hillman et al., 2009) of which the preceding three are a subset. Pfeffer and Salancik (2003); Hillman and Dalziel (2003); Hillman et al. (2009) extend the idea of resource

dependence by suggesting the resource dependence role includes (1) advice and counsel from boards; (2) legitimacy; (3) channels for communicating information between external entities and the organisation and (4) preferential access to commitments or support from important elements outside the organisation.

While there is no current consensus on what resources the board brings to the organisation, two key mechanisms have emerged consistently from the research on board roles (Zahra & Pearce, 1989). These are (1) outside board members provide preferential access to external resources and knowledge and (2) board members provide advice and counsel to management to minimize external dependencies for the organization.

In summary, resource dependence theory focuses on the board as an essential link between the firm and the essential resources it needs to maximize performance and minimize external dependencies (Pfeffer, 1987; Pfeffer & Salancik, 1978; Nicholson & Kiel, 2007; Hillman et al., 2009). There is a wide view within this theory of the role of the board. The predominant position is that boards primarily provide preferential access to external resources and knowledge and secondly provide advice and counsel to management to minimize external dependencies for the organisation (Hillman et al., 2009). These two theory elements of RDT form the basis of analysis in my study.

Under resource dependence theory, I would expect to see the governing body choosing external members with considerable IT knowledge and skills. This would allow the governing body to provide preferential access to IT knowledge and resources as a result of board members associations with other external organisations. I would also expect to see evidence of these external board members providing advice and counsel to management on IT decisions to minimize the organization's dependence on external parties. Evidence of these elements may assist my understanding of how resource dependence theory could potentially explain how boards govern IT.

5.2.4 A multi-theoretic approach

Sections 5.2.1 to 5.2.3 outlined three prominent corporate governance theories that could potentially explain how boards govern IT. Each of these theories presents an interesting and alternative explanation of what boards might do in respect of university IT

governance processes, namely control management (agency theory), collaborate with management (stewardship theory) or provide resources to management (resource dependence theory).

Agency, stewardship and resource dependence theory have all been previously applied individually to the study of boards with mixed results; that is, no one single theory has received unambiguous support (Abdullah & Valentine, 2009). Consequently, board research has moved beyond either/or thinking on theories to consider whether the role of boards can be explained by multiple corporate theoretical perspectives. A number of studies have conducted empirical research combining two or more corporate governance theories such as agency and stewardship theory (Sundaramurthy & Lewis, 2003; Tosi et al., 2003); agency and resource dependence theory (Hillman & Dalziel, 2003); agency theory, stewardship theory and resource dependence theory (Nicholson & Kiel, 2007) and agency theory, resource dependency theory, institutional theory and social network theory (Lynall, Golden & Hillman, 2003).

The use of multiple theoretical perspectives is more generally reflected in the need for both control and collaboration in governance (Sundaramurthy & Lewis, 2003). This is because control curbs human limitations while a collaborative approach enhances individual aspirations though cooperation and empowerment (Sundaramurthy & Lewis, 2003). Nicholson and Kiel (2007) studied the links between board demography and firm performance and found that while agency, stewardship and resource dependence theories can explain a particular case, no single theory was able to explain the general pattern of results. They indicated that whilst they could isolate the conditions necessary for each theory to hold, that a more productive research agenda would be to develop theoretical models with a holistic view of the complex processes involved in the board-corporate performance relationship. Lynall, Golden and Hillman (2003) developed a theory that indicated that board composition and firm performance are a reflection of a firm's life cycle and the relative power of the CEO and external financiers at the time of founding. The theory provides insights in the predicative ability of agency, resource dependence, institutional and social network theories.

These studies highlight that corporate governance theories are more likely to complement each other and operate simultaneously; together they more clearly explain a holistic view of the complex governance process than any single theory (Sundaramurthy & Lewis, 2003; Hillman & Dalziel, 2003; Lynall, Golden & Hillman, 2003; Nicholson & Kiel, 2007). It is not a matter of choosing one theoretical perspective over another but rather identifying under which conditions each theory is more applicable (Lynall et al., 2003). This logic provides support for adopting a multi-theoretic approach to investigating how boards govern IT within Australian universities. By adopting this approach, I aim to provide greater insight into the board governance of IT in direct response to Van Grembergen, De Haes & Guldentops (2004) for a greater understanding of the role of the board in the governance of IT.

5.3   Qualitative method

Chapter 4 highlighted a need for richer and deeper data on "***How do boards govern IT?***" Qualitative research can provide such data as it is often highly descriptive, emphasises the social construction of reality and focuses on how theory operates in particular situations (Eisenhardt & Graebner, 2007). Siggelkow (2007, p.21) indicates that *"where only limited theoretical knowledge exists on a particular phenomenon, an inductive research strategy can be a valuable starting point"*. This approach also matches my ontological and epistemology position of critical realism, as it allows me to explain events and processes surrounding boards and IT governance by firstly conceptualising the properties and causal mechanisms generating and enabling ITG events. IT also allows me to describe how different mechanisms manifest themselves under specific conditions (Danermark, Ekstrom, Jakobsen, & Karlsson, 2002). A qualitative approach enables me to delve more deeply into board action around ITG within universities, to identify the experiences of key actors and thus attempt to explain the generative mechanisms that underlie this process. In summary, case study research fits within the critical realist paradigm and is suited to explaining how boards govern IT (Perry, 1998).

Since I was interested in the individual, organisational, social and political phenomena surrounding boards and their role in ITG, I chose a combined exploratory and explanatory multiple case-based method (Yin, 1994). A combined case method allowed me to

explore the board's role in ITG processes and use an inductive iterative approach to develop theoretical explanations for how boards govern IT. I adopted a multiple case design to allow replication logic whereby multiple cases are treated as a series of experiments with each case serving to confirm or disconfirm the theoretical inferences drawn from the others (Yin, 1994; Eisenhardt, 1989c). Replication of cases fits my epistemological position of critical realism and adds credibility to my study (Tsang & Kwan, 1999). This allows the researcher to perceive patterns more easily and eliminate chance associations. Multiple cases allow me to develop more elaborate theory and emphasises complementary or disconfirming aspects of a research issue (Eisenhardt, 1991; Eisenhardt, 1989c). In this study, retrospective cases were used which rely on "*interviews and archival data to build up the number and depth of cases efficiently and thus cover more informants and include more cases*" (Eisenhardt & Graebner, 2007, p.28). This type of data collection design permits induction of rich and reliable analysis and increases the validity and reliability of the results (Yin, 1994; Eisenhardt, 1989c).

The conceptual model guiding my research program (see Figure 5.1) illustrates where my overarching research question ***"How do boards govern IT?"*** sits with respect to the ITG research agenda. My case analyses in chapters 6-8 aim to explore how well three prominent corporate governance theories explain board governance of IT. This exploration may also provide a potential link to the processes, structures and relational mechanisms identified in the Enterprise governance of IT framework (Van Grembergen De Haes & Guldentops, 2004; De Haes and Van Grembergen, 2009; Van Grembergen and De Haes, 2009b; Ko & Fink, 2010). This chapter links corporate governance theories to IT governance research by considering how corporate governance theories explain board ITG processes.

5.3.1 Case study research design

I have applied Eisenhardt's (1989c) process of case study research to Yin's (1994) methodology to operationalise my research design (See figure 5.2). The steps in my research design are detailed in Table 5.2 and form the basis for my discussion of the research method, analysis and results throughout the remainder of this chapter and chapters 6 to 8.

The case study approach was initially exploratory in nature and commenced with the identification of three potentially competing theories of governance, namely agency theory, stewardship theory and resource dependence theory. I selected cases using a theoretical (purposeful) sampling approach. As the case study design was a multiple case design, I developed a case study protocol (Yin, 1994). This protocol was applied throughout the data collection and analysis processes to ensure that each case study was conducted following set procedures and rules. The case study protocol is included in Appendix 5.

Semi-structured interviews were the primary source of data in each case and these were supplemented with document reviews. Each case was analysed by inductively iterating between the case data and the competing theories looking for a priori theoretical constructs (patterns) in the data so as to provide evidence of the theoretical principles underlying how boards (governing bodies) were dealing with the governance of IT.

An individual case report was produced for each university. The case report combined the data from each university and identified the IT governance with potential evidence of which theories were at work. At the end of the data collection and analysis approach, I conducted a cross-case analysis and conclusions were drawn about the evidence of the three theories across all the data. This analysis is presented in chapter eight.

Case based research relies on the quality of the case method design and the trustworthiness of the data. Shenton (2004) provides a number of strategies to ensure trustworthiness in qualitative research projects and I integrated these with a number of tactics from leading case researchers (e.g. Yin, 1994; Gibbert, Ruigrok and Wicki, 2008; Cook and Campbell, 1979 and Eisenhardt, 1989c, 1991). The table in Appendix 3 provides detailed descriptions of how quality/trustworthiness tactics were embedded into my case study research.

DEFINE AND DESIGN PREPARE, COLLECT AND ANALYSE ANALYSE AND CONCLUDE

Iterate between case data and theories

Agency Theory

Rival theories

Stewardship Theory

Rival theories

Resource Dependence Theory

Select Cases using a purposeful sampling spproach

Design Data Collection protocol

Conduct 1st Case Study – University A

Conduct 2nd Case Study – University B

Conduct remaining case studies – Universities C to K

Code and Analyse case data using Nvivo Software

Code and Analyse case data using Nvivo Software

Code and Analyse case data using Nvivo Software

Write University A Case Report

Write University B Case Report

Write University C to University K Case Reports

Draw Cross University Case Conclusions

Show Context in which theory applies

Develop policy implications

Write University Cross Case Report

Chapter 5 **Chapter 6-7** **Chapter 8**
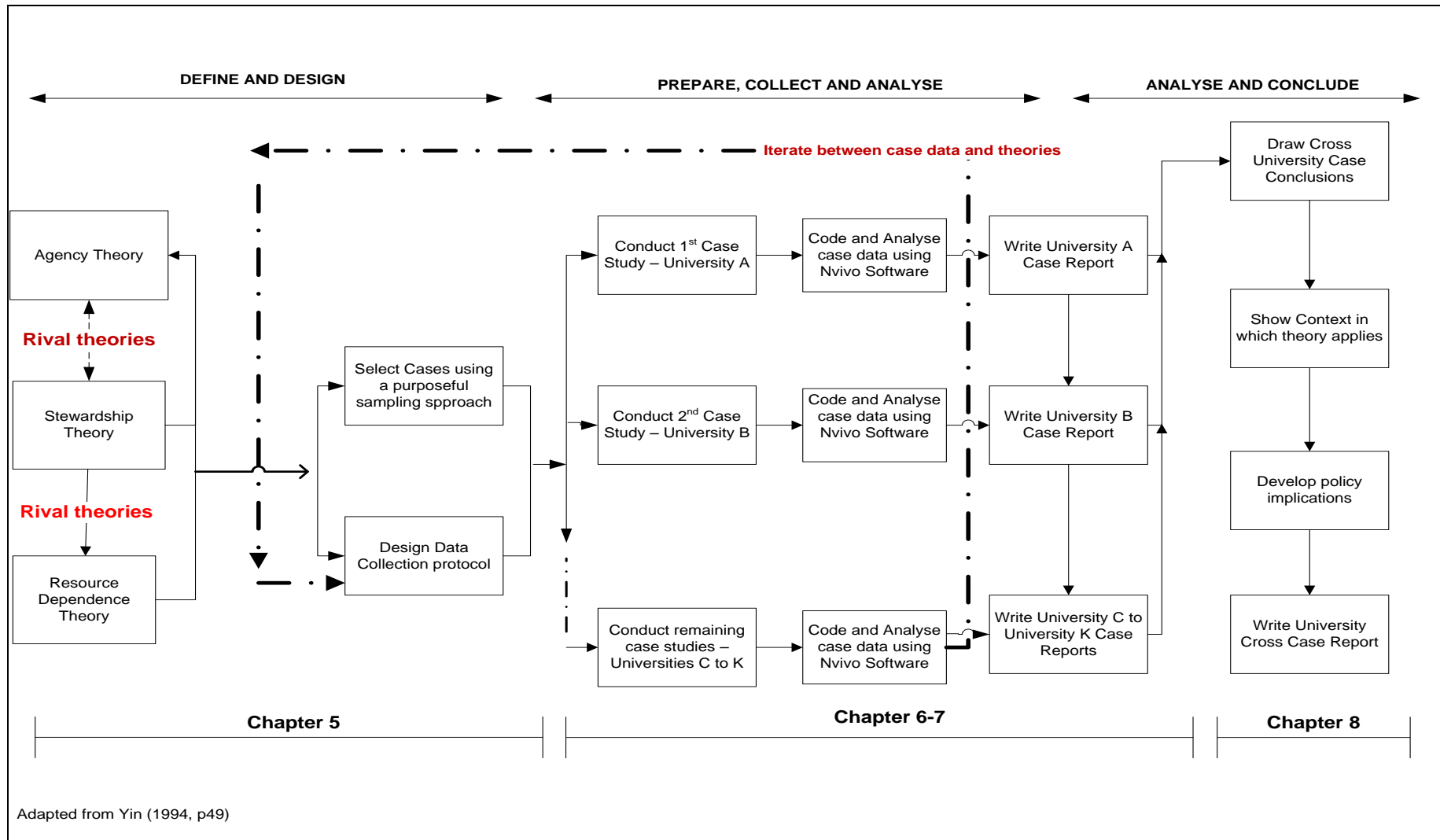
Adapted from Yin (1994, p49)

***Figure 5.1* Case study method design**

75

Table 5.1 **Application of the building theory from case study process to my qualitative study**

Steps	Recommended activities (Eisenhardt, 1989c)	Activities applied to my research study	Benefits of each process
Getting started: the research focus	• Develop a clear research focus and research question	• I developed a clear research design in Figure 5.1 • I developed clear research process as detailed in this table. • My research had a clear research Question ***"How do boards govern IT?"***	• Focuses the effort of the research process
	• Identify theories and a priori theoretical constructs	• I identified three possible rival theoretical explanations for my research question namely agency theory, stewardship theory and resource dependence theory in section 5.2. • I also identified possible elements for each theory to aid data collection and analysis in section 5.2. These elements were applied in the development of the interview protocol used in the data collection process in section 5.3.4.3 and Table 5.9.	• Provides stronger grounding for the theoretical constructs and their links to theory building
Selecting cases	• Specified population	• I chose the tertiary education sector and Australian public universities as the population for my qualitative study. This is discussed in section 5.3.3.1.	• Constrains extraneous variation and sharpens external validity
	• Theoretical sampling	• I conducted a theoretical purposeful sampling process that selected university cases based on university complexity and maturity of IT governance processes. This process will ensure my sample includes cases which provide maximum variation between cases and thus the best insight into the gambit of university IT governance processes. The details of this process are discussed in section 5.3.3.2.	• Focuses efforts on theoretically useful cases i.e. that replicate or extend theory
Data collection: crafting interviews and protocols	• Multiple data collection methods	• I chose to use multiple data collection methods in my study including semi-structured interviews across 11 university cases and collection of university annual reports and website documents. This is discussed in section 5.3.4.3 and 5.3.4.5.	• Strengthens grounding of theory by triangulation of evidence
Data collection: entering the field	• Overlap data collection and analysis including field notes	• I ensured data collection and data analysis overlapped using interview field notes to accomplish the overlap. This is discussed in section 5.3.4.3.	• Speeds analyses and reveals helpful adjustments to data collection
	• Flexible and opportunistic data collection methods	• I made additions to the semi-structured interview questions throughout the data collection process to probe for emergent themes to assist theory building ability of case. This is discussed in section 5.3.4.3. • I collected additional university	• Allows researcher to take advantage of emergent themes and unique case features

Steps	Recommended activities (Eisenhardt, 1989c)	Activities applied to my research study	Benefits of each process
		documents as a result of what emerged from the interview processes to assist theory building ability of cases. This is discussed in section 5.3.4.5. • Participants agreed I could phone them for any additional data I required. This is discussed in section 5.3.4.3	
Data analysis	• Within-case analysis	• I conducted within-case analysis for each university case by writing case reports for each case using a number of key headings. This is discussed in section 5.3.5. • I looked for unique patterns to emerge within each case prior to the identification of across cases patterns. This process is discussed in section 5.3.5. • I undertook a within-case analysis through the writing of individual case reports to assist me with identification of theoretical patterns within the data and assist with the overlap of data and analysis. This is discussed in section 5.3.5. The results of the within-case analyses are in chapters 6 and 7.	• Gains familiarity with data and preliminary theory generation
	• Cross-case pattern search using divergent techniques	• I analysed the data across cases by looking for issues which are related to the key themes of each of the rival theories. This is discussed in section 5.3.5. • I compared cases based on the information in the case reports looking for theoretical patterns within the data. This is discussed in section 5.3.5. • Similarities and differences were identified by me across key headings to confirm and disconfirm theoretical evidence	• Forces researcher to look beyond initial impressions and see evidence through multiple lenses
Results: Shaping Hypotheses	• Iterative tabulation of evidence for each construct	• I constantly compared theory and data and iterated towards the theories that closely fit the data. This is discussed in section 5.3.5 and illustrated in Figure 5.1. • I aimed to ensure that elements within each theory were sharpened by refining the definitions of the elements and building evidence which measures each element for each of the three theories. This is discussed in section 5.3.5. • I tabulated qualitative data which summarises the data relating to a priori constructs relating to each theory. A series of tables are provided in the discussion of the results in chapter 6 to support the qualitative findings.	• Sharpens construct definition, validity and measurability
	• Replication, not sampling logic across cases	• I undertook 11 university cases using the same data collection and analysis processes across all cases to ensure	• Confirms extends and sharpens theory

Steps	Recommended activities (Eisenhardt, 1989c)	Activities applied to my research study	Benefits of each process
		replication of the study is possible. This is discussed in the theoretical sampling process in section 5.3.3.2. • I identified cases which confirm a priori theoretical constructs and enhance confidence in the validity of the constructs. As each case was undertaken, I iterated between the interview data and theoretical constructs searching for evidence of the theories. This is discussed in section 5.3.5. • I also aimed to identify disconfirming cases which support rival theoretical constructs or refine and extend theories. All of my cases did not provide evidence of the theoretical constructs of resource dependence theory. This is highlighted in section 7.4 and section 8.2.	
	• Search evidence for "why" behind relationships	• I searched for evidence of "why relationships" in the data to elaborate existing corporate governance theories by applying context to existing theories. I was looking to see if the theories operate in isolation or can operate simultaneously together by studying IT governance processes of Universities. This extends our understanding of the role of corporate governance theories in organisations. This is discussed in section 5.3.5 and in the results in chapter 6-7.	• Builds internal validity
Enfolding Literature	• Comparison with conflicting and similar literature	• Comparison of data with literature of each rival theory. This occurs in chapter 8 of the thesis.	• Builds internal validity, raises theoretical level and sharpens construct definitions
Reaching Closure	• Theoretical saturation when possible	• Case collection was ceased when theoretical sampling saturation was achieved i.e. cases were collected and analysed from each quadrant of the purposeful sampling process as discussed in section 5.3.5.	• Ends process when marginal improvement becomes small

5.3.2   Getting started – The research focus

I commenced with a clear research design (Figure 5.2) and a clear method of operationalising this design (Table 5.1). My overarching research question of "***How do boards govern IT?***" also established a clear focus for the qualitative study. Within this process of starting my study, I also identified possible rival theories which might provide a theoretical explanation for how boards govern IT. The theories and their possible constructs were discussed in further detail in section 5.2. The next stage in this process involved selecting the universities for study.

5.3.3   Selecting cases

Case selection involved three key decisions. First, I chose a single sector (the university sector) to eliminate possible confounds that might arise from investigating multiple sectors.

Second, individual cases were selected using a purposeful maximum variation stratified sampling approach. This maximized the chances of selecting the most theoretically appropriate sample of university cases. Selecting universities with high, medium and low performance in IT governance increased the likelihood that contrasting patterns in the data should be discernable (Eisenhardt & Graebner, 2007).

Third, I chose three groups of interview participants likely to be able to explain how boards govern IT at each university. The potential participants selected were executives and governing body members who could provide the most insight into the IT governance processes of the university and in particular the role of the board in these processes (Eisenhardt & Graebner, 2007). The following sections provide more detailed information on these decisions.

5.3.3.1   Selection of a sector and unit of analysis

The university sector was chosen for this study because universities rely on IT systems and services. Specifically, universities require large systems to track student activities; to distribute online curriculum and interactive teaching activities to students and to

disseminate university research to the wider community. Universities usually need to make these systems available to students and staff through an intranet or online portal system for ease of access. Universities also require robust finance, human resource and other reporting systems to assist staff to perform the myriad of tasks undertaken in large complex organisations. In short, universities are considered to be dependent on IT.

The university sector was also chosen because there are key similarities and differences between universities increasing the likelihood of richer insights. The key similarities between universities are their structure and operations. In terms of structure, all public universities are enacted by an Act of Parliament in their state of origin. This act details the composition of the governing body and the main roles and responsibilities of this board like structure[1]. Australian public universities are governed by a council, senate or board of trustees and have a governing body (board) composition of less than twenty-two members if they meet the requirements of the National Protocols for Higher Education Approval Process. These protocols are mandated governance controls established by the Federal government in 2007 for all universities (National Ministerial Council on Education, Employment, Training & Youth Affairs, 2007) and government funding depends on a university's compliance. Australian public universities have similar owners or principals namely the Federal and State governments jointly. Whilst public universities must report to their particular state government under their Act of Parliament requirements and are monitored by state Auditors-General departments, much of the funding on which universities rely for their operations (teaching and research) is provided by the Federal government and universities must comply with government legislation to receive this funding.

The demographics of university governing bodies is also similar with most acts of parliament detailing three official members of the governing body being the Chancellor, the Vice-Chancellor and the chair of the academic board. In addition, a number of external governing body members at each university are appointed by the state government or by the Chancellor depending on their university act. The remaining members of the governing body in all universities are elected members from university staff, students and alumni. The governing body appoints the Vice-Chancellor (CEO)

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[1] Private universities were excluded from the study as they have different owners and processes of enactment.

who in turn employs the key executives of the university. The governing body's role is clearly defined in each parliamentary act and usually includes monitoring the performance of the Vice-Chancellor; overseeing the university performance; overseeing the activities of the university; approving the University mission, strategic direction, annual budget and business plan; overseeing the risk management and risk assessment processes across the university; approving and monitoring the university's systems of internal control and accountability; approving significant university commercial activities; establishing policies and procedures for the university; establishing university grievance processes and regularly reviewing its own performance. Each university act may include other specific responsibilities as well. The generic governance structure of universities generically within the sector is shown in Figure 5.2 below:
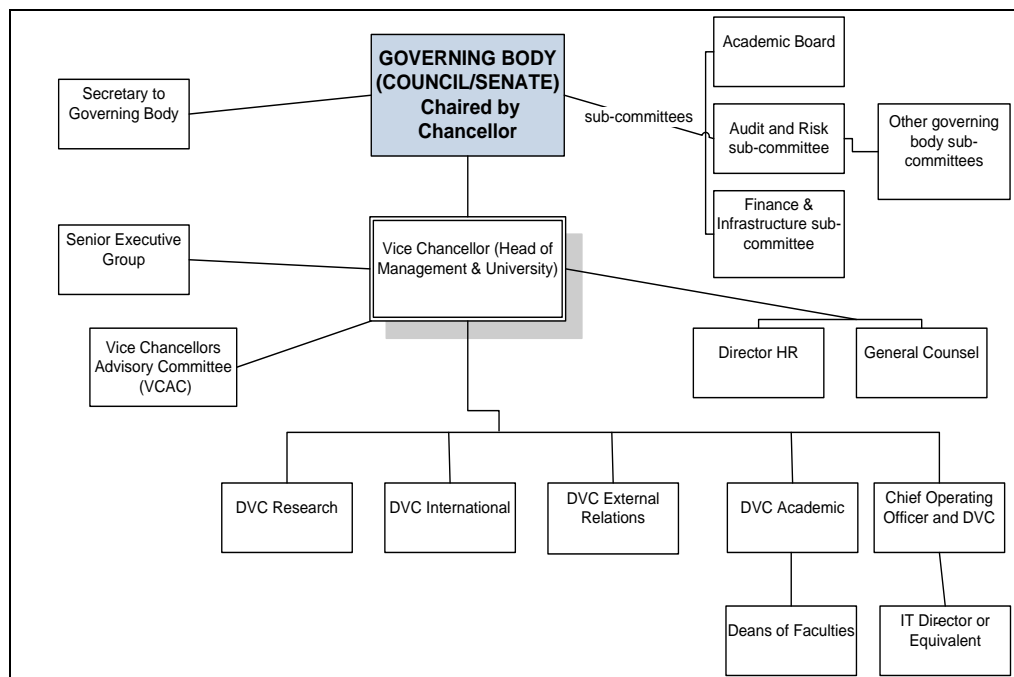
Figure 5.2   **Generic university governance structure**

Most universities belong to one of the four university networks such as Group of Eight Universities (GO8), Australian Technology Universities Network (ATN), New Generation Universities Network (NGU)[2] or Innovative Research Universities Network (IRU) and operate for similar purposes namely teaching, research and community service (Australian Education Network, 2007a).

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[2] The NGU network was disbanded in 2007 after the commencement of my qualitative study (Australian Education Network, 2007a).

The diversity between universities is focused on two key issues: complexity and core operations. Universities vary considerably in terms of complexity as evidenced by differences in total revenue, student numbers and staff numbers. Total revenues ranged from $145 million to $1.1 billion; student numbers ranged from 10,000 equivalent full time student units (EFTSU) to 51,000 EFTSU; and, staff numbers ranged from 500 to 6,500 equivalent full-time staff during 2007. Universities also differ in terms of their core operational focus (Good Universities Guide, 2008; Department of Education, Employment and Work Place Relations, 2005). Group of Eight (G08) universities focus more heavily on attracting research funding and producing research output than universities from other networks (Group of Eight, 2010). Other universities are recognised for their teaching intensity especially in the delivery of distance education to students unable to attend university campuses. The similarities and differences highlighted above impact on the IT infrastructure and resources needed to operate each university. This may cause a difference in the manner in which IT is governed. These issues are also important as the lifecycle of an organisation and its complexity are thought to affect governance arrangements and what boards do (Lynall, Golden & Hillman, 2003).

5.3.3.2   Selection of cases – theoretical sample

There are thirty-seven public universities in Australia. From this population, I selected sixteen universities using a maximum variation stratified purposeful sampling approach (Lincoln & Guba, 1985; Patton, 2002). Purposeful sampling involves selecting cases for a theoretical purpose rather than one of representativeness and randomness (Guba & Lincoln, 1989). It aims to ensure maximum variation between the selected university cases by selecting cases for study based on diverse, identified characteristics. Multiple cases were chosen to enable broader exploration of the overarching research question and to create more robust theoretical explanations and elaborations as the theoretical propositions are likely to be more deeply grounded in varied empirical evidence (Eisenhardt & Graebner, 2007). By studying cases in approximately one-third of the university population, my study was designed to yield more robust and testable theory than a single case would yield (Eisenhardt & Graebner, 2007).

The sampling process commenced with a review of possible selection characteristics. The parameters for the stratification process are presented in Table 5.2 below. This table includes data on university age, size (student numbers and total revenue), location, research intensity ratings, teaching quality ratings, type of University network, university complexity and an IT governance maturity rating. These attributes were identified from the Good Universities Guide Australia for 2008 (Good Universities Guide, 2008), and the statistics on higher education available from the Department of Education, Employment and Work Place Relations for the year 2007 (Department of Education, Employment and Work Place Relations, 2008). The items chosen were considered by these two sources as representative of the diversifying characteristics associated with Australian universities.

I selected university complexity as an appropriate stratification characteristic as the complexity rating is a combination of a university's IT profile, structure, and costs (Council of Australian Directors of Information Technology, 2008). For the second stratification characteristic, I selected IT governance maturity rating. This rating was based on expert perception of each university's IT governance processes. This rating was particularly relevant to this study as I wanted to ensure that universities with different ITG maturities were included in the sample.

Cases were selected based on university complexity and ITG maturity. The university complexity rating was developed by The Council of Australian University Directors of IT (CAUDIT) and reflects an index that runs from 1 (low complexity) to 10 (high complexity). CAUDIT use four dimensions (staff, students, research and geography) to rate complexity and combine these scores to determine an overall complexity index value for each university (Council of Australian University Directors of Information Technology, 2008). The complexity index value for each university is determined by measuring the complexity of IT resourcing at each university. Complexity is determined by considering the IT demands of staff and students for teaching and research purposes, the number and size of campuses over which a university has to function and the distance between campuses which results in increased duplication of IT services (Council of Australian University Directors of Information Technology, 2008).

Since I was interested in IT governance, the second stratification criteria chosen was IT governance maturity or how established and refined IT governance processes were. This maturity level was based on the expert opinion of a university IT director with extensive knowledge of Australian universities and their IT governance processes.

The director categorised all thirty-seven public universities into three broad categories of IT governance maturity, namely well established (WE), established (E) and not well established (NWE).

Table 5.2 **Australian public universities - diversifying attributes**

UNIVERSITY CODE	AGE[1]	SIZE[2]	NETWORK[3]	LOCATION[4]	RESEARCH INTENSITY[5]	TEACHING QUALITY[6]	IT GOVERNANCE MATURITY[7]	COMPLEXITY[8]
ACU	Very Young	Medium	NGU	MM	Very Poor	Good	NWE	Low
ADELAIDE	Very Old	Medium	GO8	MM	Very Good	Good	NWE	Medium
ANU	Very Old	Very Large	GO8	MM	Very Good	Very Good	E	Medium
BALLARAT	Very Young	Medium	NGU	R	Poor	Satisfactory	E	Low
CANBERRA	Very Young	Small	NGU	MM	Satisfactory	Good	NWE	Low
CDU	Very Young	Small	NN	R	Satisfactory	Poor	NWE	Low
CQU	Very Young	Large	NGU	M & R	Very Poor	Very Poor	NWE	Low
CSU	Very Young	Large	NN	R	Poor	Poor	NWE	Low
CURTIN	Very Young	Large	ATN	M & R	Satisfactory	Good	WE	Medium
DEAKIN	Mature	Large	NN	M & R	Satisfactory	Satisfactory	E	Medium
ECU	Very Young	Medium	NGU	M & R	Poor	Poor	NWE	Low
FLINDERS	Old	Medium	IRU	MM	Good	Good	NWE	Low
GRIFFITH	Mature	Large	IRU	MM	Satisfactory	Good	WE	Medium
JCU	Mature	Medium	IRU	R	Poor	Satisfactory	WE	Low

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[1] Very Old=>60 yrs; Old=41-59 yrs; Mature=31-40 yrs; Young=21-30 yrs; Very Young=<20 yrs Actual ages identified and classified in following categorizations to assure anonymity of universities (Australian Education Network, 2007b).

[2] Very Large=Equivalent Full-time Student unit (EFTSU)>40K and Total Revenue (TR) >$600M; Large=EFTSU 25-39K and TR $400M to<$600M; Medium=EFTSU 10 to<25K and TR $200M< $400M; Small=EFTSU <10K & TR<$200M (Department of Education, Employment and Work Relations, 2008).

[3] Group of Eight (GO8), Australian Technology Network (ATN);Innovative Research Universities (IRU); New Generation Universities (NGU); No Network (NN) (Australian Education Network, 2007a).

[4] Metropolitan &Regional (M&R), Mostly Metropolitan (MM), Regional (R) (Australian Education Network, 2007a).

[5] Research Intensity rating (Good Universities Guide, 2008).

[6] Teaching Quality rating (Good Universities Guide, 2008).

[7] An expert's opinion of IT governance maturity of each university. Categorised as WE=Well established ; E=Established; NWE=Not well established.

[8] Univeristy complexity rating developed by the Council of Australian Directors of IT (Council of Australian Directors of Information Technology, 2008).

UNIVERSITY CODE	AGE[1]	SIZE[2]	NETWORK[3]	LOCATION[4]	RESEARCH INTENSITY[5]	TEACHING QUALITY[6]	IT GOVERNANCE MATURITY[7]	COMPLEXITY[8]
LA TROBE	Old	Large	IRU	M & R	Satisfactory	Satisfactory	NWE	Medium
MACQUARIE	Old	Large	IRU	MM	Good	Good	E	Medium
MELBOURNE	Very Old	Very Large	GO8	MM	Very Good	Very Good	WE	High
MONASH	Old	Very Large	GO8	M &R	Good	Very Good	WE	High
MURDOCH	Mature	Medium	IRU	MM	Satisfactory	Very Good	NWE	Low
NEWCASTLE	Old	Medium	IRU	R	Good	Satisfactory	E	Medium
QUT	Very Young	Large	ATN	MM	Good	Poor	WE	Medium
RMIT	Very Young	Large	ATN	MM	Satisfactory	Good	E	Medium
SCU	Very Young	Small	NGU	R	Satisfactory	Satisfactory	NWE	Low
USC	Very Young	Small	NGU	R	Very Poor	Satisfactory	NWE	Low
SWINBURNE	Very Young	Medium	NN	MM	Satisfactory	Good	NWE	Low
SYDNEY	Very Old	Very Large	GO8	MM	Very Good	Very Good	NWE	High
TASMANIA	Very Old	Medium	NN	M & R	Good	Good	NWE	Medium
UNE	Very Old	Small	NN	R	Satisfactory	Good	NWE	Low
UNISA	Very Young	Medium	ATN	M & R	Satisfactory	Satisfactory	WE	Medium
UNSW	Very Old	Large	GO8	MM	Very Good	Very Good	NWE	High
UQ	Very Old	Very Large	GO8	MM	Very Good	Very Good	WE	High
USQ	Very Young	Small	NGU	R	Poor	Poor	WE	Low
UTS	Very Young	Medium	ATN	MM	Satisfactory	Very Good	E	Medium
UWA	Very Old	Large	GO8	MM	Very Good	Very Good	NWE	Medium
UWS	Very Young	Large	NGU	MM	Satisfactory	Satisfactory	NWE	Medium
VU	Very Young	Medium	NGU	MM	Poor	Satisfactory	NWE	Low
W'GONG	Mature	Medium	NN	R	Good	Very Good	E	Low

Please refer to the prior page for details of the footnotes.

By selecting at least one university from each cell, I sought to ensure I gained a theoretically diverse set of universities based on their IT governance needs (complexity) and IT governance responses (maturity) As there were no universities who were stratified as being highly complex and having established ITG processes, no university cases could be selected from this stratum. Table 5.3 provides details of the strata into which the population of Australian universities were categorized.

Table 5.3 **Population of Australian universities stratified by ITG maturity and university complexity**

University Complexity / ITG Maturity	High Complexity	Medium Complexity	Low Complexity	Totals
Well Established IT Governance Processes	- Monash - Melbourne - UQ	- Curtin - Griffith - QUT - UniSA	- JCU - USQ	9
Established IT Governance Processes		- ANU - Deakin - Macquarie - RMIT - Newcastle - UTS	- Ballarat - W'gong	8
Not so Well Established IT Governance Processes	- UNSW - Sydney	- La Trobe - Adelaide - UWA - UWS - Tasmania	- ACU - CDU - CSU - ECU - Flinders - Murdoch - SCU - Swinburne - Canberra - UNE - VU - CQU - USC	20
Totals	**5**	**15**	**17**	**37**

5.3.3.3   Determining potential Interview participants in each case

In order to gather rich data, I developed a list of common potential participants for all cases who I considered would be most knowledgeable about IT governance and board processes. Eisenhardt and Graebner (2007, p.28) indicate that it is best to "*interview numerous and highly knowledgeable informants who view the focal phenomena from diverse perspectives, that is, they should be from different hierarchical levels, functional areas or are outside observers of the processes.*"

The Vice-Chancellor in each university was identified as being ultimately responsible for the IT governance processes. He/she generally relies on the Deputy VC responsible for IT operations and the IT director for advice and support of the successful implementation of ITG processes. The Vice-Chancellor takes direction from the governing body generally through the chair (Chancellor).

Eisenhardt and Graebner (2007) indicate that using numerous and highly knowledgeable participants who view governance from diverse perspectives assists the richness and breadth of each case. I thus sought to interview participants from three groups, namely external governing body members, internal governing body members and university executive management (Eisenhardt, 1989c). These groups were chosen as they were the most likely to be knowledgeable about university board IT governance processes, were likely to attend governing body meetings and were responsible for implementing IT governance processes within each university. The aim of determining the three classes of potential participants was to try to ensure that similar participants were interviewed at each university. This increases the replication rigour of the case data and assists in ensuring comparisons across cases are valid (Yin, 1994). The participants sought in each university case are shown in Table 5.4 below.

Table 5.4   **Potential interview participants**

Participant Groups	Interview Participants Sought
External Governing Body members (Independent of the University)	Head of Governing Body (Chancellor), other University Governing Body members not employed by the university.
Internal Governing Body members (Members of University Staff)	Internal Governing Body members (members of university staff who also sit on the governing body).
University Executive Management	Vice-Chancellor (CEO), Deputy Vice-Chancellor responsible for IT or equivalent, Head of University Governance or equivalent, IT Director (CIO) or equivalent, IT governance committee members, Other IT management

While all potential positions were deemed important to the study, I found some were more difficult to access. The governing body chair (Chancellor) and external governing body members were harder to contact and arrange interviews with, but where I was able to interview them, they provided rich descriptive data on the board's (governing body) role in ITG processes within the university. Another limitation with data collection was that not all Vice-Chancellors of participating universities would allow me to contact their Chancellor and/or external board members. Vice-Chancellors posited that an interview would impinge on external board member's time.   Similarly, most Vice-Chancellors did not accept my invitation to be interviewed. The Vice-Chancellors who did participate were very informative about the IT governance processes of their university and the role of the board within these processes.

5.3.4   *Data collection protocol & processes*

The data collection protocol involved (1) inviting universities to participate in the study, (2) inviting potential interviewees within participating universities and (3) developing the data collection processes associated with the semi-structured interview protocol and the secondary documentation collection methods. This process was designed as part of the case study protocol in Appendix 5 item 1 (Yin, 1994).

5.3.4.1   Inviting universities to participate in the study

Following the categorization of universities (see table 5.5); I randomly chose two universities from each cell (with the exception of the empty cell) and invited them to be part of the study. Sixteen universities were invited to participate.

Ethical approval (QUT Ethics Approval No.: 0800000483) was received prior to inviting universities or commencing data collection. Vice-Chancellors from the selected universities were sent an invitation to participate. The letter (Appendix 5 item 2) outlined the purpose of the study, the methods of data collection, and the potential interviewees. Along with the letter, Vice-Chancellors were also provided with the participant information sheet (Appendix 5 item 6) and a permission advice slip (Appendix 5 item 4) that they could sign and return by fax or email. This was considered an important factor in the success of the research as a copy of the signed permission advice slip was sent to potential interviewees to convey top management support for the project.

Eleven universities agreed to participate and five universities declined. Table 5.5 below provides a summary of sampling characteristics of the participating universities. It highlights that I was able to secure participation from universities drawn from all theoretically important combinations of university complexity and ITG maturity. In three strata, two universities agreed to participate and that in the remaining five strata, one university agreed to participate. Vice-Chancellors took between one day and four months to decide to participate in this research study.

***Table 5.5*   Participating universities – across sampling categories**

University Complexity / ITG Maturity	High	Medium	Low	Totals
Well established IT Governance processes	2	1	2	5
Established IT Governance processes	[empty cell]	1	1	2
Not Well Established IT Governance processes	2	1	1	4
Totals	4	3	4	11

Table 5.6 below provides a summary of the key characteristics of each of the universities participating in the study. It highlights the diversity of the cases in the sample. Universities were coded as A, B, C, etc and the characteristics about each university were coded into bands to protect the identity of each university.

Table 5.6 **Summary of key attributes of university cases**

Cases	Age[1]	Size[2]	Network[3]	IT Structure[4]	ITG Maturity[5]	University Complexity[6]
A	Mature	Medium	IRU	Decentralised	Well Established	Low
B	Very Young	Small	NGU	Federal	Well Established	Low
C	Very Old	Very Large	GO8	Federal	Well Established	High
D	Very Young	Medium	NGU	Federal	Not Well Established	Low
E	Very Young	Large	NGU	Federal	Not Well Established	Medium
F	Very Old	Large	GO8	Decentralised	Not Well Established	High
G	Very Young	Medium	NGU	Centralised	Established	Low
H	Very Old	Very Large	GO8	Decentralised	Not Well Established	High
I	Old	Very Large	GO8	Decentralised	Well Established	High
J	Very Young	Large	ATN	Centralised	Well Established	Medium
K	Mature	Large	NN	Decentralised	Established	Medium

5.3.4.2   *Potential interviewees*

After gaining the Vice-Chancellor's or delegate's consent, I emailed a table to the Vice-Chancellor's office (or delegate) seeking the details (name, title, position, phone number, email address) of potential participants (See Appendix 5 item 7).

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[1] Very Old=>60years; Old=41-59 years; Mature=31-40 years; Young=21-30years; Very Young=<20years. Actual ages identified and classified in following categorizations to assure anonymity of universities (Australian Education Network 2007b).

[2] Very Large=Equivalent Full-time Student unit (EFTSU)>40K and Total Revenue (TR) >$600M; Large=EFTSU 25-39K and TR $400M to<$600M; Medium=EFTSU 10 to<25K and TR$ 200 to<$400M; Small=EFTSU <10K & TR<$200M (Department of Education, Employment and Work Relations, 2008).

[3] Group of Eight (GO8), Australian Technology Network (ATN); Innovative Research Universities (IRU); New Generation Universities (NGU); No Network (NN) (Australian Education Network, 2007a).

[4] Assessment from interview data.

[5] An expert's opinion of the IT governance maturity of each university. Categorised as WE= Well established ; E=Established; NWE= Not well established.

[6] Univeristy complexity rating developed by the Council of Australian Directors of IT (Council of Australian University Directors of Information Technology, 2008).

Participating universities returned this information to me and each person identified in the table was emailed a personal invitation letter outlining the research study, its motivation and information about the semi-structured interview processes (see Appendix 5 items 3 and 5). The potential participants were also provided with a participant information sheet (see Appendix 5 item 6) that contained details of the project, potential ethical considerations, the university ethical approval number and also with a copy of the Vice-Chancellor's signed permission slip.

People who agreed to participate returned a signed consent form. Once this consent was received, I arranged a suitable time and place for the interview and they were included on an interview schedule for that case (see Appendix 5 item 7). Participants were reminded of the objectives of the interview at the start of each interview and were reminded that they could withdraw from the interview or not answer any of the questions at any point during the interview.

Tables 5.7 and 5.8 below categorise interview participants across the sampling criteria and according to each case (i.e. university).

Table 5.7 **Interview participants across the theoretical sampling strata**

University Complexity / ITG Maturity	High Complexity	Medium Complexity	Low Complexity	Totals
Well established ITG processes	9	6	11	26
Established ITG processes	Empty cell	1	5	6
Not well established ITG processes	5	2	3	10
Totals	**14**	**9**	**19**	**42**

Table 5.8 **Interview participants across university cases**

| Cases | Governing Body Members | | University Executive Management | | | | | |
	Chair	Governing Body Members	Vice-Chancellor	DVC- IT or equivalent	Head of Governance or equivalent	IT Director	Other IT managers	Total
A	D	2	D	2	1	1	NS	6
B	NP	NP	D	1	1	1	2	5
C	NP	NP	NP	1	1	1	2	5
D	D	1	D	NP	1	1	NS	3
E	NP	1	NP	D	NP	1	NS	2
F	NP	NP	NP	NP	1	1	1	3
G	1	1	1	1	NP	0	1	5
H	NP	1	NP	NP	NP	1	NS	2
I	NP	2	D	1	NP	1	NS	4
J	1	1	1	1	1	1	NS	6
K	NP	NP	NP	NP	NP	1	NS	1
Total	**2**	**9**	**2**	**7**	**6**	**10**	**6**	**42**

D = Declined invite, NP = Not given permission to invite, NS =Not sought for interview

5.3.4.3   Developing & using the semi-structured interview protocol

Data collection processes were designed to capture the observable experiences of participants (the empirical domain) so that I could isolate patterns of events (actual domain) to assist with the identification of the generative mechanisms in the real domain. Since I was using a multi-theoretic approach, the data collection instruments needed to be sufficiently broad and flexible to be able to gather data about both the IT governance processes of universities and patterns about the theoretical principles underlying boards and how they govern IT. I chose semi-structured, open-ended interviews as my primary method of data collection.

Before developing the interview protocol, I conducted a focus group session with a number of university IT directors at a Council of Australian University Directors of Information Technology (CAUDIT) annual general meeting in Christchurch New Zealand. This helped me to more clearly understand the IT governance processes at Australian universities. I deepened this understanding by observing one university's IT

governance committee processes during 2007/2008. Together with my reviews of the literatures, these steps allowed me to identify relevant issues and a series of questions that formed the basis of the interview protocol (see Appendix 5 item 8).

The interview protocol was designed to guide the interviews and to prompt me to record the contextual environment of each case. The semi-structured nature of the guide aided consistency by detailing the procedures and requirements to be followed during data collection while still providing for flexibility in the interview as required by my approach (Yin, 1994). The exact questions and their wording and sequence were left to my discretion (Ritchie & Goeldner, 1994; Corley & Gioia, 2004) and the protocol was reviewed as each new case study and interview was undertaken. These additions reflected new themes that emerged as a result of the continuing iterations between data and theory (Yin, 1994, Eisenhardt, 1989c). Table 5.9 provides one example of the theoretical elements being investigated within each theory, the evidence expected to be collected and the semi-structured interview questions developed to gather this evidence. The full table associated with this development is located in Appendix 4.

Table 5.9   Development of the semi-structured interview protocol

Theory Elements (Generative Mechanisms)	Theory Constructs (Theoretical Events)	Expected Evidence gathered from Interviews (Theoretical Experiences)	Interview Questions developed to gather the expected data
AGENCY THEORY			
Self-Interested behaviour of the Agent	**Information Asymmetry- agent deliberately does not share information with university or governing body/principal**	Evidence that the agent chooses not to disseminate information to the university and principal/governing body	• Do you think university management provide sufficient information up to the governing body for them to make decisions?
STEWARDSHIP THEORY			
Owner/governing body clearly specifies to the steward how they should govern IT	**Governing body is able to clearly specify on behalf of the owners how IT should be governed within the university**	Evidence that governing body/owners have established a clear direction on how stewards should govern IT.	• Do you find the governing body is particularly interested in IT issues, that is, are they proactive in their views of IT?
RESOURCE DEPENDENCE THEORY			
Outside Governing body members provide preferential access to external IT resources and knowledge	Outside governing body members link the university governing body to external IT resources	External governing body members assisted the governing body with access to external IT resources and knowledge	• So you think IT skills on the governing body are essential? Do you think that's really helped the governing body's understanding of IT issues?

5.3.4.4   The interview process

Semi-structured in-depth interviews using open-ended questions and probes were conducted with 42 participants across 11 universities between September 2008 and February 2009. Interviews lasted between 25 and 45 minutes. Interviews commenced with introductory statements about participation and the project before participants were asked the open-ended questions about each of the research issues.

By using interviews involving open-ended questions, participants were given the opportunity to respond in their own words, rather than being forced to choose from fixed responses (Yin, 1994; Eisenhardt, 1989c). Open-ended questions of this type have the ability to evoke responses that are meaningful to the participant, unanticipated by the researcher, rich and explanatory in nature (Yin, 1994). This approach also allowed me the flexibility to probe initial participant responses, that is, to ask why or how. By listening carefully to what participants were saying, I was able to engage with them according to their individual personalities and styles, and use "*probe*s" to encourage them to elaborate on their answers (Patton, 2002). To maintain consistency, I conducted all of the interviews (Corley & Gioia, 2004). To ensure the research rigour of interviews, I conducted the first two interviews with my supervisor observing and had a debriefing session at the end of each interview to assist me to improve my interview technique and to add any additional probes required to the interview protocol (Yin, 1994; Patton, 2002)

The interviews were recorded and transcribed verbatim to improve the reliability of the data collected and to facilitate participant verification of the interview data prior to analysis. Transcripts were emailed to interview participants for review and returned with any suggested changes. The revised interview transcripts were use in the data analysis process.

All data was recorded in a document database in order to clearly organize, track and document the data collection process. Yin (1994) indicates that building a document database considerably improves the strength of the case study research and the data collection process. The document database is included in Appendix 5 item 9. Details about the conduct of the interviews were recorded in this database including date, time, place, length of interview, file names, dates sent for verification, and so on.

The database indicates that thirty-one interviews were conducted personally with the participants at either the university main campus or other agreed location. Eleven interviews were conducted over the telephone. Field notes, including diagrams, were also taken during interviews to support the data collection process and help with the overlapping of data and analysis; these are also identified in the document database. Participants agreed at the interviews that I could contact them for additional information if required. This assisted me to achieve flexible and opportunistic data collection methods.

5.3.4.5   Collection of supporting documentation

In order to triangulate the interview data and to gain additional insights on university IT governance processes, the data collection protocol included collecting documents from university websites, annual reports, the University Act under which each university was established and federal government websites relating to the governance and funding of universities. Records of the items collected at each university formed part of the document database in Appendix 5 item 9. Collection of these additional documents helped to assist the rigor of the data collection process and to support the validity of data collected from the interview processes. The secondary documents were used to triangulate with the interview data in the cases presented within the results in chapters 6 and 7.

5.3.5   Data analysis processes

The data analysis stage was guided by my ontological and epistemological approach of critical realism. Suddaby (2006, p.636) indicates that "*a realist ontology rests on the assumption that the variables of interest exist outside individuals and are, therefore, concrete, objective, and measurable*". Thus, I used naturalistic inquiry methods developed by Lincoln and Guba (1985) and the constant comparison techniques emanating from the grounded theory approach of Glaser and Strauss (1967).

The approach to data analysis is best described as qualitative, inductive theory elaboration in that it elaborates theoretical links not previously addressed in the IT governance or corporate governance literatures (Eisenhardt, 1989c; Glaser & Strauss, 1967; Lee, 1999;

Lee, Mitchell & Sablynski, 1999, Charmaz, 2008). It involved a constant comparison approach that emanates from the work of Glaser and Strauss (1967); Strauss (1987). This method is important in developing theory that is grounded in data (Boeije, 2002). Data from my many different sources were repeatedly compared with each other and theories to discern major categories, dimensions, themes, or processes (Corley & Gioia, 2004; Gioia, Thomas, Clark & Chittipeddi, 1994). Constant comparison involves simultaneous data collection and analyses processes; it contradicts the myth of a clean separation between data collection and analysis (Suddaby, 2006). Specifically, I sought to critically evaluate emerging theoretical constructs against ongoing data observations from further cases (Eisenhardt, 1989c; Dooley, 2002; Locke, 2007). I sought *"not to make truth statements about reality, but, rather, to elicit fresh understandings about patterned relationships between social actors and how these relationships and interactions actively construct reality"* (Suddaby, 2006, p.636). This approach is most relevant to this study as IT governance is an interesting phenomenon which has little or no theoretical explanation (see the review of relevant ITG literature in chapter 2).

Data from the 11 cases, including interview transcripts and supporting archival and electronic documents, were repetitively reviewed, coded, categorized, and studied for content and meaning until patterns emerged and content saturation had been reached (Agar, 1986; Miles and Huberman, 1984; Spradley, 1980). The data was analysed iteratively using a constant comparison approach which iterated between the data from the 11 cases and the key a priori constructs identified in the review of literature on three corporate governance theories in section 5.2. Yin (1994) indicates that when iterating between data and rival theoretical propositions, it is important to realise that each theory involves a pattern of independent variables that is mutually exclusive. Thus when coding interview data, the data can be coded to only one theoretical construct, not multiple constructs, which should result in either one theory or another becoming prominent or theories being applied simultaneously (Eisenhardt, 1989c, Dooley, 2002; Locke, 2007). To ensure that the prior knowledge of these three theories did not contaminate my data analysis I tried not to adhere too closely to one single substantive area but focused on several substantive areas that are frequently reflected in the reality of University ITG operations (Suddaby, 2006). The key areas of substantive research were IT governance processes, board processes, agency theory, stewardship theory, and resource dependence

theory. Data collection was ceased at 11 cases as theoretical saturation of data across the university sector had been reached (Eisenhardt, 1989c; Yin, 1994).

The research study focused on elaborating on existing corporate governance theories; that is, determining the context in which these theories applied rather than developing a new theory of ITG. This would allow me to conclude if one of the theories dominated the explanation of board IT governance processes or whether multiple theories could be operating simultaneously as generative mechanisms. I understood that whilst I paid attention to extant corporate governance theories, I also constantly reminded myself that I was only human and what I observed was a function of who I am and what I hoped to see (Suddaby, 2006). I used analytical replication to determine whether the emerging relationships identified from the data of the early cases were confirmed or disconfirmed in the remainder of the cases (see Figure 5.1 and Table 5.1) (Gilbert, 2005; Eisenhardt, 1989c; Yin, 1994). The development of case reports which established within-case themes assisted me to identify theoretical patterns emerging from each case during the data collection processes.

To analyse each interview transcript, I used a two-step coding system. I derived codes inductively from the interviews to identify concepts or themes related to agency theory, stewardship theory or resource dependence theory (Corley & Gioia, 2004). Using this coding approach, each word, sentence, paragraph and passage was considered for its link to each of the three theories and their themes. This lower level coding aimed to ensure all aspects of the interviews were conceptually coded using Nvivo8 based on relevant simple descriptive phases which related to the three theories (Strauss & Corbin 1990). As the researcher, I was instrumental in interpreting the data and making the key decisions about which lower order concept was most closely related to the data (Kreiner, Hollensbe & Sheep, 2009; Suddaby, 2006). My in-depth understanding of the IT governance literature and my observations of university IT governance committee operations at one university assisted me to make these decisions. The constant comparison method employed in this study relied on my sensitivity to the tacit elements of the data and the meanings and connotations that emerged from the data from each iterative examination (Gioia et al., 1994; Eisenhardt, 1989b).

After the lower order concepts had all emerged from the data, I engaged in axial coding, where I searched for relationships between the first order concepts I had identified in the first stage (issues) and the a priori theoretical constructs (themes) of each of the three theories. This allowed me to assemble these lower order concepts into higher order (or second order) theoretical themes. Finally I linked the second order themes up to higher order theories so as to provide detailed evidence of each theory's mechanisms and its relationship to IT governance data (Eisenhardt, 1989c; Dooley, 2002). The analysis of the data also followed Eisenhardt's (1989c) application of building theory from case study research process (see table 5.1). The within-case analyses illustrate the data analysis process and how the concepts emerged from the study. These will be presented in chapters 6 and 7.

5.3.6 Chain of evidence processes

Appendix 6 presents the chain of evidence tables associated with the analysis of qualitative data. The tables highlight the links between the coding of interview data using Nvivo 8 software and the qualitative ratings presented in the results chapters 6 and 7 (see tables 6.1a-6.1d and 7.1a-7.1d). The number of interview sources and the number of interview references identified in the appendix 6 tables (Nvivo 8 coding) are not directly linked to the qualitative rating given for each issue. This data is presented to identify the prevalence of the evidence linked to each of the themes and associated issues for each theoretical mechanism across all 11 cases.

The qualitative ratings presented in the tables in Appendix 6 and the tables in chapters 6, 7 and 8 were determined based on my analysis of the individual relevant interview statements within each theme of the theories. The qualitative ratings presented in the six tables represent a *qualitative* assessment of how the interview statements represent high, medium or low evidence of each theme and thus each mechanism of the corporate governance theories. The chain of evidence process explaining the links between the data coding and the final qualitative ratings for each theme within each theoretical mechanism for the eleven cases is presented as follows.

For example, in table 1 of Appendix 6, cases A, F and J were ranked *qualitatively* as high (H), medium (M-) and low (L) respectively for the '*conscious self-interest of the agent*

mechanism' of agency theory. Within table 1, case A had a total of '15' interview references and a high qualitative rating, Case F a total of '3' interview references and medium qualitative rating and Case J a total of '3' interview references and a low qualitative rating for the theme of '*Information asymmetry exploited by the agent*'. The high rating for case A was determined based on considerable evidence from five interview sources of management not providing information to the governing body/principal on ITG issues. Evidence of this poor information dissemination is demonstrated in the following examples. These statements provide the chain of evidence of this rating for this case for this agency theory theme.

> "*No I don't think we communicate well to the [governing body] at the moment*, *but I think we are improving, but I think we need to do better than we are.*" (SDVC)

> "*There are times when I wonder if we are being told the whole truth*" (GBM)

> "*It was not in depth when it arrived to [the governing body]*. *It was simply part of the Vice-Chancellor's discretionary arrangements so it had certainly been costed at Faculty level*, *I'm just trying to remember what we saw, it was not an awful lot*." (GBM)

In comparison, the medium rating determined for case F was based on the evidence of two sources who indicated that management appeared to be providing some information to the governing body but the quality of that provision was not strong. Thus information asymmetry was occurring but was not as 'high' as case A. The following examples provide the chain of evidence of this rating for this case for this theme of agency theory.

> "*[Governing body] really doesn't have a big role here in terms of nitty, gritty projects, even down to the stage*, *I mean they are aware that there is an IT change program going, we provide them with some sort of newsy snippets like I've just done, there's one going in.*" (ITD)

> "*I've never heard of us putting something to the chancellor.*" (OITM)

The low qualitative rating for case J emanates from the evidence in that there is a definite flow of information between management and the governing body, but that this flow could still be improved. Thus information asymmetry is not as great an issue in this case when compared to case A. There was also evidence within this case of evidence of low levels of information asymmetry in relation to dissemination of information between IT

management and the university community. The following statements provide the chain of evidence of this rating for this theme for this case.

> *"I mean I don't know,* **sorry I am sure it could be improved but there is a flow definitely.** *As I said we've asked for more,* **so they've come in and presented to us and we've said no you have to provide us written papers, so we've demanded things of them [IT management]."***(GBM)*

> **"I've seen it only with internal audit and we did comment on it there because there were some things out of the ordinary, so we did comment on that one"** *(GBM)*.

Further examples of interview statements which rate qualitatively as 'high' are provided in the examples of coding and the illustrative cases for each theme and mechanism presented in the within-case analyses in the following two chapters.

5.4   Summary

This chapter outlines the method used in my qualitative study of Australian university IT governance processes. The chapter justified the use of a qualitative study and provided an overview of three key corporate governance theories (agency theory, stewardship theory and resource dependence theory) that may provide an answer to my overarching research question **"How do boards govern IT?"**   My qualitative study aims to provide insight into how well traditional corporate governance theories may potentially explain board governance of IT and shed some light on the processes, structures and relational mechanisms identified in the Enterprise governance of IT framework (Van Grembergen, De Haes & Guldentops, 2004; De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2009b; Ko & Fink, 2010). This provided a strong theoretical framework on which the study could proceed.

The chapter proceeded to discuss in detail the qualitative method used for this study. This discussion included the development and operationalisation of the case study research design, the selection of cases, the selection of potential interview participants, the development of the data collection protocol and processes, development of the interview protocol, the interview process and the data methods.   The chapter also focused on the methods used to assure quality within the data collection processes and the data analysis processes. The chapter finishes with a discussion of the chain of evidence processes for

the qualitative study, linking the data coding to the qualitative assessments presented in the following chapters. Chain of evidence tables are included in Appendix 6 to illustrate this process.

As a result of the data collection processes and the analysis of this data using Nvivo 8 software, the within-case results from this study are presented in chapters 6 and 7 and the cross-case analysis of the qualitative study in chapter 8.

Chapter 6

Analysis of Agency Theory Mechanisms

6.1   Introduction

The results of the analysis of the qualitative study outlined in chapter 5 will be discussed in this chapter and chapter 7. I sought to analyse the data in light of three rival corporate governance theories (agency, stewardship or resource dependence theory). My aim was to identify if any theory explained board governance of IT within Australian universities or whether two or more theories operated simultaneously and, if so, in what context. The chapter commences with a review of the key attributes of each case (section 6.2) before I outline the within-case results of agency theory and its related mechanisms in sections 6.3 and 6.4. The chapter concludes with a discussion of evidence for agency theory as an explanation for IT governance in section 6.5. This forms the basis for a comparison with stewardship and resource dependence theories (chapter 7) and for my cross-case analysis (chapter 8).

I follow Pratt (2009) and Weick (2007) in presenting my results. Excerpts from the interviews (i.e. raw data) are used to corroborate in-depth discussion of the trends and emerging themes. Similarly, interview data are triangulated with archival data and interpreted in light of theory (Pratt, 2009; Weick, 2007). I also identify how the classification process provides new theoretical insights into the three rival corporate governance theories (Pratt, 2009). The framework for the results is consciously inductive and the voices of the individual participants studied are clearly represented within the examples of coding and illustrative cases of each of the theoretical themes in this chapter and chapter 7 (Pratt, 2009; Weick, 2007). While some tables are included in the cross-case analysis in chapter 8 they have been kept to a minimum and are presented using a qualitative rating approach of high, medium and low (Pratt, 2009).

Results are structured so my position in the field is clear and indicates how I arrived at my findings. This is achieved by showing *what interview participants said* (first order codes) and *how these were linked to second order themes* and *resultant theoretical mechanism*s (Eisenhardt, 1989c; Dooley, 2002; Pratt, 2009). I have also included my interview protocol and examples of interview questions in Appendix 5 to provide a clear chain of evidence from my results to the key theories (Pratt, 2009). Within the results, names of committees, people, governing bodies are replaced with a generic term in square brackets to maintain anonymity of individuals and universities. Similarly, excerpts from the interview data are identified only by a generic title for each participant and the university network. The generic titles and university networks are described in the list of acronyms on page ix.

6.2 Overview of cases

Eleven universities agreed to participate in the study. In order to maintain anonymity, I referred to each participating university by a case letter only. I classified the key attributes of each case according to age, size, network, IT structure, ITG maturity and university complexity and these are shown in Table 5.6.

6.3 Within-case analysis of agency theory mechanisms

Agency theory is the predominant theory used to explain corporate governance and so has the potential to explain how University governing bodies deal with the governance of IT. Agency theory focuses on the relationship between a principal and agent and is generally operationalised in corporate governance research as the shareholder (principal) and manager (agent). While the agent in the university context is clear (management including the Vice-Chancellor), there is no equivalent position of shareholder. Instead, I consider that the federal and state governments jointly are the principal. This is discussed in more detail in section 5.3.3.1.

This section will focus on a detailed within-case analysis of agency theory within the ITG processes of the 11 cases. Figure 6.1 presents the coding structure for issues, themes and mechanisms suggested by agency theory. Sections 6.3–6.4 provide examples of the data that justify my classifications.
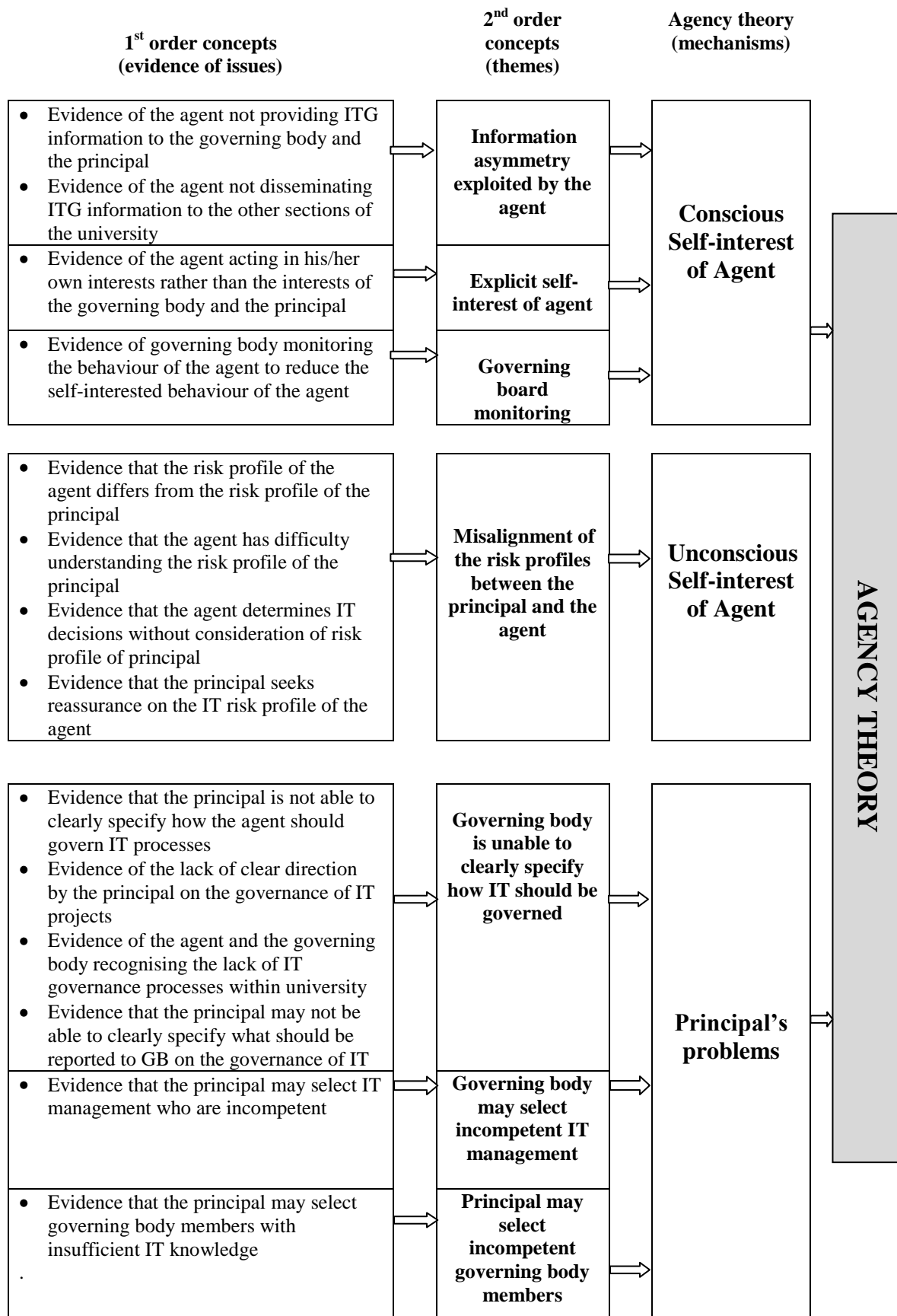
Figure 6.1   Agency theory analyses of qualitative interview data

6.4   Understanding agency theory mechanisms

Analysis commenced with a coding regime designed to reveal the applicability of agency theory to the governance of IT at Australian universities. Specifically, I coded data from the 11 Australian universities by looking for evidence of theoretical themes and mechanisms for agency theory. A summary of the evidence, themes and underlying mechanisms is provided in figure 6.1. The remainder of this section provides examples from interview data of evidence that agency theory can explain some aspects of the governance of IT within Australian universities. This evidence is subject to further review and analysis in the cross-case analysis (chapter 8).

6.4.1   The conscious self-interest of the agent mechanism

The conscious self-interest of the agent links evidence of agents (i.e. university management) acting opportunistically to further their own interests at the expense of the governing body and the principal, a classic implication of agency theory (Jensen & Meckling, 1976; Eisenhardt, 1989a; Shapiro, 2005). There were three key themes in the data that highlighted issues around conscious self-interest, namely information asymmetry, self-interested behaviour by the agent and the implementation of governance board monitoring designed to alter agent behaviour.

The first theme, exploitation of information asymmetry, involves the agent not sharing information with the governing body or other areas of the university to reduce scrutiny on management decision-making (Eisenhardt, 1989a; Shapiro, 2005). In this situation, the governing body may find it more difficult to obtain IT information (or information may be deliberately withheld by IT managers to reduce scrutiny on their IT actions). The second theme is most clearly self-interest with guile (Williamson, 1975; Eisenhardt, 1989a; Shapiro, 2005) and involves the agent explicitly acting in his/her own interests rather than the interests of the governing body/principal. The third theme involves the governing body monitoring the actions of the agent to reduce the agent's ability to exploit or strengthen his/her asymmetric position and thus remove opportunities for explicit self-interested actions on the part of management (Jensen & Meckling, 1976; Eisenhardt, 1989a).

These three themes are linked. That is, in situations of high exploitation of information asymmetry and uncertainty, agents are likely to behave in a consciously self-interested manner as they have superior information compared with the principal and they can exploit this superiority. Thus the expected pattern across the cases in this aspect of conscious self-interest is *high levels of information asymmetry* that result in *high levels of self-interested behaviour* by the agent. Additionally, self-interested behaviour will be more obvious to the governing body when mitigated by *high levels of governing body monitoring*.

The following sub-sections provide examples of the coding associated with each of these themes along with an illustrative case that describes the entire mechanism.

6.4.1.1　Information asymmetry exploited by agent

In several cases there was clear evidence that management was deliberately not sharing IT information with the governing body or other sections of the university. This created information asymmetry, a classic attribute of agency theory (Eisenhardt, 1989a; Shapiro, 2005; Hendry, 2002). As a result, management had an ongoing and superior level of knowledge of IT governance processes and decisions compared with the governing body. In several cases, management sought to exploit or strengthen this asymmetric position to increase self-interested actions. The universities exhibiting these behaviours were operating in a decentralised or federated IT structure. Two issues were linked to this theme as follows.

Agent not providing information to the governing body/principal

Considerable evidence from the cases highlighted that information asymmetry arose from management not providing information to the governing body. In over half of the eleven cases management were not providing this information because they did not consider the governing body needed to be well informed on IT governance issues; they considered IT governance as predominantly a management activity. Alternatively, sometimes the information asymmetry resulted from poor university management reporting processes to the governing body. Interview evidence indicated that the governing bodies were particularly susceptible to exploitation of information asymmetry. The universities

exhibiting this evidence were operating in a decentralised or federated IT structure. In a number of cases the governing body only responded to issues bought to their attention, thus management could conceal information from the governing body by withholding information on activities that it did not want scrutinized. The following interview excerpts provide examples of the coding for information asymmetry:

Examples of Coding:

> *"I think a good manager never gives the [governing body][1] all the information they want, but more the information they can manage." (GBM GO8)*
>
> *"Again relying on information that comes up to them [the governing body] historically I think. I mean to be frank more often than not probably **most of the time we just don't get reports on IT to the [governing body]**." (GBM NGU)*

Agent not disseminating ITG information to other sections of the university

In addition to managing information flows to the governing body, there were three cases where participants reported management withholding ITG information from other sections of the university. This issue was not as prevalent as managing information to the governing body. Withholding information allows key IT managers to act in their own best interests not the interests of the university as a whole. As with management of information to the governing body, this appeared to be either a deliberate strategy or a consequence of poorly developed communication processes around IT. For instance, despite having a dedicated ITG committee, some universities did not communicate IT decisions to other sections of the university effectively or efficiently. This situation occurred in universities operating in a decentralised or federated IT structure where communication was more difficult because IT information was more widely dispersed. The following excerpts illustrate coding for this aspect of information asymmetry:

Examples of Coding:

> *"**I think the area that we may not do so well in is communicating back,** so yes, we are happy to endorse things and see things, new initiatives take place and not that it is necessary the role of ICT governance to do that communication back, it is actually more so the people who are proposing those things, **but I don't think there is enough communication from the governance committee out** to the Deans, the Associate Deans, Learning and Teaching and people like that of what is actually been decided." (ITGM NGU)*

[1] Names of university governing bodies have been removed from all quotes to protect the anonymity of the university and have been replaced with the generic term [governing body].

> *"I probably think they don't have enough communication with those other committees.*
> *Yes, there is corporate knowledge because some people sit on those other committees, but in*
> *terms of a formal reporting structure to those committees it tends to sit out by itself a little.*
> *Again this is a communication issue. **Most of them come back to communication."** (ITGM*
> *NGU)*

6.4.1.2   Explicit self-Interested actions of the agent

A classic attribute of agency theory is the agent acting in his/her own interests rather than the interests of the principal (Jensen & Meckling, 1976; Eisenhardt, 1989a). This explicit self-interest manifests itself in self-interested decisions where the agent makes decisions that are not in the principal's best interests and shirking where the agent puts in less effort than agreed toward achieving the principal's objectives.

There was clear evidence of management self-interest in three of the 11 cases. Management focused on their IT interests rather than the IT direction or vision of the university as a whole when purchasing IT equipment and IT software resources. In this situation, management did not appear concerned about how these IT purchases were to be supported or governed. Data indicated that, in many universities, it was difficult to reduce this type of self-interested behaviour because faculties and divisions had their own budgets from which to purchase items (decentralised or federated IT structure). Combined with a lack of monitoring by the governing body and high information asymmetry, the governing body was not aware of this self-interest. The following excerpts provide examples of explicit self-interest:

Examples of Coding:

> *"**Each area has their own ideas about the systems they need and it's legitimate**. You know*
> *they are the business owners they know what they need to further the goals and the terms of*
> *reference for their business. **However, it does come back to IT actually supporting it."***
> *(DVCIT IRU)*
>
> *"**If you are in a Faculty or School, you are entitled** to do, either use us, a contract with us or*
> *to **do it yourself or get someone else to do** it. … **There is virtually no control** over how the*
> *faculties or schools spend their budgets in relation to IT." (ITD G08)*

Another example of self-interest with guile involved a case where management sought to delay the establishment of a governance structure, specifically an IT governance committee. This decision occurred because of the change associated with an upcoming

turnover in VC; management did not want to expend effort on establishing a committee that might later be changed or removed. This evidence of shirking (that is postponing change until they understood what the new VC was likely to support) again establishes management putting their interests ahead of the university. This was despite the ITG committee being considered by management as being an ideal forum for the university to establish. The following excerpts provide an example of coding on this issue:

Example of Coding:

> *"I think it was a combination of several things, weakly you could just say it was an indifference and there was an element of that, **I won't lie, but there was consideration of the fact that we were anticipating changing quite significantly with a new Vice-Chancellor** and as it turned out that has happened, there is significant organisational change in the university **but that should not have precluded us having this group meeting but it was all put on hold,** but as I said, an example has just come up where that would have been an ideal forum to have." (ITD NGU)*

Management self-interest also manifested itself in management not wanting the governing body to be involved in the governance of IT within the university. Management appeared concerned that a knowledgeable governing body would become too involved in IT governance processes and create problems for management. The following provides an example of coding on this issue:

Example of Coding:

> *"**The university [governing body],** I would say that **no it shouldn't [be involved in IT governance].** You **do not want your [governing body] to have a hands-on role with the university.** That's when you get lots of problems. That's not appropriate in my mind at all." (DVCIT IRU)*

6.4.1.3   Governing body monitoring

The final theme involving the conscious self-interest of the agent mechanism was evidence of active monitoring by the governing body. Active monitoring is important because it reduces information asymmetry, controls the self-interested behavior of the agent and so reduces agency costs for the organisation (Jensen & Meckling, 1976; Eisenhardt, 1989a; Shapiro, 2005). Evidence of monitoring by the governing body in the 11 cases included the development of performance indicators and measures of IT systems failure and performance. Some examples of the coding of the governing body monitoring are as follows:

Examples of Coding:

> *"We are given **annual reports on all sorts of things** as I said like security so particularly they've stopped X amounts of threats and downtime, **so we do see some [monitoring²].** But we don't look at sort of performance and efficiency; [the governing body sub-committee] looks at those sorts of sides. We are more an audit risk committee."* (GBM ATN)
>
> *"**Each organisational unit has its own operational performance targets from this year on.** Ours are around student numbers, staff numbers, and the amount of research money we pull in. For our IT Director it is around outage times, how old are the machines we've got. **I am sure he is concerned about his OPT's as I am about mine."** (GBM IRU)*

While the sample extracts reported above provide coding examples, my analysis was based on a holistic analysis of the hypothetical agency mechanism at play. In the case of conscious agent self-interest, the pattern expected was *high information asymmetry* between the principal and agent leading to *high levels of self-interested actions* by management and *high levels of monitoring* by the governing body/principal. Evidence of these three characteristics in a single case provides a clear example of an agency theory explanation for a case.

In the next section I detail a single case that illustrates these three characteristics. It provides a holistic example of the theory mechanism within a case, specifically the conscious self-interest of the agent.

6.4.1.4   *Illustrative case of the conscious self-interest of the agent*

IT governance difficulties caused by high information asymmetry were clearly evident at an IRU university and affected the governing body's role in the governance of IT. This university operated in a decentralised IT structure. Most participants indicated that management did not always provide sufficient information to the governing body for them to make decisions. This poor information dissemination made the governing body less trusting of management. The following comment from a senior manager highlights this issue:

> *"**No I don't think we communicate well to the [governing body] at the moment**, but I think we are improving, but I think we need to do better than we are."* (SDVC)

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² The name of a function was replaced with the generic term [monitoring].

Similarly, another manager indicated that information was controlled and that information flows were not free and unfettered:

> "*Well, I would have to say that one of the things that seems to happen on all big projects that come before a decision-making body is* **that you never ever get the full story.**" *(HG)*

Governing body members indicated that reporting to their governing body was not as detailed, open and frank as they would like and this made them less trusting of management.

> "*It's brought to the [governing body] usually through Finance but it is certainly brought to the [governing body] as to the implementation.* **There are times when I wonder if we are being told the whole truth**." *(GBM)*

> "**It was not in depth when it arrived to [the governing body]…..** *I'm just trying to remember what we saw*, *and it was not an awful lot.* **[The governing body] never asked any questions about it,** *nor were we provided any information about that. Should have probably actually, yeah I never gave it a thought.*" *(GBM)*

Some managers indicated that information asymmetry occurred because management saw IT as an operational issue and not within the role of the governing body:

> "*If you are doing your job right,* **the [governing body] don't have to discuss it.**" *(DVCIT)*

Others indicated that management has not yet worked out what the governing body really needs in terms of ITG information:

> "*…it is not through a desire to conceal,* **it's just that I think we are still getting the management act together** *to help the governance act out.*" *(SDVC)*

The only contrasting piece of evidence involved a recent, one-off large implementation project had been a standing item on the Vice-Chancellor's report to the governing body

> "**If you look at Vice-Chancellor's advisory committee report to the [governing body] you will see that the project is a standing item and it does get raised** *and it does get discussed in there, where it is up to and its costings etc.* *It's usually in the domain of the VC's report and it's discussed during that report and then it's accepted.*" *(GBM)*

The data in this case also revealed a very clear case of agent self-interest. In this case, management appeared to make decisions that furthered their personal agenda or the needs of their immediate university function even where this conflicted with the articulated vision of the university. This was particularly evident in purchase decisions in a decentralised IT structure. A senior manager indicated:

> *"Let's, take an example, International office wants us to do some serious client relationship management and decides they need some new software.* ***They might go out and buy it and next thing IT knows is that they have this software package they are expected to implement****. They would have paid for the software, but they certainly* ***have not paid for the maintenance and other costs****. Even the licensing they might have paid for, but they haven't paid for hardware or the IT time to implement it." (DVCIT)*

Having decentralised IT processes (i.e. with faculties and divisions determining their own IT spend) appeared to exacerbate this self-interested behaviour. For instance, two different managers commented:

> *"****Each area has their own ideas about the systems they need*** *and it's legitimate. You know they are the business owners they know what they need to further the goals and the terms of reference for their business.* ***However, it does come back to IT actually supporting it****. My university has been a very decentralised university and now we are starting to centralise some key IT resources." (DVCIT)*

and

> *"While we are starting to centralise in a whole raft of ways we now run a centralised mail system and we have a centralised learning management system and so* ***on there are some minor IT fiefdoms that have grown over time within some schools." (ITD)***

At this university, some management participants considered that the governing body should not have a hands-on role in relation to IT governance within the university as they saw it leading to unneeded scrutiny of management's IT decision-making. The decentralised IT structure in this university appeared to encourage this view. As one manager indicated:

> *"Rather than the [governing body] getting involved in the debate about whether we should have it and all that type of thing, because that's more about running the business of the university. Of course we would give reports to [the governing body] on major implementations perhaps like the [student system][3] or that, **but you do not want [the governing body] involved in the day to day governance of these types of activities**." (DVCIT)*

This case also highlighted the governing body moving to a more structured monitoring approach to reduce the high agency costs of information asymmetry and agent self-interested behaviour. Performance indicators and measures were introduced by the governing body in the year in which the interviews took place (2008). Triangulation with the university website indicated that key performance indicators (KPIs) had been established by the governing body to provide stronger monitoring of all university processes including IT. Evidence of the use of the KPIs for reporting purposes was also observed in the university annual report.

Senior management indicated that the introduction of the KPIs had improved the governing body's monitoring of IT, through linking performance measures to the university's strategic plans. This allows the governing body to gain a sense of increased control over IT decisions in a decentralised IT structure. A senior manager commented:

> *"**OPT's and KPI's are tied into those plans [strategic plans of the university[4]] as well. We're first time around the block on it. We established them for 2008,** we're just looking at them now in terms of outcomes. We will then need to go through the cycle of saying well, were they the right measurements? Were the right target? I think performance measurement is a conversation, so you never design it perfectly and find that it was brilliant**....I think it is being successful, in that the key successes is that people are taking notice of it." (SDVC)*

More specifically, a senior manager indicated that monitoring had been put in place to stop the self-interested behaviour of management:

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[3] The name of a particular software application was replaced with the generic [student system] to protect the anonymity of the university.

[4] The name of this document was replaced with a generic term to protect the anonymity of the univeristy

*"That's been evident because our [IT division][5] are **now setting in place rules and protocols to stop people going out and buying individual systems** and that was what was happening. It was that you get these independent autonomous stand alone networks and systems up and happening and **without any consideration to the bigger picture."** (HG)*

This illustrative case highlights high levels of information asymmetry which resulted in high levels of agent self-interest and thus high agency costs incurred by the university. The case also indicates that high levels of self-interested behaviour are currently not evident to the governing body due to the recent introduction of governing body monitoring. This case meets the major aspects of the expected pattern for the conscious self-interest mechanisms of agency theory but needs higher levels of monitoring to fully support of the pattern.

6.4.1.5 Summary of the conscious self-interest of the agent

Conscious agent self-interest is one of the three key mechanisms of agency theory. The expected pattern in this mechanism focuses on *high information asymmetry* between the agent and the principal/governing body which leads *to high levels of agent self-interested behaviour*. The agency costs that are incurred as a result of information asymmetry and self-interested behaviour are more visible to the governing body when *high levels of monitoring* by the governing body are occurring. Table 6.1a provides an overall rating for each case for the conscious self-interest of the agent mechanism of agency theory. The rating for each case was determined by considering the evidence for each of three themes (explicit self-interest of agent, information asymmetry exploited by agent, governing board monitoring) within this mechanism. Table 1 in Appendix 6 presents the chain of evidence for all 11 cases by demonstrating how the coding of data within Nvivo 8 is linked via qualitative ratings for each issue/them to the overall qualitative ratings. If agent self-interest or information asymmetry themes rated as high, the case was rated as high overall for the conscious self-interest mechanism. Three universities were rated as high, five as medium and three as low for this mechanism. The three universities with a high rating all operated in a decentralised IT structure. The results also indicate that in some cases, monitoring by the governing body is not yet sufficient to highlight this problem to the principal.

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[5] The name of this division was replaced with a generic term to protect the anonymity of the university

Table 6.1a **Ratings for agency theory mechanisms by case**

Agency Theory Mechanism	Cases										
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Conscious Self-interest of Agent	**H**	**M**	**M-**	**M-**	**M-**	**M-**	L	**H**	**H**	L	L
Unconscious Self-interest of the Agent											
Principal's Problems											
Overall Rating											

H= High, M=Medium, L= Low

6.4.2   The Unconscious self-interest of the agent mechanism

The unconscious self-interest of the agent is the second theoretical mechanism linked to agency theory. Unconscious self-interest focuses on the evidence that management may not act in the best interests of the principal, but that this action occurred unknowingly or unconsciously (without guile) (Eisenhardt, 1989a; Hendry, 2002). One theme emerged from the data, namely, the misalignment of risk profiles between the principal (state and federal governments jointly) and the agent. Agency theory posits this misalignment occurs because the principal has a diversified risk portfolio (Eisenhardt, 1989a). In the cases of universities, the government is exposed to many universities and so would like management within an individual university to take riskier decisions but management (the agent) is risk averse because they want to protect their employment security, income and reputation which are all inextricably linked to that particular university (Eisenhardt, 1989a; Shapiro, 2005; Wiseman & Gomez-Mejia, 1998). The pattern expected under this mechanism is *high misalignment of risk profiles between the principal and the agent.*

6.4.2.1   Misalignment of the risk profiles between the principal and the agent

This theme highlights that the agent is more risk averse and protective of the organisation (university) whereas the principal tends to desire riskier decisions as they have a diversified portfolio of interests (Eisenhardt, 1989a; Hendry, 2002). There is no reason to suspect this mechanism is not in play at universities, as both principals (federal and state

governments) have diversified risk (i.e. multiple universities) and a key policy of the federal government has been to encourage diversity among universities (Department of Education, Employment and Workplace Relations, 2005).

In terms of IT governance, risk profiles misalignment may emerge when the agent focuses too much on strategies that mitigate the risks of the university's IT systems and infrastructure, whereas the principal may be willing to accept a risk preference that provides greater opportunities for the university and its stakeholders (Eisenhardt, 1989a; Shapiro, 2005).

There were four key groups of issues identified from case interviews indicating unconscious self-interest of the agent namely (1) Evidence of the differences in risk profiles between the agent and principal; (2) the agent having difficulty understanding the risk profile of the governing body/principal; (3) the agent determining IT decisions without consideration of the risk profile of the governing body/principal and (4) the principal seeking reassurance on the IT risk profile of the agent. The discussion of these issues is provided in the following sub-sections.

Differences in the risk profiles between the agent and the principal

Evidence emerged from the cases which demonstrated the differences in risk profiles between the agent and the principal. This evidence showed that, often unconsciously, management applies a risk averse approach to IT decisions (taking up opportunities that are low risk) when the principal would have preferred a more risk-taking approach as a result of their diversified investment portfolio. The following excerpts provide examples of the coding on the differences in risk profile between the agent and principal:

Examples of Coding:

> *"Essentially we used an audit process to identify the fact that while there were steps taken within central IT to ensure security and redundancy, good environmental controls and physical and security controls with physical and logical security controls **there was a significant exposure by the proliferation or the allowed growth of some fiefdoms of IT within schools** so there is a review, we have a security review that's essentially at the moment is sitting in abeyance until we get our IT Management Committee formed and there are a number of key recommendations that we will be making to that committee." (ITD IRU)*

> *"It is, it is a big issue for me, it is, you know, **as we centralise things we are finding all sorts of interesting and duplicated, multiplicated** if that is the right word, systems around the place **so in order to manage** both the security risk side of the model as well as **proliferation of non standard solutions,** it is almost essential and you know to the extent **you can stop the unnecessary growth of satellite systems.**" (ITD G08)*

The agent has difficulty understanding the risk profile of the principal

The second issue focused on management not always being able to understand the risk profile of the principal. In a number of cases, management had difficulty understanding the risk frameworks established by the principal. This lack of understanding by management is often due to management's inability to comprehend the principal's risk preferences. This may be due to high information asymmetry between the principal and agent. The following coding examples provide evidence of this issue:

Examples of Coding:

> *"**What goes on at universities frightens the hell out of me. Risk management is a big issue for us.** We are certainly starting to build it in to IT as a whole; we've now got a risk register at a high level. All of our projects now have risk registers, so there are risk mitigation plans. We are at least getting on journey where I am comfortable we will get somewhere but it is again **it is both fixing some of the underlying infrastructure and a lot of education to get there.**" (ITD G08)*
>
> *"**I don't think risk management generally is well understood.** However by its very nature there are so many inherent risks in a failed system that it gets appropriate attention." (HG IRU)*

The agent makes IT decisions without considering the risk profile of the principal

Several cases reported evidence of the agent determining IT decisions without considering the risk profile of the principal. The data on this issue appears to indicate that decisions to purchase large IT software programs may have been made without much consideration of the principal's risk-taking profile. These decisions were often made without sufficient stakeholder consultation, without strong business cases and without real consideration of how the software will ultimately benefit the growth of the university in the future. Some excerpts below from the case data provide examples of the coding:

Examples of Coding:

> *"**There can be conflict between what IT believes should be done and what the local functional area believes should be done** and that's probably where we have our greatest potential (risk) for breakdown. That's not to say that it is a breakdown but that's where the potential, I don't think we are on top of." (DVCIT NGU)*
>
> *"So the bane of our lives over the last couple of days has been in our calendaring systems which has been a disaster because it's very 'clunky' and is not delivering the type of functionality, you really need to run a modern organisation. As far as I know there was no stakeholder consultation before making that purchase decision, that's quite some years back now **and I don't think we have discipline procedures in place to collect stakeholder input before making purchasing decisions. So we need to do that better. I am specifically am concerned that we can't assess the business case for IT systems well enough.** But then I don't know if we've, I think we are a bit worse than other places I've worked. But whether we are substantially worse than the sector in general or even industry you know because, well it's a bit of a black hole." (SDVC IRU)*

The principal seeks reassurance on the IT risk profile of the agent

The final issue related to the misalignment of risk profiles between the principal and agent was evidence that the principal seeks reassurance from the agent on risk issues. The governing body appears to undertake this reassurance as they are concerned that the principal and agent risk profiles are not in alignment. Examples of the coding which relate to this issue include:

Examples of Coding:

> *"[The governing body] approves the development of new systems in particularly the [software] system which has been just bought in. **[The governing body] gets feedback on its implementation and the associated disasters**, but it doesn't burrow down into the day to day stuff but has a big picture look at that from a risk management point of view, **as I believe that [governing body]** and the audit and risk management committee **need to look at for example the risks associated with our IT."** (GBM IRU).*
>
> *"**Our [governing body] is more interested in being assured that our IT does not propose a corporate risk** but they are interested in the context of it being an enabler for [our university][6] to improve its teaching and research and all that that encompasses." (DVCIT GO8)*

While the excerpts reported above provide coding examples, my analysis was based on analysis of the hypothetical agency mechanism at play. In the case of unconscious agent self-interest, the pattern expected was *high misalignment of risk profiles between the*

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[6] The name of the university was replaced with the generic [our university] to protect the university's anonymity.

principal and the agent. Evidence of this particular characteristic in a single case provides a clear example of an agency theory explanation for the case.

In the next section I detail a single case that illustrates this characteristic. It provides a holistic example of the theory mechanism within a case, specifically the unconscious self-interest of the agent.

6.4.2.2   *Illustrative case of the unconscious self-interest of the agent*

This university (IRU) provided insight into the unconscious self-interest of the agent. In particular the case highlighted issues associated with the misalignment of the risk profiles between the principal and agent. The misalignment of the risk profiles appears to result from lack of understanding by the agent of the principal's risk profile. This may be due to poor communication between the principal and agent. This lack of communication manifests itself in a lack of discussion between the governing body and management about the university's risk profile and risk processes. These poor communication channels may be due to the decentralised IT structure of this university. This was evident in the following corroborating statements from a number of managers:

> *"**I don't think risk management generally is well understood**. However by its very nature there are so many inherent risks in a failed system that it gets appropriate attention." (HG)*

> *"Well, as part of the financial process, **there is a risk management framework, but I mean it is fairly standard, I don't know how well it is really understood by people**." (DVCIT)*

What was also evident from this case was that even the governing body was having difficulty understanding the risk processes of the university and was unable to communicate the risk profile of the principal to management. This is evident from the following statement by a governing body member:

> *"**I don't think there been enough thought put into the risk management process itself about how we should identify those risks and take it from there.** Work out a strategy to minimize those risks and then fund it." (GBM)*

This was corroborated by the following statement by a manager who indicated that the governing body does not necessarily understand their risk responsibilities:

> *"**So I don't think [the governing body] actually appreciate necessarily their responsibility for ICT security [part of IT risk] and I don't know that we've got mechanisms in place** to make everybody happy. We have a risk management framework but that is a bit of a work in progress, again, I don't think it is substantially worse than other university systems I've seen."* (SDVC)

It was apparent from the evidence that the governing body (itself an agent of the principal) was also in misalignment with the principal's risk profile by indicating concerns about the lack of testing of the disaster recovery plan:

> *"[The governing body] approves the development of new systems in particularly the [software] system which has been just bought in. **[The governing body] gets feedback on its implementation and the associated disasters,** but it doesn't burrow down into the day to day stuff but has a big picture look at that from a risk management point of view, **as I believe that [the governing body]** and the audit and risk management committee **need to look at, for example the risks associated with our IT** and to some extent we do, however I think well I have been on one particular issue testing the disaster recovery plan and it has never been tested and I have a concern about that."* (GBM)

The other key issue to emanate from this case university was the lack of consideration by management of the risk profile of the principal when making IT decisions. A senior manager indicated that there was a lack of disciplined procedures within management to collect stakeholder input before making large IT purchasing decisions. He/she also indicated concerns about management and the governing body's current ability or inability to assess business cases for IT system purchases. The senior manager said:

> *"As far as I know there was no stakeholder consultation before making that purchase decision, that's quite some years back now and **I don't think we have discipline procedures in place to collect stakeholder input before making purchasing decisions. So we need to do that better. …** I am specifically concerned that we can't assess the business case for IT systems well enough. But then I don't know if we've, I think we are a bit worse than other places I've worked. But whether we are substantially worse than the sector in general or even industry you know because, well it's a bit of a black hole."* (SDVC)

Reassurance from management about their risk profile also arose as a prominent issue for this university as well. The following evidence from a governing body member provides evidence of the governing body's focus on the risk profile of management and provides further evidence of the risk averse approach of the governing body:

> *"But from a policy point of view too, [the governing body] will* **like to be re-assured that management has policies in place which reflect the IT systems we have that they meet all the confidentiality relations, that they are secure, that they integrity in the data they produce."** *(GBM)*

What was evident from this case was that risk was a high profile issue for both the management and governing body. Case evidence indicated there was a misalignment between the agent and the principal's risk profiles. This may be due to the principal not clearly indicating their risk profile to the governing body or the inability of the governing body to communicate the principal's risk profile to the agent. This appeared to be made worse with the decentralised IT structure used within this university to manage IT. Another cause of the misalignment identified from this case was the lack of encouragement by the governing body for management to take a more risk-taking approach. The case data indicated that the governing body appeared to encourage management to increase their risk aversion.

This case meets the expected pattern for unconscious agent self-interest by demonstrating *high levels of misalignment of the risk profiles between the principal and agent*. The case also highlights that a decentralised IT structure makes this misalignment more elevated. The case also highlights that the governing body as the agent of the principal may also be in misalignment with the principal's risk profile.

6.4.2.3   Summary of the unconscious self-interest of the agent

The unconscious self-interest of the agent is a key mechanism of agency theory which focuses on the misalignment of the risk profiles between the principal and the agent. The expected pattern in this mechanism focuses on *high levels of misalignment of the risk profiles between the principal and the agent.* This pattern was evident in the illustrative case at one university in the previous section. The IT structure of this university (decentralised) appeared to be linked to the high levels of risk asymmetry.

Table 6.1b is a continuation of Table 6.1a. Table 6.1b provides a summary rating for each case for the unconscious self-interest of the agent mechanism of agency theory. In this section, the unconscious self-interest of the agent is rated by qualitatively assessing the evidence for each case for the misalignment of the risk profiles between the principal

and agent theme. Table 2 in Appendix 6 provides details of the chain of evidence for all 11 cases from by demonstrating how the coding of the data within Nvivo 8 is linked to the qualitative ratings for each issue/theme to the qualitative ratings presented in Table 6.1b. Four universities were rated as high, four as medium and three as low for this mechanism. The results indicate that agents in many universities have difficulty aligning with the risk-taking profile of the principal. This finding appears linked to the decentralised IT structure of the four universities who were rated high. This result also suggests significant agency costs were imposed on these four universities (Eisenhardt, 1989a; Sundaramurthy & Lewis, 2003). The presence of monitoring systems and performance measurement systems were also observed in these four high rating universities to reduce agency costs and to assist the board with their monitoring responsibilities (Eisenhardt, 1989a).

Table 6.1b **Ratings for agency theory mechanisms by case**

Agency Theory	Cases										
Mechanism	A	B	C	D	E	F	G	H	I	J	K
Conscious Self-interest of Agent	H	M	M-	M-	M-	M-	L	H	H	L	L
Unconscious Self-interest of the Agent	H	M-	L	M	M-	H-	M-	H-	H-	L	L
Principal's Problems											
Overall Rating											

H= High, M=Medium, L= Low

6.4.3 Principal's problems mechanism

The final agency theory mechanism is the principal's problems (Hendry, 2002, 2005). Principal's problems arise where the agency relationship causes loss to the principal not as a result of the agent's action, but rather due to a problem associated with the principal (Eisenhardt, 1989a; Hendry, 2002). Three themes were identified where problems originated with the principal rather than the agent, namely where (1) the governing body (representative of the principal) may not be able to clearly specify how IT should be governed within the university; (2) the governing body may not have selected competent

IT management and (3) the principal may not have selected competent governing body members.

The pattern expected under this mechanism is *high levels of the principal being unable to clearly specify how IT should be governed to the agent* or *high levels of the governing body selecting incompetent IT management* or *high levels of the principal selecting incompetent governing body members.*

6.4.3.1 Governing body may not be able to clearly specify how IT should be governed

The first theme involves situations where the principal is not able to specify how IT should be governed within the university. This may occur for three reasons namely (1) the principal/governing body has insufficient information and understanding to be able to clearly specify how IT should be governed due to information asymmetry; (2) the situation is so complex the principal is unable to specify his/her goals to the agent or (3) the principal has difficulty accurately and unambiguously communicating his/her objectives to the agent (Hendry, 2002; Eisenhardt, 1989a). This miscommunication between the agent and the principal, not the inability of the agent to perform his/her role is termed honest incompetence (Hendry, 2002; Eisenhardt, 1989a). Four key theoretical issues were identified in this theme, namely (1) the governing body is not able to clearly specify its role in the governance of IT, (2) lack of clear direction by the principal on IT projects across the university, (3) lack of IT governance processes within the university and (4) the principal may not be able to clearly specify what should be reported to the governing body by the agent. Each of these issues will be examined below.

The governing body is unable to clearly specify its role in the governance of IT

The inability of the governing body to clearly specify to management how IT should be governed is a clear problem caused by the principal. Each university is governed by its own Act of Parliament that allows the governing body to specify its powers regarding ITG. Thus, where there is no clear role, its genesis lies with the governing body, not management. This inability to specify appears to be more prevalent in decentralised IT structures where communication and information sharing is difficult. The following extracts from the interview data provide examples of the coding under this issue:

Examples of Coding:

> *"**That is a real challenge because I would say that is a good example of where the [governing body] has not really considered [IT governance].** So, they decide to approve [a number] of research positions which is great thing, but then they don't really break that down and say so what is the implication not only on ICT but space and other types of things."* (DVCIT IRU)
>
> *"**I don't think it is well formally defined. I think that a lot of the governance around IT is covered by the general governance throughout the university** so probably to explain that a bit more specifically in relation to purchasing equipment, services, software etc we are governed by the signing limits of the, set down by the university, the finance directorate."* (ITD NGU)

The lack of clear direction by the principal on IT projects across the university

The second issue to emerge from the cases under this theme is evidence of the lack of clear direction by the principal and the governing body on IT projects across the university. Where the governing body provides no clear direction to management on how to govern, it is difficult for management to determine the appropriate direction for IT projects. This clearly relates to the principal being unable to clearly specify how governance of IT should occur and the resultant actions of the agent. A few key excerpts from the cases are presented as examples of the coding associated with this issue:

Examples of Coding:

> *"So you know, the worst thing for IT departments is they constantly get all of these projects that everyone wants them to do and then they struggle to say OK these are the resources and this is what we can do and what we can't do and usually you have a governing body that all proposals come to, they take a look at it, they rate them and it gives some order to the chaos. We desperately need an ICT. **We have everyone wanting various systems, and nobody quite knows where should it all go together to be properly co-ordinated,** [the ITG committee] can stand on its own or report up through [a governing body sub-committee]. The major issue again is the disconnect. Each area has their own ideas about the systems they need and it's legitimate."* (DVCIT IRU)
>
> *"**I don't think there is enough emphasis placed in the budgets of those projects for the evaluation of those projects.** So it is all very nice to talk about how we are going to implement it and how we are going to get the ICT training to train staff in the use of the software and things like that, **but all of a sudden once its implemented then we kind of drop the ball and go on to the next thing,** because we are usually managing more than one project at a time."* (ITD IRU)

The agent and the governing body recognise the lack of IT governance processes within the university

The third issue to emerge from the case data is the fact that the agent and governing body members clearly recognize the lack of IT governance processes within the university. This lack of IT governance potentially causes a loss to the principal not as a result of the agent's action, but as a result of the lack of clear directions from the principal (Eisenhardt, 1989a; Hendry, 2005). A number of excerpts from the cases provide examples of the coding for this issue:

Examples of Coding:

> *"**I think we are getting wiser [about IT governance], and I think we have improved**, our problem has really been applying enough management resources to the issues to actually make up ground. I think that we are quite a way behind some of the other universities." (SDVC IRU)*
>
> *"It does produce tensions in relation to duplication and whether we actually get the value for dollar, value for money, some parts of it are very good, I think the way we deal with major systems is very good, and you know we've got a bit of a reputation for that, a good reputation. **I'm not sure we deal with the central issues quite as well and that comes out of that audit that we've just undertaken." (HG G08)***

The principal may not be able to clearly specify what should be reported to the governing body on the governance of IT

The final issue to emerge from the cases was evidence that the principal may not be able to clearly specify what should be reported to the governing body on the governance of IT. This provides further evidence of the lack of clear direction on IT governance by the principal and may be due to insufficient information on the part of the principal (Hendry, 2002). This appeared to be more prevalent in a decentralised IT structure where information is dispersed to different physical locations. The following excerpts from the case data provide examples of the coding of this issue:

Example of Coding:

> *"[The governing body] here, unlike probably in a lot of other universities, has been drawn into. I mean we put, for reports going from,* **okay so for the VC's report to [governing body] we put articles up for them and that forms part of the reporting that comes from the VC,** *you know, say this is the model it was, this is the model it will be, and in terms of time and cost. But they have and obviously they approve overall budgets they see that large amount of money has been spent on IT, they've been provided with the summary of the business case, they were not subjected to the business case itself, even though business cases are actually are a lot of diagrams and pictures and power point slides and that sort of thing they weren't, they saw maybe five to six pages of that and then it is reflected in the budget side but no they seem to have a greater interest in physical buildings, it depends on the members. But in terms of the discussion and [the governing body] from what, obviously* **you don't see a lot of the information that comes out, inside that group but I have had very few questions come back to me from [the governing body]."** *(ITD GO8)*

While the sample coding reported in the above sections provide coding examples, my analysis was based on the hypothetical agency mechanism at play. In the case of principal's problems, the expected pattern included three aspects, *high levels of the principal being unable to clearly specify how IT should be governed to the agent* or h*igh levels of the governing body selecting incompetent IT management* or *high levels of the principal selecting incompetent governing body members.* Evidence of the first characteristic in a single case provides a clear example of an agency theory explanation for the case.

In the next section I detail a single case that illustrates this first characteristic. It provides a holistic example of the theory mechanism within a case, specifically the principal's problems.

6.4.3.2 Illustrative case of the governing body being unable to clearly specify how IT should be governed

What was evident at this university (NGU) was the governing body was not sufficiently engaged with the IT processes of the university to clearly specify to management (the agent) how IT should be governed. This may be due to the university operating in a federated IT structure with core systems centralised and the remaining IT operations and decision-making decentralised. Two different managers indicate that the governing body has not been providing clear direction on the governance of IT:

> ***"I think [the governing body], our [governing body] is probably more concerned with the learning and teaching side of the university rather than the ICT side** and are happy to receive reports about it but ultimately it's probably more the [name], the [Vice Chancellor's Advisory Committee[7]] that report to [the governing body] and academic board who also report to [the governing body] are probably more hands on in that structure. I think [the governing body] are fairly distant from that."* (ITGM)

and

> ***"I don't see that they necessarily, well they certainly don't have the expertise within [the governing body]** and ICT after all is a support mechanism for the activities of the university as opposed to the core business of the university. So I think that **[governing body's] job is to govern the overall objectives of the university** and the learning and teaching plans and things like that as opposed to the maintenance of those plans."* (ITGM)

This was corroborated by a senior manager who considered that the university was only just starting to put in place strategy for IT and that the lack of clear direction from the principal on how IT should be governed meant that the IT direction of the university could be interpreted to meet management's agenda at present:

> *"Partially, because the strategic level in the university in only really starting to be put in place in anything like a robust method. So you know without having**, it's the same for any finance, marketing or IT without having** the corporate for what of a better word, **the university wide strategy really clearly it enables anyone to drive a truck, you know through in terms of any personal agenda that they might have, which is clearly not necessarily, to the benefit or the greater benefit of the organisation."** (OITM)

Another example of management needing clearer direction from the principal and governing body was on the issue of IT projects and how they should be implemented and managed. It was clear that a lack of post implementation reviews on projects by management was leading to the same errors occurring on projects in the future. The lack of clear direction from the principal on the governance of IT and in particular the governance of IT projects was evident from the following statement from a manager:

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[7] The name of this committee was replaced with a generic name to protect the anonymity of the university.

> *"I don't think there is enough emphasis placed in the budgets of those projects for the evaluation of projects. So it is all very nice to talk about how we are going to implement it and how we are going to get the ICT training to train staff in the use of the software and things like that, but all of a sudden once its implemented then we kind of drop the ball and go on to the next thing." (ITGM)*

Despite management establishing an IT governance committee to assist with the governance of IT, there was evidence from management that this committee was struggling to govern IT processes and struggling to be given sufficient credence by other parts of the university. This may be due to the lack of clear direction from the principal on the role of the IT governance committee within university ITG processes. One manager indicated:

> *"[The IT governance committee] it's still got a way to go. It's a lot better the reason we are getting on to things… but we still need a lot more rigour in our process in terms of the commitment from individual system sponsors or business owners in terms of their prioritisation of it as a strategic body of the university. Sometimes they don't give it enough credence and what the Vice-Chancellor and others of us are doing is trying to formulate that and build it back into it." (ITD)*

This was supported by a senior manager who indicated:

> *"I think a few years ago before we had the review and created the [IT governance committee] it was regarded by other governance groups as a bit of a black box, not fully integrated…. So I think we've come a long way but I still feel we've got a fair way to go." (DVCIT)*

This case provides evidence of a lack of clear direction from the principal on how IT should be governed by management within the university which was the first characteristic of the expected pattern for the principal's problems mechanism of agency theory.

6.4.3.3   The governing body may not select competent IT management

The second theme to emerge focused on the governing body not being able to select competent IT management on behalf of the principal. Hendry (2002) indicates that this may be due to the governing body being unable to select management with the appropriate IT skills needed to competently perform the tasks required. The expected pattern in this theme of the principal's problems mechanism is *high levels of the governing body selecting incompetent IT management*.

Evidence emerged from case data that the governing body may have selected incompetent IT management in that they were not always satisfied with the skills applied by management to IT problems (adverse selection). The governing body considered that management may have made mistakes that led to their taking IT decisions different from what that they rationally should (Hendry, 2002). The following excerpts from the interview provide examples of the coding on this issue:

Examples of Coding:

> *"**But again he lacks a technical insight,** I mean he's dependant on particular views about technical approaches that are, it's **unrealistic to expect the VC to have more than a general manager's view of the situation."** (DVCIT NGU)*
>
> *"**It is hard to tell at [governing body] level. You always hear gripes. My perception is that the [manager] responsible for that has so much on his/her plate,** he/she doesn't get enough depth in this area recently. [The Manager] certainly understands the IT issues, but I am not sure how deeply [the manager] is getting into the issues due to all the responsibilities he/she currently has." (GBM IRU)*

While the sample extracts reported above provide coding examples, my analysis was based on a holistic analysis of the agency mechanism at play. In the next section I detail a single case that illustrates this second characteristic of the expected pattern. It provides a holistic example of the theory mechanism within a case, specifically the principal's problems.

6.4.3.4   Illustrative case of the governing body may select incompetent IT management

This university (NGU) identified that governing bodies across the university sector may select incompetent IT management. A governing body member commented more broadly that the Vice-Chancellor (CEO) of any Australian university who is ultimately responsible for IT decisions within that university may not have sufficient IT skills to make competent IT decisions. The governing body member indicated:

> *"I think even **Chief Executive Officers [Vice-Chancellors] don't either** and that's not to take away from them or denigrate them in anyway **because it is a fairly highly refined area full of jargon and all the rest of it so they're not in a position to really know the details of it**. You often see a CEO [VC] as in my experience is that they complain on two different fronts, one on the amount of money that's going into it and two about how they are not satisfied with what's coming out the other end of it. **But beyond that they have little ability to, other***

> *than their [IT Director] sort of looks after that, which takes a lot of trust at the end of the day." (GBM)*

To overcome concern with the IT skills of management, this particular governing body co-opted one of its external members to be part of its IT governance committee to monitor the actions of management and reduce the agency costs associated with possible incompetent management. The governing body member commented on this decision:

> *"But now it is fair to say my presence on the board that it is somewhat proactive because I've been a member of the [governing body] board is actually immersed in the strategic consideration of these things that are more on an ongoing basis rather than just simply meeting as a [governing body] every quarter or whatever else and getting a report from the Executive. **And I mean to be frank more often than not probably most of the time we just don't get reports on IT to the [governing body].** So and that still does not occur to a large extent, it will at the next meeting because we're reaching a key milestone in terms of this reform process but in the **meantime the [governing body] I suppose is comfortable that one of its members is more immersed in these issues therefore if anything needs to be reported to the board it will be through that member." (GBM)*

The governing body member indicated that the competence of IT management had been improved in his/her university as a result of his/her monitoring of the IT governance committee and he/she no longer needed to be part of the ITG committee on a regular basis. This is corroborated by the IT Director who indicates:

> *"What we will do **is sort of combine these two committees and this element will continue to meet fairly regularly as the year unfolds but key points**, we will tend to have serious discussions about our IT governance model about strategies. And we will see individuals from this group joining in the discussion." (ITD)*

This case illustrates the issues with the incompetence of management in terms of IT skills. The case meets the expected pattern for the second characteristic of the principal's problems mechanism of agency theory namely *high levels of the governing body may select incompetent IT management*. The case highlights governing body concerns that management may not have the IT skills to independently manage the IT strategic decisions for the university.

6.4.3.5   Principal selects incompetent governing body members theme

The third and final theme to emerge from the cases was the inability of the principal to select competent governing body members (adverse selection). This theme focuses on the whether the governing body members selected by the principal have sufficient IT skills to govern IT processes on behalf of the principal (Hendry, 2002; Eisenhardt, 1989a). As the principal has considerable input into who is selected as external members of the governing body, issues with lack of skills of governing body members can be clearly linked to the principal's problems mechanism of agency theory.   The key issue to emerge from the case data was the competence of governing body members in relation to the governance of IT.   The pattern expected in this third characteristic of the principal's problems mechanism of agency theory is *high levels of the principal selecting incompetent governing body members.*   The following excerpts from the interview data provide examples of the coding on this issue:

Examples of Coding:

> *"I think that is a problem with boards and boards seek independent members that bring a range of skills and I think all boards in the past have just simply not ensured that they have enough IT skill at the board level. Because IT has increasingly become a big proportion of the spend, extraordinarily strategically important and often the board does not have the expertise and I think even Chief Executive Officers don't either and that's not to take away from them or denigrate them in anyway because it is a fairly highly refined area full of jargon and all the rest of it so they're not in a position to really know the details of it. You often see a CEO as in my experience is that they complain on two different fronts, one on the amount of money that's going into it and two about how they are not satisfied with what's coming out the other end of it. But beyond that they have little ability to [govern IT], other than their Chief Technology Officer sort of looks after that, which takes a lot of trust at the end of the day." (GBM NGU)*
>
> *"I think quite frankly the [governing body] tends to work in, **I don't think there is a lot of people like with IT knowledge in there**, I mean I exclude the Chancellor obviously." (ITD GO8)*

While the sample extracts reported above provide coding examples, my analysis was based on a holistic analysis of the agency mechanism at play. In the next section I detail a single case that illustrates this third characteristic. It provides a holistic example of the theory mechanism within a case, specifically the principal's problems.

6.4.3.6 Illustrative case of the principal selects incompetent governing body members

This particular university (NGU) indicated that some of its governing body members may lack sufficient skills to govern IT within the university. This may be due to the principal's inability to select competent governing body members. A governing body member indicates:

> *"It's like any other [governing body] there are twenty-three or twenty four members and there's about a dozen different skill bases **and there are people on [the governing body] who would have no idea and people on [the governing body] who have many years of IT experience, like I do."** (GBM)*

He went on to add the following further insight:

> *"**Yes, if I had to line our [the governing body] up and say who's got IT skills and looking around the table I would only pick three or four people of that twenty-two.** But then if you said the same thing about several other important skills with the [the governing body] it would also be true and they would be different people and that's why we have a bigger [governing body]." (GBM)*

This is corroborated by the DVC IT who indicated:

> *"Yes some aren't. **We've got a very mixed group on [the governing body]** that literally goes from the owner of the local hairdressing salon through to a couple of people from consulting firms who are from the big end of town." (DVCIT)*

A governing member indicated that where governing body members also served on a governing body sub-committee that their IT skills were higher. He indicated:

> *"**Yes, you will find the subcommittees, the skill groups tend to congregate.** The finance sub-committee for example would have the majority of members with significant IT skills." (GBM)*

This case provides evidence that governing body members selected by the principal may not have sufficient skills to effectively govern IT within the university. This case fits the third characteristic of the expected pattern of the principal's problems mechanism of agency theory, that is, *high levels of the principal selecting incompetent governing body members*.

6.4.3.7   Summary of the Principal's problems

The principal's problems are a key mechanism of agency theory which focuses on three key aspects of agency behaviour. The expected pattern in this mechanism included three aspects, *high levels of the principal being unable to clearly specify how IT should be governed to the agent* or *high levels of the governing body selecting incompetent IT management* or *high levels of the principal selecting incompetent governing body members.* These principal's problems appeared more prevalent at universities with decentralised or federated IT structures. Each aspect of this pattern was evident in the three separate illustrative cases of three different universities detailed above.

Table 6.1c is a continuation of Table 6.1b. Table 6.1c provides a summary rating for each case for the principal's problems mechanism of agency theory. The ratings in table 6.1c were determined by assessing the evidence for each case across the three key themes (governing body is unable to clearly specify how IT should be governed, the governing body may select incompetent IT management and the principal may select incompetent governing body members) of this mechanism. Table 3 in Appendix 6 provides the chain of evidence for all 11 cases by demonstrating how the coding within Nvivo 8 is linked via qualitative ratings for each issue/theme to the overall ratings for this mechanism of agency theory indicated in table 6.1c. Two cases were rated as high, seven as medium and two as low. The results indicate that many universities are having problems with the principal specifying how IT should be governed and the IT competence of management and/or governing body members. This may be due to the communication problems associated with a decentralised or federated IT structure.

Table 6.1c   Ratings for agency theory mechanisms by case

Agency Theory Mechanism	Cases										
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Conscious Self-interest of Agent	H	M	M-	M-	M-	M-	L	H	H	L	L
Unconscious Self-interest of the Agent	H	M-	L	M	M-	H-	M-	H-	H-	L	L
Principal's Problems	H	M	M-	M	M	H-	M-	M-	M	L+	L
Overall Rating											

H= High, M=Medium, L= Low

6.5   Conclusion

This chapter presents the within-case analysis of agency theory and its related mechanisms for 11 cases. The chapter provides the qualitative results associated with the three key mechanisms of agency theory, namely the conscious self-interest of the agent, the unconscious self-interest of the agent and principal's problems.

The result of the first mechanism of agency theory (the conscious self-interest of the agent) focuses on evidence of management acting opportunistically to further their own interests at the expense of the principal. Results indicate that three universities exhibited *high levels of information asymmetry*, *high levels of agent self-interested behaviour* and *high levels of governing body monitoring*. These three universities (A, H, I) operated a decentralised IT structure. The remaining universities that were rated medium or low for this mechanism did not operate a predominantly decentralised IT structure. The results for this first mechanism of agency theory indicated a possible link between management self-interest and the decentralised structure of IT.   In this structure, self-interested behaviours may be more likely to occur as decentralised IT operations are more difficult to control and monitor due to their dispersed geographic location and complex management structures.

The second mechanism of agency theory, focuses on the misalignment of the risk profiles between the principal and the agent. Four universities (A, F, H, I) were identified as

having *high levels of misalignment of the risk profiles between the principal and agent* (the expected pattern for this mechanism). These four universities were also identified as operating a predominantly decentralised IT structure. Thus, there appeared to be a link between the nature of the university's IT operating structure and evidence of this second agency theory mechanism. Aligning the risk profiles of management and the governing body/principal may be more difficult to achieve in a decentralised IT structure, as it is harder for the governing body to encourage the multiple levels of decentralised IT management to take a more risk-taking approach to their IT decision-making processes.

The third mechanism of agency theory, principal's problems, arises where the agency relationship causes loss to the principal that is not of the agent's doing, but is associated with a problem with the principal. Two universities (A,F) were identified as having the expected pattern for this mechanism of *high levels of the principal being unable to clearly specify how IT should be governed to the agent* or *high levels of the governing body selecting incompetent IT management* or *high levels of the principal selecting incompetent governing body members.* These two universities operated in a highly decentralised IT structure. There appears to be a link between universities displaying high levels of evidence of the principal's problem's mechanism of agency theory and the IT structure of the university. This increased evidence of principal's problems may be due to the communication difficulties associated with the multiple levels of IT management and the fact that IT management may be dispersed over a large number of buildings and campuses in a decentralised IT structure.

In conclusion, Table 6.1d provides an overall rating for agency theory for each case based on the culmination of ratings for the three agency theory mechanisms discussed above and reported in tables 6.1a-6.1c and sections 6.3-6.4 of this chapter. The overall results from Table 6.1d indicate that four cases (A, F, H, I) provided high levels of evidence of the presence or absence of behaviours and processes that are best described by agency theory in the governance of IT at their university. These four universities operated in a decentralised IT structure. Thus the presence of agency theory behaviours and processes appears linked to the operation of a decentralised IT structure within Australian universities. In contrast, four cases (B, C, D, E) provided medium levels of evidence of agency theory and operated in a federated or hybrid IT structure (partly decentralised and

partly centralised) and three cases (G, J, K) provided low levels of evidence of agency theory and operated in a centralised or federated IT structure. There appear to be definite links between the absence or presence of the behaviours and processes associated with agency theory and the IT organisational structure adopted by each university.

Table 6.1d   **Ratings for agency theory mechanisms by case**

Agency Theory Mechanism	Cases										
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Conscious Self-interest of Agent	H	M	M-	M-	M-	M-	L	H	H	L	L
Unconscious Self-interest of the Agent	H	M-	L	M	M-	H-	M-	H-	H-	L	L
Principal's Problems	H	M	M-	M	M	H-	M-	M-	M	L+	L
Overall Rating	H	M	M-	M	M-	H-	L+	H-	H-	L+	L

H= High, M=Medium, L= Low

The next chapter (chapter 7) will present the qualitative analysis for stewardship and resource dependence theories. The results identified in this chapter and chapter 7 will be analysed further in the cross-case analysis in chapter 8 to answer the research question "*How do boards govern IT?"* and to explore the possible links between this research and the emerging enterprise governance of IT framework (Van Grembergen, De Haes & Guldentops, 2004; De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2009b; Ko & Fink, 2010).

Chapter 7

Analysis of Stewardship Theory & Resource Dependence Theory Mechanisms

7.1　Introduction

This chapter follows on from chapter 6 and presents the remaining analysis of qualitative data, that is, the analysis relating to stewardship theory and resource dependence theory. The chapter forms part of my analysis of three rival corporate governance theories (agency, stewardship or resource dependence theory). My aim was to identify if any theory explained board IT governance processes within Australian universities or whether two or more theories operated simultaneously and, if so, in what context. The chapter commences with the within-case analysis of stewardship theory in sections 7.2 and 7.3. This is followed by the within-case analysis of resource dependence theory in section 7.4. The chapter concludes with a summary of the evidence for stewardship and resource dependence as potential explanations for IT governance in section 7.5.

7.2　Within-case analysis of stewardship theory mechanisms

Stewardship theory, like agency theory, focuses on the relationship between the owners and management (Donaldson & Davis, 1991; Davis et al., 1997) except that stewardship theory views this relationship as positive. As with my agency theory analysis, owners are operationalised in this context as the federal and state governments jointly and management is operationalised as the Vice-Chancellor and other university management. This section focuses on a within-case analysis of stewardship theory within the 11 cases. Figure 7.1 presents the coding structure for issues, themes and mechanisms suggested by stewardship theory. Sections 7.2-7.3 provide examples of the data that justify my classifications.
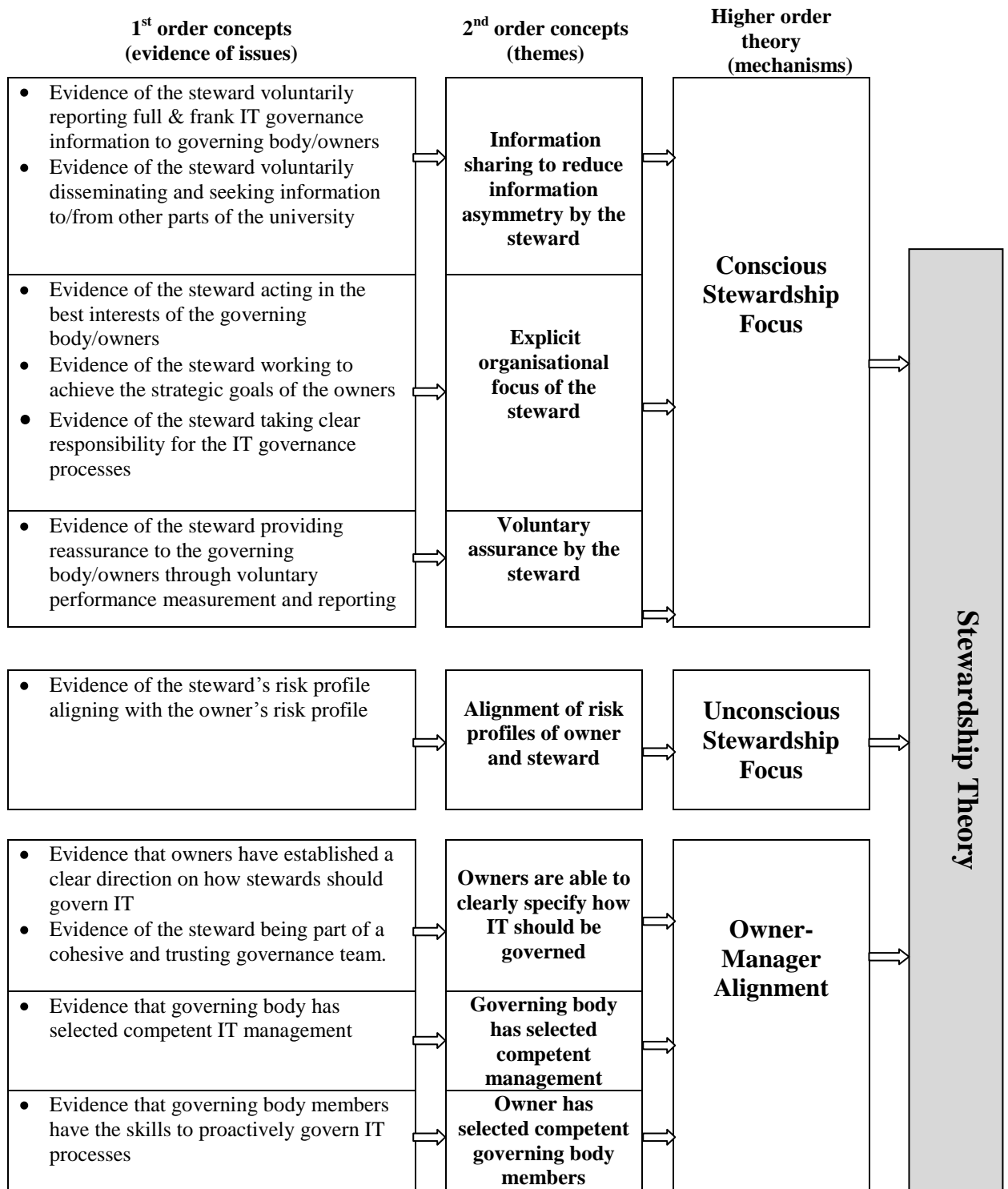
1st order concepts (evidence of issues)	2nd order concepts (themes)	Higher order theory (mechanisms)	
• Evidence of the steward voluntarily reporting full & frank IT governance information to governing body/owners • Evidence of the steward voluntarily disseminating and seeking information to/from other parts of the university	**Information sharing to reduce information asymmetry by the steward**	**Conscious Stewardship Focus**	
• Evidence of the steward acting in the best interests of the governing body/owners • Evidence of the steward working to achieve the strategic goals of the owners • Evidence of the steward taking clear responsibility for the IT governance processes	**Explicit organisational focus of the steward**		**Stewardship Theory**
• Evidence of the steward providing reassurance to the governing body/owners through voluntary performance measurement and reporting	**Voluntary assurance by the steward**		
• Evidence of the steward's risk profile aligning with the owner's risk profile	**Alignment of risk profiles of owner and steward**	**Unconscious Stewardship Focus**	
• Evidence that owners have established a clear direction on how stewards should govern IT • Evidence of the steward being part of a cohesive and trusting governance team.	**Owners are able to clearly specify how IT should be governed**	**Owner-Manager Alignment**	
• Evidence that governing body has selected competent IT management	**Governing body has selected competent management**		
• Evidence that governing body members have the skills to proactively govern IT processes	**Owner has selected competent governing body members**		

Figure 7.1 **Stewardship theory analyses of qualitative interview data**

7.3 Understanding stewardship theory mechanisms

Analysis of the case data commenced with a coding of data according to stewardship theory. I first looked for evidence of theoretical themes and mechanisms to indicate the presence or absence of behaviours and processes best described by stewardship theory. A summary of the evidence, themes and underlying mechanisms is provided in figure 7.1. The remainder of this section provides examples from interview data of evidence that stewardship theory explained ITG within some Australian universities. This evidence is subject to further review and analysis in the cross-case analysis (chapter 8).

7.3.1 *Conscious stewardship focus*

The conscious stewardship focus mechanism identifies evidence of management wanting to be good stewards of corporate assets (Donaldson & Davis, 1991). Under this mechanism, stewards identify personally with the organisation and are not motivated completely by self-interest (Sundaramurthy & Lewis, 2003). There were three key themes in the data that highlighted issues around the conscious stewardship focus, namely reduced information asymmetry, explicit organisational focus of the steward and voluntary assurance by the steward.

The first theme, reduced information asymmetry, involves the steward voluntarily sharing information with the governing body or other areas of the university. Full and frank information sharing ensures that management does not have greater knowledge about the ITG processes than the governing body/owners (Davis et al., 1997; Sundaramurthy & Lewis, 2003). By reducing information asymmetry, management is indicating their willingness to have their decision-making scrutinized by the governing body (Sundaramurthy & Lewis, 2003; Dalton & Daily, 1999). The second theme, explicit organisational focus of the steward, centres on the steward aligning their behaviour with the goals of the board/owners in order to protect and maximize organisational performance and personal reputation (Davis, et al., 1997). The third theme, voluntary assurance by the steward, involves the steward voluntarily reporting on his/her performance to the governing body as he/she feels empowered by the owners to self manage and report on ITG processes (Tosi et al, 2003; Sundaramurthy & Lewis, 2003).

These three themes are linked. That is, in situations of reduced information asymmetry, management is not likely to behave in a self-interested manner as management does not have superior information. Thus the expected pattern across the cases in this aspect of conscious stewardship focus is *high levels of sharing to reduce information asymmetry* or *high levels of explicit organisation focused behaviour* by the steward or *high levels of voluntary assurance* by the steward of ITG processes.

The following sub-sections provide examples of the coding associated with each of these themes along with an illustrative case that describes the entire mechanism.

7.3.1.1   Information sharing to reduce information asymmetry by the steward

In several cases there was clear evidence that management was voluntarily sharing information with the governing body or other sections of the university. This demonstrates effort by management to reduce information asymmetry, a key attribute of stewardship theory (Sundaramurthy & Lewis, 2003, Dalton & Daily, 1999). As a result, management, the governing body and other sections of the university have an equal level of knowledge of IT governance processes and decisions. In these situations, management did not seek to exploit information for self-interested purposes but focused instead on organisationally oriented IT actions. Two issues were linked to this theme as follows.

The steward voluntarily shares full and frank information with governing body/owners

Considerable evidence from the cases highlighted management providing full and frank information to the governing body. In a number of cases, reduced information asymmetry appeared to assist management and the governing body/owners to have a shared sense of ownership of the ITG processes of the organisation. This shared sense of purpose led to stronger alignment between management decision-making and the goals and objectives of the owners. This was more likely in universities with centralised IT structures. Centralisation of IT leads to IT being centrally controlled and thus information is more readily available to be reported to the governing body. In addition, with the stronger control focus of a centralised IT structure, the opportunities for management self-interest are dramatically reduced (King, 1983; Peterson, 2004b;

Musson, 2008). The following excerpts from the interview data provide examples of the coding for reduced information asymmetry:

Examples of Coding:

> *"I think they are fairly satisfied with the information that they are getting* because we've looked at and this is one of the advantages of having a governance area, we've looked at now what are the critical things that we need to inform [the governing body] about or keep them briefed on in terms of the strategic alignments, the risk, the cost, the things that I talked about before. I don't think we missed too much in that way, might we occasionally miss things, yes, but *as soon as there is any kind of an issue our [governing body] is pretty well briefed."* (*HG ATN*)

> *"It is a good question because I think in days gone by it was almost an afterthought*. These days with our [governing body], *not only is [governing body] interested and we need to report to [the governing body] on a regular basis but also the sub-committees of [the governing body]*. For instance our finance committee which obviously approves the big ticket items almost has a standing item on the agenda about IT and our risk and audit for instance, I mean when you are introducing a new system these are the sorts of things that are reported on a regular basis." (VC NGU)

The steward voluntarily disseminates and seeks information to/from the other parts of the university

In addition to sharing information with the governing body, there was evidence of management voluntarily disseminating and seeking information from other sections of the university. This form of information sharing allows all sections of university management to have a shared decision-making structure and assist management to feel empowered in their role. This sharing is easier to achieve in a centralised IT structure where information is more readily available to be shared across operational units (King, 1983). The following excerpts from the interviews provide examples of coding for this aspect of information symmetry:

Examples of Coding:

> *"Providing direction to both the IT staff but the organisation as a whole* to have a focal point that if someone said what are we doing about IT, you've got a place to go to that it is managed and controlled and that *there is a communication mechanism both ways for people to say this is what we are about,* this is what we are doing but also channel the other ways so that you can get the feedback both from IT staff but also from the academics and the general staff so I think that is a part of governance." (OITM GO8)

> *"That's, there are things that sit around it, absolutely. I mean it is interesting, we've had people come from other universities to work in our central administrative divisions and one of the things that they have noticed is as a difference about [my university] than other places is* **that [my university] spends a lot of time talking to itself** *and initially I thought, that's not a positive comment and when I explored it more with them to see what it was that they meant by that* **it was the amount of consultation that actually goes on here that we might still think needs improving but compared to other places I think we do a lot of consultation across the boundaries***.*" *(HG ATN)*

7.3.1.2   The explicit organisational focus of the steward

The second aspect of this mechanism of stewardship theory is the explicit organisational focus of the steward; that is, the steward acting in the best interests of the owners (Donaldson & Davis, 1991; Sundaramurthy & Lewis, 2003).   This explicit focus manifests in organisationally focused decisions where the agent does not shirk but puts in the agreed effort for the owners and puts the interests of the organisation first. Four types of evidence emerged under this theme namely (1) the steward voluntarily acts in the best interests of the governing body/owners; (2) the steward actively works to achieve the strategic goals of the organisation; (3) the steward takes clear responsibility for IT governance processes and (4) the steward uses IT governance to establish standards for other governance processes. Each of these issues will be discussed in the following sub-sections.

The steward voluntarily acts in the best interests of the governing body/owners

The first type of evidence from the cases was the steward voluntarily acting in the best interests of the governing body/owners. The case data linked to this issue included evidence of management voluntarily assisting the university to improve its IT systems and processes. Much of the data related to management centralising their IT structure and processes (establishing shared services arrangements) to help the university more comprehensively manage its IT resources and costs. Another aspect of this issue to emerge was management implementing a new asset management system to more clearly manage university IT resources. Excerpts from the interview data are:

Examples of Coding:

> **"A classic example of that is we've probably getting this wrong for some time, but we** discovered a few years ago that we were running some ninety separate email servers which was not deemed a terrifically efficient way to do it both from a financial point of view but also for ease of access for the whole organisation **so a recommendation was made to consolidate all those which meant putting the appropriate infrastructure in place to cater for it and to migrate all those things centrally and it's taken a long time to do,** people would have thought, but it has been successful, now there is maybe one or two organisational units with a few people to migrate if not already done so it's ninety-nine point nine percent done." (OITM G08)

> "**Assets are an issue, because again possibly like [another university] portable attractive assets haven't been managed.** Now one of the projects we've actually got because our, when it was set up, we had an ICT procurements, and ICT asset management unit, **so the aim is to be able to effectively manage all our assets,** so our software licensing is obsolete if you like, and we are still in the process of accurately reflecting the numbers and versions etc. Part of it has been driven with regards to our desktop refresh but even though we've done the best that we can to try and identify all of the devices that we've actually got, there are still a few errors that we've got fine tuning and we have not actually had an appropriate system to be able to maintain it." (ITD NGU)

The steward actively works to achieve the strategic goals of the owners

Another example of the steward actively working to achieve the strategic goals of the university was management voluntarily assisting the university to achieve its strategic goals. For instance data highlighted how in some cases stewards are applying IT governance to assist the university to achieve its strategic goals. This appears more likely to occur in a centralised IT structure where IT management is better informed of the IT decision-making process and the strategic goals of the university due to enhanced communication and information sharing between the governing body and management (King, 1983; Peterson, 2004b; Musson, 2008). Excerpts from the interview data include:

Examples of Coding:

> "Yes, I think in terms of those three things there we do some of those things better than others. **I think the strategic alignment for example we've been increasingly getting better and better at** and particularly for the big systems and because there is so much alignment that is required I think we've made a lot of progress there." (HG ATN)

> *"At a high level I think one of the key things is for governance body is being able to look at the value of their ICT investment and that is one of the reasons why we implement CobiT and we are implementing VALIT because again with every business proposal that's put forward there has to be a benefit statement so you have to look at the return on investment that is actually there and ensure, **there is an alignment with what the university is endeavouring to undertake with the core business and strategic direction of the university** but in addition to that we have to look at also being able to generate some form of offset for the investment."*
> *(ITD NGU)*

The steward takes clear responsibility for IT governance processes

Evidence emerged from the cases of the steward taking clear responsibility for ITG processes as another example of organisationally focused behaviour by management. This appears to be more easily achieved in a centralised IT structure where decision-making control is held centrally (King, 1983). Excerpts from the interview data provide examples of coding of this issue:

Examples of Coding:

> *"Absolutely, **I think it's under recognised how important the contribution an improved IT governance can make to the cultural momentum or the momentum for cultural improvement of an entire organisation.** If we're challenging more and more the quality of governance of other things like space, and [DVC] writes around recently suggesting probably we need to improve how we do this. So there is actually a thing going on here which is about okay well if they can sort that stuff out then probably the rest of the place ought to get its decision-making act together as well. It shouldn't surprise us."* (ITD ATN)
>
> *"[My role in IT governance occurs] Well, I suppose it is at a number of levels, **but the first role I have is not to micro manage IT, so [DVC IT] is the designated person there so it is crucial for me to make sure that because [DVCIT] has accountabilities there that he discharges those accountabilities and I don't micro manage him.** [My role is] very much devolved and this is crucial in how I suppose the governance principle for us works is very much project management, so for [the DVC IT], we've got to allow him to do that subsequently then have devolved responsibility in relation to project management and that is the message we get through to [the governing body] as well. They're not to micro manage any of us they've got to stay at the strategic level so when they get a document like this, it's very easy and we've said this get involved in that and don't get involved in the operational stuff, it's okay for you to ask questions but that is what project management is about. It is allowing the process to actually be part of the governance. So for me I think that's important and other issue again is to take a bit of a helicopter view and while [DVCIT} is doing his job very well, and his people are discharging their responsibilities, my role in part is to look at the connections strategically."* (VC NGU)

7.3.1.3   Voluntary assurance by the steward

The third theme related to the conscious stewardship focus of the steward was evidence of the steward voluntarily reporting on his/her performance to the owners and governing body. Stewardship theory indicates that stewards empower themselves to behave in the best interest of the organisation without the need for monitoring by the governing body or owners (Sundaramurthy & Lewis, 2003; Davis et al., 1997). Tosi et al. (2003) indicate that the use of control mechanisms by the owners (monitoring/incentives) is likely to inhibit the motivation of the steward and this can be counter-productive

The issue to emerge from the data under this theme was evidence that stewards were voluntarily establishing performance measurement processes so they could report to the owners and the governing body on the performance of IT within the university. This was a pro-organisational action on the part of management. The following excerpts from the case data include:

Examples of Coding:

> *"Yes it is critically important, although that is an area again to the [IT Director's] credit that he has been building strength there. **Well for instance he has initiated a number of across the board surveys with students to understand the performance not just from a technical put of view but also the perception of the performance from the students' point of view which in my area is actually performance.** I don't care if the ICT people think they've done a good job, I really only care if I think they've done a good job or if the students. So they are focused at what I think is the right level, but again, we are you know I'd say two thirds, three quarters of the way to maturing. So it is an area we will strengthen over the next twelve to twenty-four months." (HG NGU)*
>
> *"**Performance measurement is critical to us, we do, we are doing quite a lot of benchmarking and measurement, you could I suppose always argue that measurement is about making sure you've got strategic alignment.** You can cover a lot with strategic alignment but yeah I think if you've got strategic alignment, risk, you know, prioritisation or resource usage and IT performance you've probably got most of the we've got a thing called balance scorecard with university KPI's that sort of role down to you know, HR, finance, IT so we've alignment through that model." (ITD GO8)*

While the sample extracts reported above provide coding examples, my analysis was based on a holistic analysis of the hypothetical stewardship mechanism at play. In the case of conscious stewardship focus, the expected pattern was *high levels of sharing to reduce information asymmetry* or *high levels of explicit organisation focused behaviour* by the steward or *high levels of voluntary assurance* by the steward. Evidence of these

three characteristics in a single case provides a clear example of a stewardship theory explanation for a case.

In the next section I detail a single case that illustrates these characteristics. It provides a holistic example of the theory mechanism within a case, specifically the conscious stewardship focus of the steward.

7.3.1.4 Illustrative case of conscious stewardship focus

One particular case (ATN) provided considerable evidence of the conscious stewardship focus mechanism. This university operated in a centralised IT structure. The case firstly demonstrated evidence of information sharing. This symmetry in information resulted from the regular and unfettered flow of information between management and the governing body as well as the full and frank nature of these communications.

The regular and unfettered flow of information was acknowledged at this university by regular reporting by the Vice-Chancellor (VC) to the governing body. This reporting occurred within a standing item in the VC's report titled Physical/Virtual. The VC indicated:

> *"**Every report to [governing body] will have developments on the physical side, it will have developments on the virtual side,** whether they are related to [teaching application], whether they are related to whatever. Sometimes they get caught up in the cross-match of teaching, but the richness of, the quality of the electronic environment as it were and virtual systems is always reported and the best evidence is for you to go back, they're public documents, go back and look at my reports to successive meetings, it's there every time." (VC)*

This reporting was corroborated by a senior manager who also indicated how the VC gathered the data for this report. The senior manager stated:

> *"**The present Vice-Chancellor routinely prepares quite detailed reports to [the governing body], that he presents at every [governing body] meeting** and to gather the material for that, he in turn requests information from each of the portfolios reporting to him, one of which is the portfolio of this division, which includes the IT decision-making and governance processes, so anything that's significant, is all automatically presented for preparation in that report." (DVCIT)*

The VC provided further insight into the depth of the physical/virtual section of the report. The depth and nature of this reporting was also corroborated by two senior managers. The VC stated:

> *"**I guess giving [the governing body] perspective of the breadth and the particular clarities of what we are doing** and how they rate to one another, **and that what we are doing then relates to the University's [key strategy document]** which is taken as a very serious document and giving, been able to tell the narrative of how the elements fit together and also being very proactive in terms of the committees I sit on which is all of them". (VC)*

To gather further corroborating evidence of the regular flow of unfettered information between the two groups, I triangulated this interview evidence with the Vice-Chancellors reports for 2008/2009 which were located on the university's website. My analysis of these reports identified the inclusion of a section titled physical/virtual in each report. Analysis of the information provided in the IT section of the VC reports highlighted that a wide diversity of information was provided by management on IT issues.

The full and frank nature of the reporting between management and the governing body was also acknowledged as important in this case. The VC discussed the full and frank reporting of IT information with the governing body by stating:

> *"**When I write a report on [a major project implementation] to the governing body I understand every word in it, but it's not written by me.** It will be written by [the Head of Governance], who will consult with [the DVC IT], who might, probably check some stuff with [IT Director] and whoever else." (VC)*

Further evidence of this full and frank flow of information was provided by two senior managers, one of whom indicated:

> *"Absolutely and with **our [governing body] and we tell them about this and most of them are pretty good about it. The operation here is no surprises,** now sometime **some of the briefings might be verbal** or they will be commercial in confidence briefings and the papers are limited distribution and I think that is fine. But absolutely they know everything that is happening with [a major project implementation] and they, and quite bluntly, and they, so when I had to go to them in December and say we will not go live this year, **there was no surprises. They knew that was probably going to happen.** I mean otherwise we would have had mayhem." (HG)*

This case also provided considerable examples of the explicit organisational focus of the steward. Much of the evidence from this case focused on the steward actively working to achieve the strategic objectives of the owners. A senior manager indicated:

> *"I think the strategic alignment for example we've been increasingly getting better and better at and particularly for the big systems and because there is so much alignment that is required I think we've made a lot of progress there…I* don't see IT or technology if you like driving the university's strategy and direction, I see it being an enabler and I think that's why we've got, the way that we've got the business owners identifying what they want and seeking the importance in a partnership way from our technology people is the right way to do it. You can't always get what you want because of the cost or the availability but we have made a deliberate attention to do it in that way and I think that's the right way." (HG)

A governing body member provided further evidence of how IT linked to the university's strategic planning documents:

> *"I guess there's a linkage in the [University Strategy document] and in the [University Strategy documents], and in fact [governing body] commented very favourably,* we had budget last week come up and the way budget was linked to the [University Strategy document] was very good, so I haven't seen the plans as such but the budgets which go through for three to five years in many cases which is your strategic timeline, they've come up with all the links through to the [University Strategy document]." (GBM)

Senior management also provided evidence of the explicit organisational focus of the steward by discussing management's role in the improvement of ITG within the university including management's role in moving the IT culture forward, IT staff understanding how IT decisions occur within the ITG processes and having sufficient transparency for university staff to trust the ITG process. The IT director indicated

> *"So that's the model we are into here, I, **it's about having a culture that accepts that decisions are going to be made in a rational way, that you can't run around shopping for the decision that you want, that you need to submit to a process which has been determined which will handle you fairly** and which will tell you why you get what you should get and why you don't get certain things as well. **We've found that transparency is a fundamental part of that.** .So while you would not expect everyone to be able to understand everything that was done in our governance we would certainly expect them to know someone who had a degree of participation in the governance process and was able to be their way of accessing information if they needed it." (ITD)*

Another senior manager (DVCIT) identified how the ITG processes of the university have improved over time and how the university's IT governance processes had improved over the last two decades. The senior manager indicated:

> *"We've put considerable effort into improving IT governance. I would say, I would characterise the time since the foundation of this university has been broken to two broad periods when it comes to IT. The first of about eight years, there was an absolute preoccupation bringing systems together and not a lot of attention paid to the holistic soundness of IT governance and there were within that some tensions including service, culture issues, resource and management issues which was a bit fractured. The second period which I would now say ten years if you take the total life of the university, has been one of more increasing maturity in IT governance with some mileposts along the way and one of them was the formal adoption of a project management framework and a project management discipline which by no means fully achieved still made a big difference to the confidence in governance that we have and the confidence that we are at least stressing benefits realisation as part of process of approving projects even though we may not have a financial system for harvesting and for re-distributing." (DVCIT)*

This case also provided evidence of voluntary assurance by management back to the governing body and owners. This case indicated there were low levels of formal monitoring on IT within this university (only one formal university key performance indicator (KPI) set by the governing body related to IT). This was the one measure the university used to measure the IT division each year. One senior manager (DVCIT) indicated:

> *"The [university] KPIs that are relevant to not just IT but anything that this division does have been at the highest level. There is one that tries to measure number of computers or access points per student per year and that has been showing pretty much a continuous line of improvement over ten years." (DVCIT)*

To corroborate this evidence, I triangulated this KPI to a number of Corporate Performance reports for the university for 2008 and 2009. I found in each report a "*student access to technology*" indicator was present in the report and the indicator did show improvement across the last ten years.

Senior management indicated that as result of low level formal performance measurement, IT management were personally conscious of their responsibility and accountability for IT services and undertook a wide variety of voluntary performance

measurements within their division to indicate the improvement in IT processes. A senior manager (DVCIT) indicated:

> *"Well, yes, I mean **the performance of IT services staff, and the IT senior management is accountable like anyone else and we have heaps and heaps of metrics about our own systems as well."** (DVCIT)*

Another senior manager provided further insight into the types of measurement undertaken voluntarily by the IT Division. Student feedback and other surveys were one key performance measure that the Division used to improve the university IT systems. The IT director indicated:

> *"**We do a huge amount of measurement of our performance against client satisfaction, student satisfaction**, as part of staff opinion surveys, as part of all sorts of things. **We are measuring things all the time and capturing free comments all the time.** Tonight during maintenance window there is a new version of [the student web portal] being released to students and the work that's in this new release, the new look and feel reflects, it's due to either twelve hundred or fourteen hundred comments from students. So we have taken on board that much feedback and have built it in to this new model of [the student portal]. So we are doing this stuff all the time." (ITD)*

This illustrative case highlights high levels of information sharing were associated with high levels of explicit pro-organisational behaviour by the steward. The case also highlights the high levels of voluntary assurance by management. The low levels of formal monitoring identified in the case supports the theoretical position of stewardship which indicates that formal monitoring does not empower management to voluntarily report.

7.3.1.5   Summary of the conscious stewardship focus

The conscious stewardship focus is one of the three key mechanisms of stewardship theory. The expected pattern in this mechanism focuses on *high levels of information symmetry* between the management and owners, *high levels of explicit organisational focus of the steward* and *high levels of voluntary assurance by the steward* and reporting to the governing body and owners. Table 7.1a provides a rating for the mechanism of stewardship theory for each case. The rating is determined by considering the evidence for each case across the three themes within this mechanism. Table 4 in Appendix 6

demonstrates the chain of evidence for all 11 cases by presenting the link between the coding of data within Nvivo 8 to the qualitative ratings for themes (information sharing to reduce information asymmetry by steward, explicit organisational focus of the steward, voluntary assurance by the steward) related to this mechanism of stewardship theory. Where high levels of evidence were identified in a case for each of the three themes in this mechanism, the case was rated as high overall for this mechanism. Two cases were rated as high, two cases were rated as medium and the remaining seven cases were rated as low for this particular mechanism of stewardship theory. Interestingly, the two universities rated as high operated in a centralised IT structure, Universities rated as medium operated in federated or hybrid structure with some centralization of IT structure and universities rated as low operated in a decentralised IT structure.

Table 7.1a   **Ratings for stewardship theory mechanisms by case**

Stewardship Theory	Cases										
Mechanism	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Conscious stewardship focus	L+	M-	M	L	L	L+	H	L	L	H	L
Unconscious stewardship focus											
Owner-Manager Alignment											
Overall Rating											

H= High, M=Medium, L= Low

7.3.2   *Unconscious stewardship focus mechanism*

The second mechanism of stewardship theory considers the unconscious stewardship focus of the steward. This mechanism is concerned with the actions of the steward in achieving risk symmetry with the owners' risk profile. Risk symmetry occurs where owners (who are risk neutral due to a diversified approach to investment) communicate, interact and develop trust with management to encourage them to move to a more risk-taking approach. This is in contrast to management's more natural risk averse approach (due to their dependence on a particular university for job security, income and

reputation) (Davis et al., 1997; Wiseman & Gomez-Mejia, 1998). There was one key theme identified under this mechanism being the alignment of the risk profile of the owner and steward theme. The pattern expected in this mechanism is *high levels of risk symmetry (the risk profiles of the steward and the owners are in alignment)*. The following sub-sections provide a detailed analysis of this mechanism including an illustrative case which provides further insight into this mechanism at a particular university.

7.3.2.1   Alignment of the Risk Profiles of the Owner and Steward

This theme focuses on the steward aligning his/her risk profile with that of the governing body/owners. In this mechanism, risk averse management is encouraged to align with the risk profile of the owners (federal and state governments jointly) to achieve greater risk symmetry (Davis et al, 1997; Wiseman & Gomez-Mejia, 1998).

Risk symmetry is more likely to occur where the owners establish an involvement-oriented management philosophy where high levels of trust exist between the owners, the governing body and management. This philosophy allows management to have maximum participation in decisions and creates a supportive governance structure (Davis et al., 1997; Wiseman & Gomez-Mejia, 1998).

The key evidence to emerge from the cases exhibiting this mechanism indicated that both management and the governing body viewed IT risks as both opportunity and danger. The following excerpts provide examples of my coding on this issue:

Examples of Coding:

> *"The risk management side of it is pretty good yes. If anything that is a strength that could become a weakness,* if risk management dominates thinking so much that you don't allow some scope for strategic explanation then it moves from being a strength to being a weakness or a threat anyway." (OITM NGU)
>
> *"Well we, I think we do manage risk well, I mean at the corporate level, we've just had a risk management committee,* we've got an external member of that who is an expert on risk management and he's given us a very big tick in terms of our processes. I think two or three of our corporate risks relate to IT and we have business continuity plans and crisis management plans in place to deal with them and that's a very important part of our corporate approach to risk management." (HG GO8)

While the extracts provide coding examples, my analysis was based on a holistic analysis of the stewardship mechanism at play. In the case of unconscious stewardship focus of the steward, the expected pattern expected was *high levels risk alignment.* In the next section I detail a single case that illustrates this characteristic. It provides a holistic example of the theory mechanism within a case, specifically the unconscious stewardship focus of the steward.

7.3.2.2 Illustrative case of the alignment of the risk profiles of the owner and steward

One case (ATN) which exhibited strong evidence of risk alignment operated in a centralised IT structure. This university's management and governing body had a clear collective view that managing risks associated with IT involves both the opportunity and the potential loss. This balanced view allowed management to align more clearly with the risk profile of the owners. The head of the governing body (Chancellor) indicated:

> **"Well I think a [recent large project] is an opportunity and it's a risk, and risk and opportunity are the opposite sides of the coin.** *I'm a believer you have to look at the opportunities first and then deal with the risk that attends to those opportunities. If you just focus solely on the risk you don't ever do anything but you've got to be aware of the risks." (HGB)*

A senior manager also revealed in his interview that he had developed a process which allowed the opportunities and risks of a new project or decision to be determined. He considered this helped management and the governing body to focus more on the opportunities of an IT decision not just the risks. The IT Director indicated:

> *"It's a pretty simple idea but the thing I like about it,* **it's sort of an awareness raising thing that we should care about opportunity and risk**, *but that's the neat thing about it, opportunity is one side, it's the corollary to risk." (ITD)*

The head of the governing body (Chancellor) corroborated this view by indicating:

> **"The strategic shape of IT in the university is essentially developed by the Vice-Chancellor and his team because that's a management thing.** *What [the governing body] does is to say whether we agree with it or not, and there might be a bit of nudging so if, I think we should have a hundred percent redundancy in the heart of the systems I would have wanted us to have that warm site at [campus name] operational two years ago,* **because I look at risk in a slightly different**

> ***way.*** *But that's got to be mediated by all the other competing priorities and views. Maybe my view was wrong and management's answer was right." (HGB)*

The head of the governing body indicated that the governing body's knowledge of opportunity and risk issues was provided from two governing body sub-committees and supplemented by regular reports on IT from the Vice-Chancellor. The sub-committees regularly ask questions of management which appear to give the governing body assurance that the alignment of risk profiles is being thoroughly considered before major IT decisions are agreed. The head of the governing body indicated:

> ***"Yes I think the other thing that came in my mind was we [the governing body] gets briefed, generally through Audit and Risk and Planning and Resources Committees,*** *as matters goes to those committees first on what is the changing nature of the IT environment in the university. For example, what are the trends in email traffic, how good is our security, so we want to know how often we've had penetrations and who's doing that and how are we dealing with it." (HGB)*

The Vice-Chancellor supported this by highlighting the importance of the governing body sub-committees role in risk management. He stated:

> ***"Risk management is extremely important. If you were to look at the Audit and Risk Committee agenda you will see that absolutely clearly****. When I became VC Audit and Risk was something, one of those things I got used to. In a sense I like Audit and Risk because it's a bit of a protection." (VC)*

The IT director corroborated this by highlighting the presence of extensive risk management processes within the university and the role of board sub-committees in this process. He stated:

> *"There is a well documented stream of interconnected processes that handle risk management at a strategic level and down to a fine grade level. This is projects individually, risk management is a part of a project management framework, and there is a strategic process that* ***we engage in with Audit and Risk Management Committee.*** *There is an annual report to the Audit and Risk Management Committee of Council which I attend and present on according to a risk management framework that we prepare and maintain on an annual basis." (ITD)*

This case highlights the role of the governing body and its sub-committees in assessing the balance between risk and opportunity being taken by university management. The interview discussions from the governing body and management indicate that while both

parties had a clear view that risk entailed both opportunities and risks, the two groups had different views of when opportunities should be taken and when a more risk averse approach should prevail. Thus, while management achieved alignment with the risk profile of the owners in most cases, there were some situations where they were unable to achieve this alignment due to the risk attitude of the governing body, despite wanting to align. Thus this case provides support for the expected pattern in this stewardship theme and mechanism of *high levels of risk symmetry* as management want to achieve alignment with the risk profile of the principal.

7.3.2.3   Summary of the unconscious stewardship focus mechanism

The unconscious stewardship focus mechanism is one of three key mechanisms of stewardship theory. The expected pattern in this mechanism focuses on *high levels of risk symmetry between the owners and the stewards* as evident in the illustrative case. Table 7.1b extends Table 7.1a and provides a rating for the unconscious stewardship focus mechanism for each case. The rating is determined by considering the evidence for each case across the key theme within this mechanism. Table 5 in Appendix 6 provides details of the chain of evidence across all 11 cases by demonstrating how data coding within Nvivo 8 is linked to the qualitative ratings for themes (alignment of risk profiles of owner and steward) for this mechanism of stewardship theory. Where high levels of evidence were identified in a case of risk symmetry between the steward and the governing body/owners the case was rated as high overall for this mechanism. The results indicate that one case was rated as providing high levels of evidence of this stewardship mechanism, four cases were rated as providing medium levels and six cases were rated as providing low levels of evidence. The university in the high rating operated in a centralised IT structure. The results indicate that universities still have a considerable way to go before they are truly aligning with the risk profile of the owners.

Table 7.1b   **Ratings for stewardship theory mechanisms by case**

Stewardship Theory Mechanism	Cases										
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Conscious stewardship focus	L+	M-	M	L	L	L+	H	L	L	H	L
Unconscious stewardship focus	L	M	M	L+	L	L+	M	L	M	H	L
Owner-Manager Alignment											
Overall Rating											

H= High, M=Medium, L= Low

7.3.3   *Owner-Manager Alignment Mechanism*

Owner-manager alignment is the third mechanism associated with stewardship theory. This mechanism results in the owners being able to clearly indicate how IT should be governed within the university as a result of the clear communication processes between the owners and stewards (Davis et al., 1997). This stronger alignment with the owner's objectives is due to the existence of a cohesive and trusted relationship between the owners and managers via the governing body and relies on the owners accurately and unambiguously communicating their objectives to management. The alignment is also dependent on owners' continuously encouraging management to interact to seek clarification on any misunderstanding and misjudgements and to break down any complexity which is hindering their understanding of the owner's objectives (Sundaramurthy & Lewis, 2003). This enhanced communication and trust is more likely to occur at a university with a centralised IT structure where the IT relations need to be less about monitoring and more about sharing (King, 1983; Musson, 2008).

Three themes emerged under this mechanism. The first centred on owners clearly specifying to management how IT should be governed within each university. This theme focused on how clear communication processes between the parties allowed management to clearly understand how the owners wanted IT governed (Sundaramurthy & Lewis, 2003, Davis et al., 1997). The second theme focused on the governing body

selecting competent IT management. The third theme focused on the ability of the owners to select competent governing body members who had the IT skills to effectively govern the IT processes of their university. The pattern expected in this mechanism is *high levels of the owners having clearly communicated their objectives to management* or *high levels of a clearly trusted and cohesive relationship between the stewards and owners* or *high levels of the governing body selecting competent IT management* or *high levels of the owners selecting competent governing body members.*

7.3.3.1   Owners are able to clearly specify how IT should be governed

In some cases, the data indicated that the owners are able to clearly specify how IT should be governed within each university. In this theme, stewards are more likely to align with the interests of the owners through clear communication processes between managers and owners via the governing body. This clear specification by the owners of how IT should be governed developed as a result of a cohesive and trusted relationship between the parties (Davis et al, 1997; Sundaramurthy & Lewis, 2003).

Three key issues emerged from the case data on this theme namely (1) owners established a clear IT direction, (2) management is part of cohesive governance team and (3) a trusted relationship exists between the steward and the owners. Each of these issues will be discussed in the sub-sections that follow.

Owners established a clear IT direction

Owners established a clear direction on the governance of IT which resulted from strong communication processes between the steward and the governing body/owners. There was an obvious trusting and cohesive relationship between the parties. This appeared more prevalent in a centralised IT structure. The following excerpts from the interview data provide examples of the coding on this issue:

Examples of Coding:

> *"Now my university in that respect has **very strong but pragmatic governance** and that's a key thing, pragmatism. I am on the [finance] Committee, it's a decision-making committee, it is a subset of the [governing body] but it is probably the main decision-making committee for the university. So things go to [finance] Committee for an endorsement and decision and then basically it's onwards information to the [governing body]." (GBM NGU)*

> *"When I say the [governing body], and I do mean both [governing body] in general session but more particularly the [governing body] through its subcommittees. Where the real work's done and we, without treading on other people's prerogatives **we do tend to have quite a lot of discussion rather than be presented with facts or with positions about how things are going**. So the [finance] committee which is really only there to look after the money side of it spends quite a lot of time discussing the progress of the implementation of the various important things such as the student system, such as the finance system because people on the committee are capable of understanding what's going on and **we see ourselves as providing, mentoring is the wrong word, at least a sounding board for the people that are doing the actual work.**" (GBM NGU)*

Management is part of a cohesive and trusting governance team

In line with stewardship theory, the case data highlighted evidence of a cohesive governance team being important to owner-manager alignment. Strong owner-manager alignment was linked to trust between the governing body, owners and management. The following excerpts from the interview data provide examples of the coding on this issue:

Examples of Coding:

> *"Leadership, making sure there is an understood direction for the university, expectations are set by the university, of where we are heading. **So everyone is working together, that's a utopia, but there should be a common understanding of where we are all going, where we are taking IT, a** common direction that everyone is working too." (OITM GO8)*
>
> *"Now having said that there is also limited space and tolerance for what everyone else is doing because there is just so much going on. **I think that what happens here is a fair bit of governance takes place through trust so there's, I think there's quite high trust level at [my university] in the overall execution of IT decision-making and investment** and so on and with the exception of [the student system], which is this unprecedented very large project the rest of it is mainly a question of the main area of get on and do it, take us in the right direction." (DVCIT ATN)*

7.3.3.2   Selection of competent management

Stewardship theory was also evident when the governing body selected competent IT management (Sundaramurthy & Lewis, 2003). Having competent management running the IT processes of the university increases the likelihood that the objectives of the owners will be achieved and owner-manager alignment will be strong and effective. The following excerpts from the case data provide evidence of the coding on this issue:

Examples of Coding:

> "*One of the reasons [DVCIT] **was recruited was because of [his/her] expertise** in that area IT and the implementation of a student system. He/she did that at his/her previous university in an incredibly short period of time. He/she actually bought in/built a satisfactory system for his/her previous university and my research indicates that. In fact his/her explanation of how he/she implemented that and his/her warts and all answers as to the things he/she would have done better were very impressive." (GBM IRU)*
>
> "*Yes, increasingly. We could do a lot better I think, but certainly, [IT Director] is certainly focused on delivering that increasingly that is the case. **I think that [the IT Director] has got that quite right,** looking at the owners and certainly the university has that twin engine of research and education. Interestingly I've got a different opinion of student management systems than the rest of the university and that's starting to be one area that I'm fleshing through the governance structure. I think [IT Director] got it right you know, you look across and it is fairly standard with things like HR, finance, student management then you move into the research area, than you move into the education." (HM NGU)*

7.3.3.3.   Owners have selected competent governing body members

In order for stewardship theory to apply, it appeared that it was important for owners to select competent governing body members. There was evidence indicating that governing body members in many universities had the skills and knowledge to proactively and effectively govern the IT processes of their university. The following excerpts from the interview data provide examples of the coding:

Examples of Coding:

> "*"My role is I am on [the governing body] because I have skills in business and finance. As it happens **I also have skills in IT as does at least one other [governing body] member with almost the same level as myself.** We both see our roles as acting as mentors, sounding board or the person that will say hang on stop you're snowing us here, we want to hear it as it is and that sort of discussion and that fairly robust discussion takes place in the sub-committee meeting where we are presented with a nice shiny paper which says here we are progressing on these fronts and we start unpicking it, saying well what do you mean by that or how are the users really reacting but that sort of discussion which is entirely proper in the sub-committees I think." (GBM NGU)*
>
> "***Well I've been quite active and a few other [governing body] members have been quite active in rattling the cage to ensure that we do in fact have a strategy for systems and processes. People on [the governing body] who are not there as just a watchdog but who are interested** and saying okay now here's why the core functions need to be the same and just delivered out to different faculties, so help them with that strategy and so on. Very much at a strategic level, I don't get involved in the operational and I've been very involved for example in the digital publishing program and strategy for the university and in management information systems (MIS) and in making sure that we have a student administration tool."(GBM GO8)*

While the sample extracts reported above provide coding examples, my analysis was based on a holistic analysis of the hypothetical stewardship mechanism at play. In the case of owner-manager alignment, the expected pattern expected was *high levels of the owners having clearly communicated their objectives to management* or *high levels of a clearly trusted and cohesive relationship between the stewards and owners* or *high levels of the governing body selecting competent IT management* or *high levels of the owners selecting competent governing body members.* Evidence of these four characteristics in three individual cases provides a clear example of a stewardship theory explanation for the cases.

7.3.3.4 Illustrative Case of Owner-Manager Alignment

In this case (ATN) owners appeared to be able to clearly specify how IT should be governed. The management appeared to have a very clear view of who was responsible for the different ITG related processes. A senior manager indicated that he/she had a very clear view of what IT governance entailed at this particular university. This clear vision supports the view that in this university the owners have clearly specified how IT should be governed within the university. A senior manager stated:

> "**It's the activities and the support and the decision-making that sits around what it is that we do with our IT systems. So the governance is about making sure that things happen in the right way, at the right time, in the right order, with the right sort of sign offs and approvals** and with the right sort of risk analysis that goes with it and therefore the right reporting back to the relevant bodies about what you are doing. So, it is not about the system itself which will have its own little internal governance, the way I am thinking about it is in the much broader context and because of the cost of the systems, the impact and importance of the systems, the need to have the good governance structure **sitting around not just individual systems but then collectively has become increasingly important.**" (HG)

The chair of the governing body (chancellor) supported the fact that management in this university had a clear vision of how IT should be governed within this university. His/her comments provide evidence of the fact that the governing body on behalf of the owners has clearly specified to management how IT should be governed within this university when the chancellor stated:

> *"Now that means a couple of things; firstly it means that **the approach [that my university] takes, which is to look at the both the physical and virtual world in one set of arrangements, is in [the governing body's] view, and it's certainly in my view, a very sensible and appropriate way of doing it,** and is different from how it occurs in other organisations in my experience. This was one of the very fundamental decisions made in the university and it was before my time, (I've been Chancellor for four years now) The notion was to deal, in terms of capital appropriations, financial appropriations with the physical and virtual world as one. So when we [the governing body] consider the university's asset management plan, and when the [governing body] ticks that off and says to the Vice-Chancellor yes you can go ahead and do that, [the governing body] is approving a blend of both the physical and virtual worlds. (GBM)*

This clear vision appears to be linked to the strong level of cohesion and trust between the governing body and management and the levels of trust between key executive management. The Vice-Chancellor, the chair of the governing body (Chancellor) and senior management provided evidence of this strong and trusted relationship between the governing body and key management. The chancellor stated:

> ***"It sort of builds on, certainly from [the governing body], it builds on the relationship that existed between the prior Chancellor and Vice Chancellor. And then you know it's, I think from my point of view it's a similar relationship with the VC and myself."*** *(GBM)*

This was corroborated by the Vice-Chancellor who indicated:

> *"I am the CEO, I am accountable to the [governing body], but the role is a different role as well, **the role is about culturally, about ensuring that we develop trust with the governing body,** that we tell them what's going on whether it's good, bad or indifferent and that we seek to be non-defensive about the mistakes." (VC)*

This illustrative case provides evidence of the owners clearly specifying how IT should be governed within this particular university. This case operated in a centralised IT structure. The case illustrates that the management in this university have a clear vision of how IT should be governed and have both a trusting and cohesive relationship with the governing body and other key executive management. The case meets the pattern of this theme by *highlighting high levels of how IT should be governed in this university*. The case also indicated *high levels of a trusting relationship between the governing body and key management.*

7.3.3.5   Summary of Owner-Manager Alignment Mechanism

The owner-manager alignment mechanism is one of the three key mechanisms of stewardship theory. The expected pattern in this mechanism focuses on *high levels of owners having clearly communicated their objective to management* or *high levels of a clearly trusted and cohesive relationship between the stewards and owners* or *high levels of the governing body selecting competent IT management* or *high levels of the owners selecting competent governing body members* as evident in the illustrative case. Table 7.1c is a continuation of Table 7.1b and provides a rating for owner-manager alignment across each of the cases. Cases were rated as high if they included more than two high ratings across the three themes within this stewardship mechanism. Table 6 in Appendix 6 provides the chain of evidence for all 11 cases by demonstrating how the coding of data within Nvivo 8 is linked via qualitative ratings for each theme (owners are able to clearly specify how IT should be governed, the governing body has selected competent management and the owner has selected competent governing body members) for this mechanism of stewardship theory. The results for this mechanism identified that two cases demonstrated high levels of owner-manager alignment, three cases demonstrated medium levels of owner-manager alignment and six cases exhibited low levels of evidence.

Table 7.1c   **Ratings for Stewardship Theory Mechanisms by Case**

Stewardship Theory	Cases										
Mechanism	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Conscious stewardship focus	L+	M-	M	L	L	L+	H	L	L	H	L
Unconscious stewardship focus	L	M	M	L+	L	L+	M	L	M	H	L
Owner-Manager Alignment	L	L	M-	L	L	L+	H	M	M-	H	L
Overall Rating											

H= High, M=Medium, L= Low

7.3.3.6   Conclusion Stewardship Theory Results

This section presents the with-in case analysis of stewardship theory and its related mechanisms. The section provides the qualitative results associated with the three key mechanisms of stewardship theory, namely the conscious stewardship focus of the steward, the unconscious stewardship focus of the steward and owner-manager alignment.

The first mechanism of stewardship theory (conscious stewardship focus) focuses on management wanting to be good stewards of corporate assets. Two universities were rated as having the expected pattern of *high levels of information symmetry, high levels of explicit organisational focus of the steward* and *high levels of voluntary assurance by the steward.* These two universities (G, J) were identified as operating a highly centralised IT structure. The remaining universities, who were rated medium or low, operated in a decentralised or federated IT structure.   The results for this first mechanism of stewardship theory suggest a link between IT structure and evidence of stewardship behavior and processes. These results appear to indicate that universities operating in a centralised IT structure are more likely to exhibit evidence of empowered IT management who do not need to be monitored, who regularly voluntarily report on their activities and who have a strong organisational focus. This may be due to centralization of IT structure removing many layers of management by restructuring from a number of faculties and divisions across multiple campuses to one central location. Centralisation also allows the governing body to more actively advise and support management in their IT decision-making processes.

The analysis associated with the second mechanism of stewardship theory (unconscious stewardship focus) examines the actions of the steward in achieving risk symmetry with the owners risk profile. One university (J) presented evidence of the expected pattern for this mechanism of *high levels of risk symmetry between owners and the steward.* The fact that this university operated in a centralised IT structure suggests a link between this mechanism of stewardship theory and university IT structure. This may be due to alignment of risk profiles between the principal and agent being aided by the centralization of IT structure as it makes it easier for management to make riskier IT decisions when they can see the potential impact of these decisions on the IT processes.

It may also be easier in a centralised IT structure for the governing body to advise and support management to make IT decisions, which are more in line with the risk profile of the owners due to their higher visibility and access.

The third mechanism of stewardship theory identified evidence of the owner-manager alignment mechanism of stewardship theory. This mechanism is focused on the owners being clearly able to indicate to IT management how IT should be governed within the university. The results indicate that two universities (G, J) provided high levels of evidence of the expected pattern for this mechanism of *high levels of owners having clearly communicated their objective to management* or *high levels of a clearly trusted and cohesive relationship between the stewards and owners* or *high levels of the governing body selecting competent IT management* or *high levels of the owners selecting competent governing body members.* These two universities operated in a highly centralised IT structure. Thus a consistent pattern between IT structure and the expected patterns of stewardship theory was observed. Since under stewardship theory the governing body's role is to provide advice and support to IT management, a stronger communication and trust structure should exist between management, the governing body and the owners. This in turn should enable the governing body to provide more detailed advice to management on how to manage IT within the university.

In conclusion, Table 7.1d provides an overall rating for stewardship theory for each cased based on the culmination of ratings for each of the three stewardship theory mechanisms reported in table's 7.1a-7.1c and discussed in sections 7.2-7.3. The overall rating presented in Table 7.1d indicate that in two cases (G, J) stewardship theory was a strong explanation for how boards govern IT (rating of high or high minus). These two universities operated in a centralised IT structure and so there appears to be link between a centralized IT structure and the presence of stewardship theory behaviours and processes. Another two cases (B, C) provided moderate support for stewardship theory as an explanation of IT governance (rating of medium or medium minus) and they operated in federated structure. Seven cases (D, E, F, H, I, K) demonstrated that stewardship theory was a weak explanation of IT governance (rating of low or low plus).

Table 7.1d   **Ratings for Stewardship Theory Mechanisms by Case**

Stewardship Theory Mechanism	Cases										
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Conscious stewardship focus	L+	M-	M	L	L	L+	H	L	L	H	L
Unconscious stewardship focus	L	M	M	L+	L	L+	M	L	M	H	L
Owner-Manager Alignment	L	L	M-	L	L	L+	H	M	M-	H	L
Overall Rating	L	M-	M	L+	L	L+	H-	L+	L+	H	L

H= High, M=Medium, L= Low

7.4   Understanding resource dependence theory mechanisms

Resource dependence theory identifies the corporation to be an open system dependent on external contingencies (Pfeffer & Salancik, 1978; Hillman & Dalziel, 2003). The theory identifies that for organisations to survive they must be able to acquire and maintain resources. However, organisations are not always in control of their access to resources and their environment is not always dependable in providing resources and so often depend on other organisations for resources they require (Pfeffer & Salancik, 2003). Resource dependency theory asserts that the board is an essential link between the organisation and its required resources (Pfeffer, 1972; Pfeffer & Salancik, 1978; Hillman et al., 2009). Two key mechanisms have emerged consistently from the research on board roles and the resources the board brings to the organisation to assist the organisation to deal with its external dependencies. The two key mechanisms identified from the resource dependence literature are (1) outside board members provide preferential access to external resources and knowledge and (2) board members provide advice and counsel to management to minimize external dependencies for the organisation.

The interview data was qualitatively inductively analysed for these two resource dependence mechanisms. During the iterations between the interview data and theory, no

clear evidence was identified that could be linked to resource dependence theory and its mechanisms. No evidence emerged from the interview data that external board members provided their university governing bodies with access to external IT resources and knowledge. Whilst there was some evidence of the governing body providing advice and counsel to management, the advice was more focused on internal interactions and decision-making and was not focused on minimizing external dependencies.

The lack of evidence on resource dependence theory found in the data may be due to the fact that in the university context, boards are often larger in total size (22 members on average) than in the private sector and include a larger number of executive board members. As a result, university boards tend to have access to IT resources and knowledge from within their executive directors (university management) and may not need to seek this from external board members. In addition, external board members on university boards often are not selected for their IT knowledge and resources but are selected for the wide range of knowledge they can bring to assist the complexity of the university. To ensure IT skills are represented on the university board, universities often choose members knowledgeable in IT from within university management. As universities are governed by State Acts of Parliament which have specific selection requirements for each universities governing body, this may mean that universities do not have the opportunity to appoint external directors with IT skills. This may mean that resource dependence theory constructs may be more difficult to observe in the data than the other two corporate governance theories.

The following examples in the data support the fact that board members within the university cases did not have the IT skills or supply the contacts suggested by RDT and that the university governing bodies tended to rely on internal governing body members to provide this advice, that is, university IT management. The following quotes from the data also highlight the wide skill base required for university governing bodies and the difficulties associated with appointing external directors with IT skills.

> *"The trouble is nobody on our [governing body] has got any specific IT experience, there was a [governing body member] who was on [the governing body] and he was involved in IT.* He was a university staff member on [the governing body]." (GBM IRU)

"It's like any other [governing body] there are twenty-three or twenty four members and there are about a dozen different skill bases." (GBM NGU)

"I think that is a general enough problem here which is there is probably not enough board level people who understand IT full stop. Because I got myself elected to [prior university governing body] and one of the reasons I did was that the [governing body] seemed to know nothing whatsoever about ICT and that had been a bit painful for me as a manager. I think we've got a similar issue [at this university] we don't have many [governing body members with ICT skills]. I'm trying to think if we've got any. I think there was an assessment done of [governing body member] skills and I am not sure if ICT was in that. I could probably go back and have a look at that. Off the top of my head I think there might be a gap there" (SDVC IRU)

"Yes and I think that is a problem with boards and boards seek independent members that bring a range of skills and I think all boards in the past have just simply not ensured that they have enough IT skill at the board level. Because it has increasingly become a big proportion of the spend, extraordinarily strategically important and often the board does not have the expertise" (GBM NGU)

"I think quite frankly the [governing body] tends to work in, I don't think there is a lot of people like with IT knowledge in there." (ITD G08)

The excerpts from the data support the fact that external directors within universities may not have sufficient IT knowledge and resources to assist their governing bodies and thus may not be able to supply IT contacts to their universities. The consensus from the excerpts above is that the universities rely on IT management to provide this support internally. Hence the lack of data supporting resource dependence theory appears valid.

Table 7.1e presents a rating for each university for resource dependence theory. As no case provided evidence of the two resource dependence mechanisms, each case was rated as no evidence (N) for each mechanism which resulted in an overall rating for resource dependence theory for each case of no evidence (N). The results indicate that resource dependence theory does not appear to be a good explanation for how university boards deal with the governance of IT.

Table 7.2 Ratings for resource dependence theory mechanisms by case

Resource dependence theory Mechanism	Cases										
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
External Governing Body members provide preferential access to external IT resources and knowledge	N	N	N	N	N	N	N	N	N	N	N
Governing body members provide advice and counsel to management to minimize external dependencies for the organisation.	N	N	N	N	N	N	N	N	N	N	N
Overall Rating	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**

N= No evidence

7.5   Summary

This chapter presented the results of the qualitative inductive analysis associated with stewardship theory and resource dependence theory. The results were presented under the theoretical mechanisms and themes linked to each theory. Detailed conclusions on each theory are presented at the end of sections 7.3 and 7.4.   The results of the analyses for stewardship theory found two cases (J, G) were primarily linked to the three mechanisms of stewardship theory.   These two cases operated in a centralised IT structure. The results indicate that centralization of IT structure is associated with the behaviours and processes predicated by stewardship theory. The chapter also highlighted that no cases were primarily linked to resource dependence theory.

The results identified in chapter 6 and this chapter will be analysed further in the cross-case analysis in the next chapter (chapter 8) to explore how well traditional corporate governance theories apply to the governance of IT.

Chapter 8

Cross-Case Analysis of Corporate Governance Theories

8.1   Introduction

This chapter reports the cross-case analysis of my qualitative study. As part of this final analysis, I identify in Figure 8.1 below, where my overarching research question **"How do boards govern IT?"** and my research sits with respect to the emerging ITG research agenda. My cross-case analysis in this chapter aims to explore if traditional corporate governance theories can be linked to the processes, structures and relational mechanisms identified in the enterprise governance of IT framework (Van Grembergen, De Haes & Guldentops, 2004; De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2009b; Ko & Fink, 2010). The emerging framework proposes that in order to effectively implement ITG, an organization must establish a holistic set of governance - structures, processes and relational mechanisms at each of the strategic, management and operational levels. Structures determine how the IT function is carried out and where the IT decision-making authority is located within the organization, that is, the power structure related to IT processes. Processes refer to the formalization of strategic IT decision-making or IT monitoring procedures to policies are followed and relational mechanism refers to active participation of and collaborative relationship among, corporate executives, IT management and business management (Van Grembergen & De Haes, 2004; Van Grembergen, De Haes & Guldentops, 2004; De Haes & Van Grembergen, 2005; De Haes & Van Grembergen, 2006; De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2009b; Van Grembergen & De Haes, 2009c;Wilson & Pollard, 2009; Ko and Fink, 2010).

The within-case analyses presented in chapters 6 and 7 assessed whether the governance arrangements surrounding IT are best described by agency, stewardship and resource dependence theories. In these chapters, I determined a qualitative rating of high, medium, low or No for the level of evidence I observed in relation to each theoretical mechanism

for each theory within each case. These ratings will be used in this chapter to examine the similarities and differences between the cases explained by each theory.

A key finding of the cross-case analysis is that agency theory and stewardship theory are associated with different IT structures. More specifically, when IT is decentralised, agency theory provides a superior explanation for the processes and relationships surrounding the governance of IT. In contrast, when IT is centralised, stewardship theory provides enhanced elucidation for the governance of IT. Universities with federated or hybrid IT structures exhibit aspects of both agency and stewardship theories associated with processes and relationships surrounding the governance of IT.
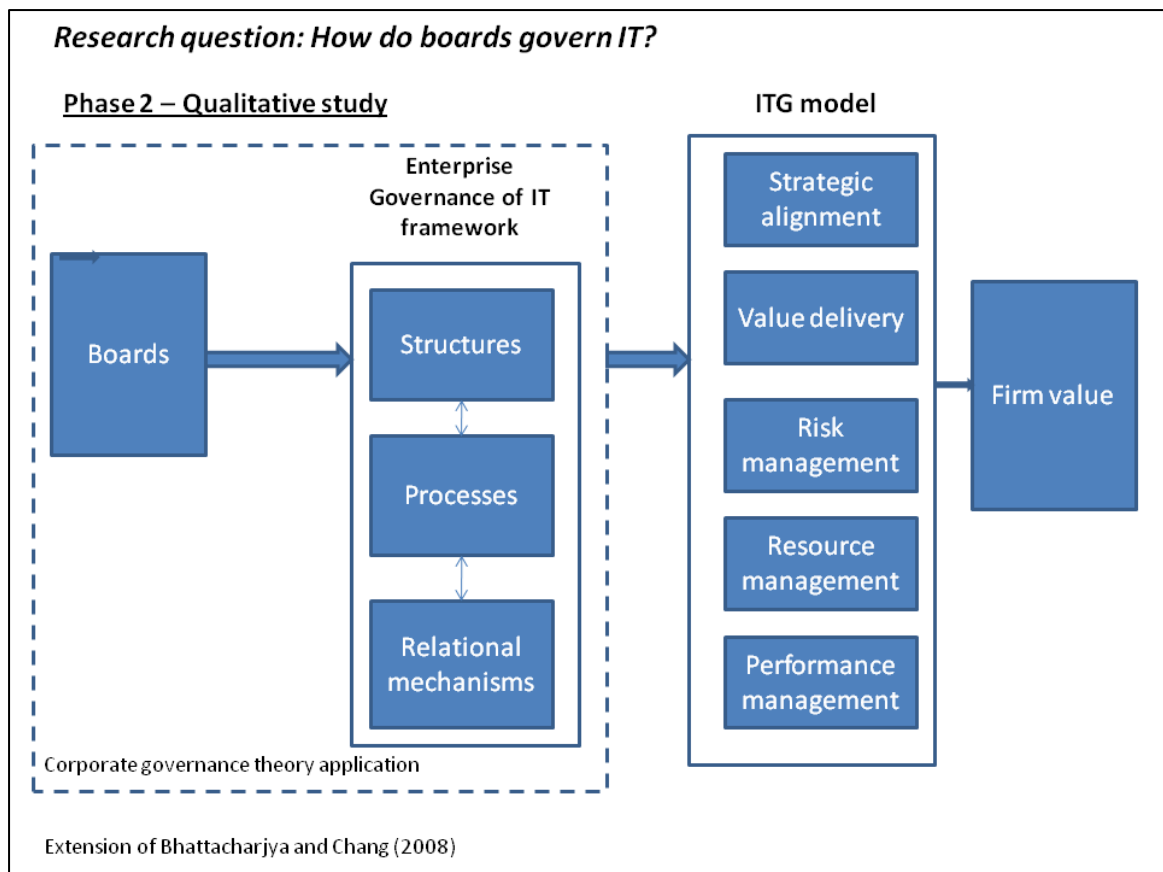
Figure 8.1   Situating my research in the emerging ITG research

The chapter will be structured as follows. Section 8.2 will consider the clustering of corporate governance theories across the cases, section 8.3 will discuss the primary agency theory group, section 8.4 will discuss the primary stewardship theory group and section 8.5 will discuss the combined agency/stewardship theory group. I summarise my insights in section 8.6.

8.2   Cross-case theory clusters

Table 8.1 presents a summary of the overall ratings for each theory which have been transferred from the overall ratings line in Table 6.1d, 7.1d and 7.2 in chapters 6 and 7. It summarizes my assessment of how well each case reflects the presence or absence of behaviours and processes that are best described by the competing theories. This table also demonstrates the inter-relationships between the theories across each case. In six cases, evidence of the mechanisms of a single theory (either stewardship or agency theory) was rated as high (A, F, H, I, G, J) with low ratings associated with evidence of the mechanisms the other two theories. In these cases (shaded in red), the relationship between the governing body's approach to ITG could be predominantly explained by the mechanisms of a single theory. In contrast, two cases (B, C) appeared to provide moderate evidence of the presence of the mechanisms of both stewardship and agency theories (shaded in yellow). Another two cases (D, E) provided moderate evidence of the presence of mechanisms of agency theory and low evidence of the presence of the mechanisms of stewardship theory. Case (K) provided low evidence of the presence or absence of the behaviours that are best described by the different theories. Finally, there was no evidence of the presence across any of the cases for the processes and behaviours that are best described by resource dependence theory.

Table 8.1   **Ratings of Three Corporate Governance Theories by Case**[1]

Cases	Overall Ratings by Theory										
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Agency Theory	**H**	**M**	**M-**	**M**	**M-**	**H-**	**L+**	**H-**	**H-**	**L+**	**L**
Stewardship Theory	**L**	**M-**	**M**	**L+**	**L**	**L+**	**H-**	**L+**	**L+**	**H**	**L**
Resource Dependence Theory	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**

H= High evidence; M= Medium; L=Low Evidence; N=No Evidence

As no evidence of the presence of resource dependence theory was found in any of the universities studied (see Table 8.1), I do not consider it an appropriate explanation for how boards govern IT within Australian universities. This may be due to three key aspects of the university context. First, universities tend to have management teams with effective IT skills (King, 1983; Peterson, 2004a, 2004b) and so may not need the IT knowledge of external directors to assist them. Conger and Lawler (2001) indicate that effective boards are assembled by identifying the needs of the board and selecting members with relevant talents and attributes. From a resource dependence perspective, these skills should complement management (Pfeffer & Salancik, 2003; Hillman et al., 2009)[2]. If management is effective, there would be no need for these skills to be represented on the board, or, if they were, it is unlikely they would be called upon in a resource dependence role.   Second, as universities are very large and complex organisations, they typically need a wide range of knowledge on the board. To ensure that IT skills are represented on the board, universities may choose from people knowledgeable in IT within the university (e.g. Deans of IT Faculties) (Conger & Lawler, 2001).   Thus universities do not need external board members to provide this IT knowledge. Third, universities are governed by State Acts of Parliament and these acts have specific selection requirements for each university's governing body. These highly prescriptive selection processes may mean that universities do not have the opportunity to

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[1] Cases with high ratings in a particular theory were shaded red, cases with medium ratings in a particular theory were shaded yellow and cases with low ratings in a particular theory were not shaded.

[2] Agency theory would, in contrast, suggest similar or overlapping skills are required so that the board can monitor management (Eisenhardt, 1989a; Hendry, 2002; Shapiro, 2005).

appoint governing body members who have sufficient IT knowledge and experience to enact the resource dependence role.

Figure 8.2 provides a graphical representation of my assessment of agency theory and stewardship theory applicability to the cases. This figure reveals four clear groups, that is, the primary agency theory group (A, F, H, I), the primary stewardship theory group (G, J), the combined agency theory/stewardship theory group (B, C, D, E) and the insufficient information to analyse group (K). This case (K) will not be considered further in this cross-case analysis and it represents only one interview with the IT director and so could not provide the diversity of information on the application of stewardship and agency theory mechanisms compared to the other cases. Each of the remaining three groups will be discussed in the cross-case analysis sections that follow.
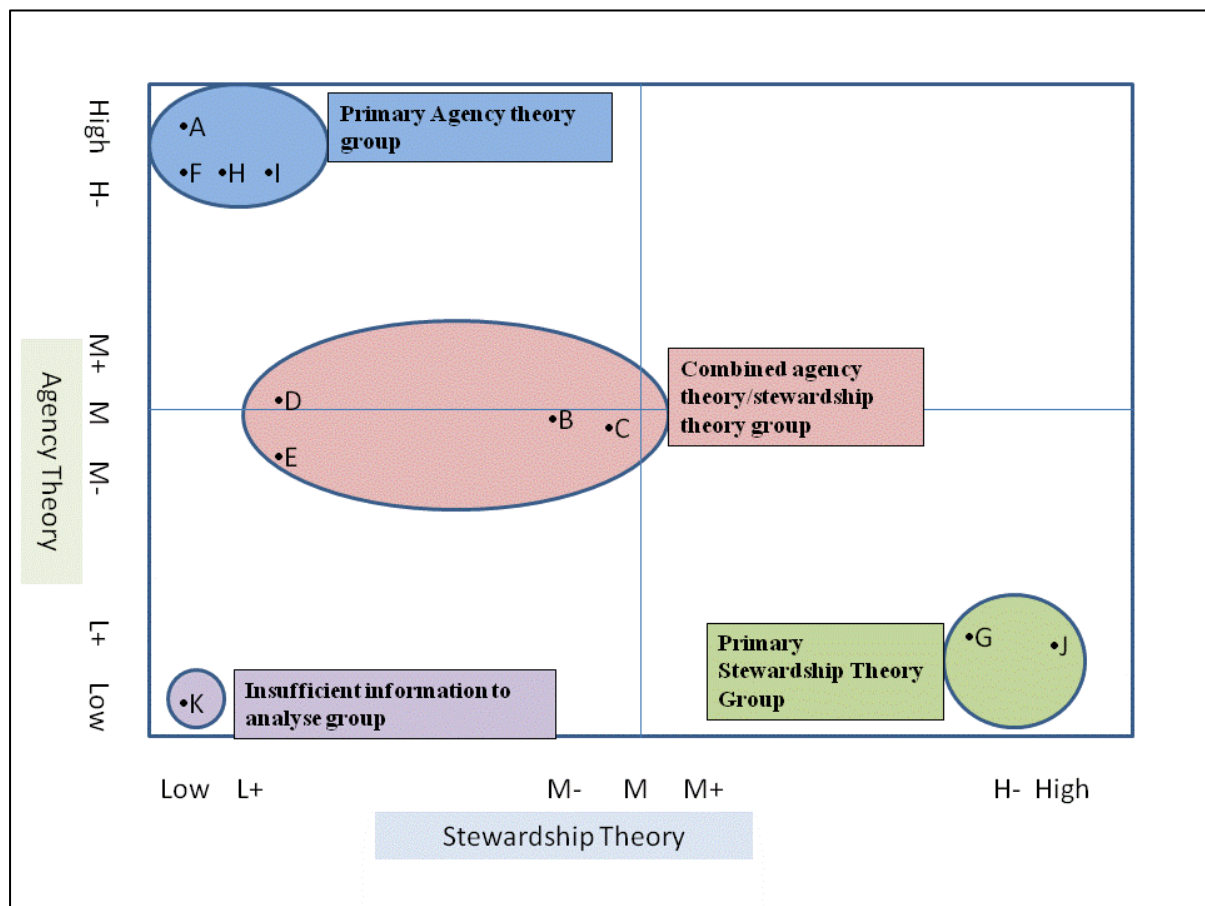
Figure 8.2 **Inter-relationship between agency and stewardship theories and the cases**

8.3   Cross-case analysis of the primary agency theory group

The primary agency theory group identified in Figure 8.2 (cases A, F, H, I) provided high support for the explanatory power of agency theory. To increase our understanding of why these four universities primarily exhibited evidence of the processes and behaviours associated with agency theory in their governance of IT, I reviewed the key case attributes of each university in the group to consider how these attributes might possibly be related to the structures, processes and relational mechanisms of the enterprise governance of IT framework (De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2009b; Ko & Fink, 2010).

My cross-case analysis identifies that age, size, ITG maturity and complexity appear linked to these four universities. The universities also operate under a decentralised IT structure which in turn appears linked to high levels of evidence of the presence of behaviours and processes that are best described by agency theory. The details of these relationships are presented in Figure 8.3.

Cases	Age	Size	ITG Maturity	University Complexity	IT Structure	Agency Theory Rating
A	Mature*	Medium	Well Established	Low	Decentralised*	H
F	Very Old*	Large*	Not Well Established	High*	Decentralised*	H-
H	Very Old*	Very Large*	Not Well Established	High*	Decentralised*	H-
I	Old*	Very Large*	Well Established	High*	Decentralised*	H-
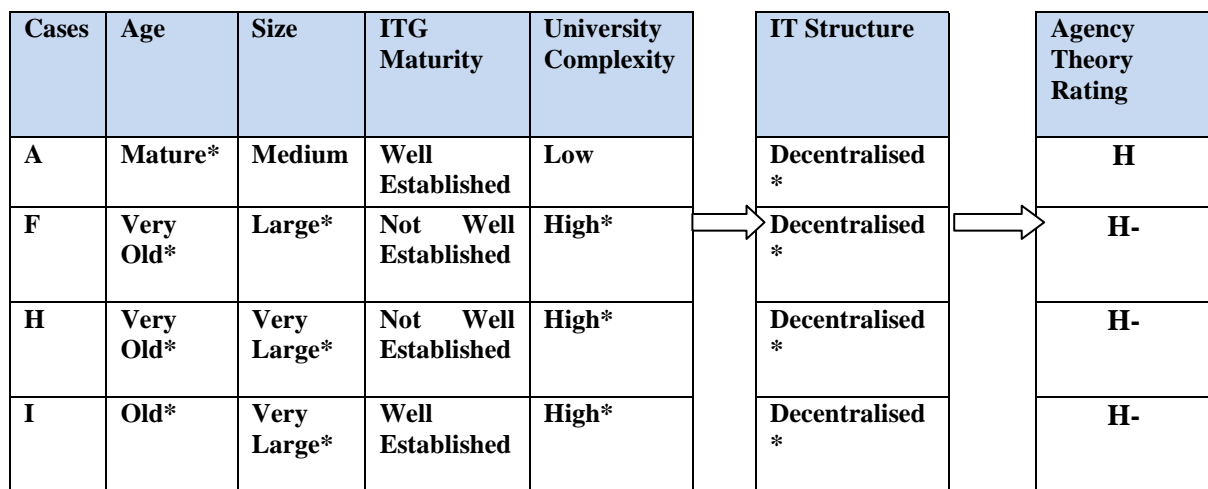
= attributes in common between the cases

Figure 8.3   **Case Attributes - Primary Agency Theory Group**

The link between the case attributes and operating under a decentralised IT structure appear to be path dependent[3]. These four universities probably developed their IT operations in a traditional silo approach over time as part of autonomous university

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[3] "Path dependence is the dependence of economic outcomes on the path of previous outcomes, rather than simply on current conditions. In a path dependent process, "history matters" -- it has an enduring influence. Thus, explanations of the outcomes of path-dependent processes require looking at history, rather than simply at current conditions of technology, preferences, and other factors that determine outcomes." (Puffert, 2010, p.1)

sections that are funded centrally for all operations, including IT (Peterson, 2004a, 2004b; King, 1983). In contrast the ITG maturity of the university (performance assessment of how well university is governing IT) does not appear directly associated with the choice of structure with two cases being rated as having well established ITG processes and two rated as having not well established ITG processes. This indicates that agency theory processes and behaviours may operate at universities who have a decentralised IT structure no matter the current level of their ITG maturity.

The four universities in this grouping have a decentralised IT structure[4] involving autonomous IT decision-making and IT staffing (Brown, 1997). Due to its lack of central control, it provides a greater opportunity for IT management to be self-interested and focus on decisions which are in their own best interests rather than the interests of the university (Jensen & Meckling, 1976; Eisenhardt, 1989a; Shapiro, 2005). In addition, due to the diverse location of IT managers across the university, the governing body in these four cases often found it difficult to gather IT information (or information was deliberately withheld by IT managers to reduce scrutiny on their IT actions). As a result, I observed high levels of information asymmetry and the agent taking advantage of this superior information status to undertake high levels of self-interested behaviour (Eisenhardt, 1989a; Shapiro, 2005). Self-interested behaviour by the agent is most likely to occur in a decentralised or federated IT structure where all or part of the locus of control for IT decision-making rests with each faculty and division, that is, decisions are made at various levels in the university hierarchy (King, 1983). These types of IT structures are more difficult for the governing body to control as decision-making is dispersed (King, 1983). High levels of agency costs were likely as a result of these conscious self-interested behaviours of the agent (Jensen & Meckling, 1976; Eisenhardt, 1989a; Shapiro, 2005).

Due to the dispersed nature of a decentralised IT structure, faculty and divisional IT management make decisions in isolation from each other and in isolation from central management. I observed in data from these four universities that agents sometimes appeared to unconsciously make decisions that favoured their business unit and that

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[4] A decentralized IT organisational structure is designed to enable better business unit control of IT processes, a greater sense of business ownership of IT systems and processes and a greater responsiveness and flexibility by IT to business needs and users (Peterson, 2004b).

managers were often risk averse due to the agent's dependence on the university for income and employment (Jensen & Meckling, 1976; Ross, 1973). This agent decision-making may not align with the risk profile of a principal who holds a widely dispersed investment portfolio (Eisenhardt, 1989a; Wiseman & Gomez-Mejia, 1998; Shapiro, 2005). This misalignment is more likely to occur in a decentralised or federated IT structure where communication between the governing body and IT management is poor and the owners are unable to clearly communicate their risk profile to management (King, 1983; Peterson, 2004a, 2004b).The high level of support of the misalignment between the risk profiles of the principal and agent observed within these four cases also suggests significant agency costs were imposed on these universities (Eisenhardt, 1989a; Sundaramurthy & Lewis, 2003).

I also observed in that case data that a decentralised IT organisational structure led to poor communication links between the governing body/executive management and IT managers. These communication difficulties were associated with a large number of IT managers and their widely dispersed locations. As a result of this decentralised structure, the principal appeared unable to effectively communicating his/her risk profile and how IT should be governed to faculty and divisional IT management across the four cases (Eisenhardt, 1989a; Hendry, 2002). The cases also identified that due to a lack of understanding by the governing body of the IT processes of the university and information asymmetry, the principal was not able to select governing body members with sufficient IT skills to effectively manage a diversified IT environment (Hendry, 2002; Eisenhardt, 1989a). The principal's problems observed in these four cases also increased the agency costs incurred by these universities (Eisenhardt, 1989a; Hendry, 2005).

To reduce these agency costs, I observed the presence of monitoring systems and performance measurement processes being established by the boards in the four universities to assist their board monitoring responsibilities (Jensen & Meckling, 1976; Eisenhardt, 1989a; Shapiro, 2005; Hendry, 2002, 2005).

The primary agency theory group appears to exhibit the presence of behaviours and processes that are best described by agency theory as a result of their decentralised IT organisational structure. The decentralised IT structure appears to be path dependent as a

result of the university's age, size and complexity. The cross-case analysis of the universities in this grouping appears to indicate when IT is decentralised, agency theory provides an enhanced understanding of the processes and relationships surrounding the governance of IT.

8.4 Cross-case analysis of the primary stewardship theory group

Two cases (G and J) presented support for stewardship theory as an explanation for how university boards govern IT. To provide a superior understanding of why stewardship theory explains ITG in these universities, I analysed the key attributes of each case in the group (see Figure 8.4).

Cases	Age	Size	ITG Maturity	University Complexity		IT structure		Stewardship Theory Rating
J	Very Young*	Large	Well established	Medium		Centralised*		H
G	Very Young*	Medium	Established	Low		Centralised*		H--
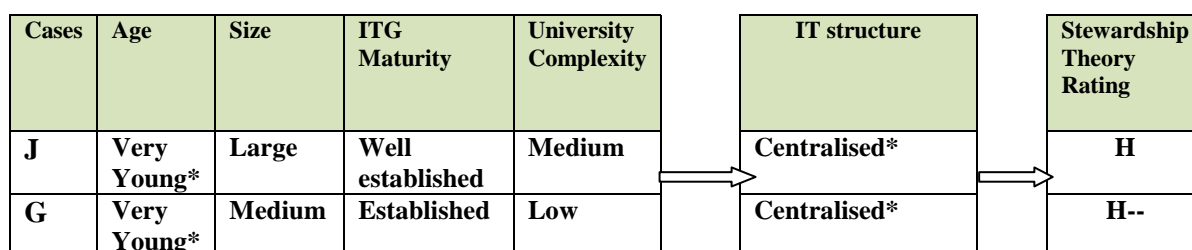
= attributes in common between the cases

Figure 8.4 **Case Attributes- Primary Stewardship Theory Group**

This figure highlights that university age (both universities are less than 20 years of age) appears directly related to universities with a centralised IT structure. In contrast, size, complexity and ITG maturity did not appear to be so strongly associated with the adoption of a centralised IT structure. These two universities indicated that they centralised as IT became more important to the university. This centralization was implemented to reduce IT costs, to gain greater control over IT assets and to achieve economies of scale in terms of IT operational costs. As a result, the university was able to pursue a central student focused vision with IT systems which made these universities more competitive in the marketplace.

The adoption of a centralised IT structure[5] by these two universities appears linked to the presence of high levels of processes and behaviours in university ITG that are best described by stewardship theory. Centralisation of IT is said to result in greater control of the IT resources of the university through its structure and processes (Bedell, 2005). As a result of centralisation, these two universities exhibited considerable central control over the IT decisions across the university and I found little evidence if any of self-interested IT decisions by management as a result. I also observed that decisions were made centrally about IT which resulted in accurate and reliable information (full and frank disclosures) being reported up to each governing body meeting. This information symmetry occurred because the locus of control for IT decision-making resides centrally thus information is more readily accessible and management gained no advantage by deliberately withholding information (Donaldson & Davis, 1991; Sundaramurthy & Lewis, 2003; King, 1983; Peterson, 2004a, 2004b; Musson, 2008). As a result of the greater control from the centralised IT structure, evidence of IT management acting in the best interests of the university and striving to align IT decisions with the strategic goals of the university was clearly evident.

The centralised IT structure of these two cases focused management on maximising their own utility by improving organisational performance and reputation. I identified from the case data instances of IT managers making IT decisions which advanced the IT processes of the university rather than for self-interest (Tosi et al., 2003). I observed in both cases central IT management exhibiting 'pro-organisational, collectivistic behaviours' that involved the establishment of good regular communication processes and strong trusting relationships between themselves, the Vice-Chancellor and the governing body (Davis et al., 1997, p.24).

Making IT decisions in central committees encouraged IT management to see the university's perspective (Davis et al., 1997). Central IT management's behaviour is pro-organisational as they have superior ability to personally identify with the university's goals and objectives (owner's goals and objectives) due to clearer communication processes with the board and stronger management relationships. High levels of evidence

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[5] A centralized IT organisational structure is characterized by reduced operating costs as a result of economies of scale (no duplication of services and costs), high levels of IT specialization, consistency of IT offerings to students and staff and standardized central control of IT investment and IT decision-making (Bedell, 2005)

were identified in these cases of management behaviour which clearly aligned IT decisions with university strategy and led to risk symmetry between IT management and the owners (Wiseman & Gomez-Mejia, 1998).

A centralised IT structure where all of the locus of control for IT decision-making rests with central university management appeared to assist enhanced communication between the owners/governing body and management on how IT should be governed within these two universities. IT Management in these two universities exhibited a clear vision of the future direction of their IT systems and processes. Centralization appeared to lead to enhanced communication and relationships between university management and the board as they were in closer contact and had greater opportunities to develop cohesion and trust (Sundaramurthy & Lewis, 2003; King, 1983).

Interview evidence indicated that these two universities relied on less formal governance processes and communications and that much of the interaction between the governing bodies and central management occurred informally. Trust was mentioned quite regularly by both the chair of the governing body and the Vice-Chancellor in these two universities. Thus evidence of stronger owner-management cohesion and trust and clearer communication of how IT should be governed was identified in these two cases.

These stronger communication and information sharing processes between management and the governing body in these two cases also led to improved selection of competent IT management by the governing body due to closer links to central IT management. Information symmetry also supported stronger owner-manager alignment and improved selection of governing body members by the owners in these two universities (Davis et al., 1997).

Stewardship theory cases illustrate how a centralised IT structure provides the bases for behaviour and processes predicted by stewardship theory. The impact of a centralised IT structure saw IT management and the governing body in these universities form stronger trusting relationships that involve improved communication and information sharing processes due to closer working proximity, improved communications and more regular interactions. The results of the cross-case analysis of this group indicate that when IT is

centralised, stewardship theory provides enhanced elucidation of IT governance processes and relationships.

8.5 Cross-case analysis of combined agency/ stewardship theory group

The remaining cases (B, C, D, E) provide moderate evidence that supported both agency theory and stewardship theory. Two of these four cases (B, C) provided stronger evidence of the presence of both agency and stewardship theory behaviours and processes (see Figure 8.2) while the other two cases (D, E) provided stronger evidence of agency theory behaviours and processes (see Figure 8.2).

To improve our understanding of why universities in this combined agency/stewardship theory group exhibited behaviours and processes that could be best described by both theories, I consider the key attributes of each case in the group in Figure 8.5.

Cases	Age	Size	ITG Maturity	University Complexity	IT Structure	Agency Theory Rating	Stewardship Theory Rating
B	Very Young*	Small	Well Established	Low	Federated*	M	M-
C	Very Old	Very Large	Well Established	High	Federated*	M-	M
D	Very Young*	Medium	Not Well Established	Low	Federated*	M	L+
E	Very Young*	Large	Not Well established	Medium	Federated*	M-	L

= attributes in common between the cases

Figure 8.5 **Case Attributes - Combined Agency/Stewardship Theory Group**

Figure 8.5 highlighted that a federated IT organisational structure was the predominant link between these four cases and the evidence of both agency theory and stewardship theory. The adoption of this type of IT structure appeared to be linked primarily to university age. Size, complexity and ITG maturity did not appear to be associated with federated IT structure. ITG maturity, whilst not influencing the IT structure appeared to explain why two cases presented medium levels of both theories and the other two cases presented medium levels of agency theory and low levels of stewardship theory. The

cases with moderate levels of both theories (B,C) had been assessed as having well established ITG processes, while the cases with high agency and low stewardship theory (D, E) were both assessed as having not well established ITG processes. This appears to indicate that where ITG maturity is low in a federated IT structure, the behaviour and processes observed are more likely to be control processes than collaboration processes.

Ko and Fink, (2010, p.666) posit that *"today's organizations need a flexible, complementary and collaborative IT governance arrangement to prosper in a turbulent environment"*. A federated IT organisational structure provides this flexibility by combining centralised IT management for core infrastructure and decentralised IT management for application development and faculty operation functions (Bushell, 2007). Thus the federated model attempts to achieve the global efficiencies of centralization (cost economy, consistency, standardisation, control) while providing the responsiveness to business units of decentralization (improved service delivery, closer alignment with business units, more responsiveness to tactical business needs) (Peterson, 2004a, 2004b; Bushell, 2007). This hybrid structure defines a governance structure that establishes boundaries between the centralised components of the IT system and the business unit level IT decision-making of the decentralised component of the model. As a result of the combination of centralization/decentralization, a moderate level of control over the decentralised aspects of the IT structure is needed, but little control is needed over the centralised IT structures. Thus whilst there is the opportunity for management self-interested behaviour and information asymmetry to occur in the decentralised sections of the IT structure, there is little opportunity for management self-interest and information asymmetry to occur in the centralised sections of the structure.

Cases (B, C) demonstrated moderate levels of behaviour and processes that could be linked to either agency or stewardship theory. This appears to be due to the strong control over central infrastructure in these cases. They also appear to have established good communication networks and processes for the decentralised components through user reference groups and the establishment of an IT strategy committee to reduce the agency costs associated with their decentralised sections of their IT structure. These conclusions are supported by their case attribute ITG maturity rating of well established.

In contrast, cases (D, E) exhibited evidence of being not so well established in their ITG processes or in the process of change in relation to ITG. Case D and E also have widely dispersed university campuses. This increases the difficulties in controlling the decentralised components of their IT structure. The combination of undeveloped ITG processes and more difficult to control decentralised sections of the IT structure may explain why these two cases exhibited evidence of more presence of behaviours and processes that are best described by agency theory than by stewardship theory.

The combined agency/stewardship theory group appears to provide evidence of the presence of behaviours and processes that can be linked to agency and stewardship theories. This appears due to the federated IT structure under which these four universities operate which is a combination of centralised core infrastructure and decentralised application development and faculty operations. The results of the cross-case analysis of this group indicate that when IT is both centralised and decentralised (federated IT structure) exhibit aspects of both agency and stewardship theories.

8.6   Conclusion

This chapter presented the cross-case analysis of three rival corporate governance theories and their ability to explain how boards (governing bodies) in Australian universities deal with the governance of IT. The cross-case analysis in this chapter explored how centralisation of a university's IT structure affects the presence or absence of behaviours and processes that are best described by different corporate governance theories.

The chapter identified in section 8.2 that all 11 cases applied some combination of agency and stewardship theory mechanisms to govern IT. The cross-case results firstly highlighted that there was no evidence within the cases of the behaviours and processes linked to resource dependence theory. As indicated in section 8.2, this may be due to three key aspects of university context. First, universities tend to have effective IT management teams and so may not need the IT skills of external directors to assist them. Second, universities are very large and complex organisations and typically need a wide range of knowledge on the board (Conger & Lawler, 2001). Third, universities are governed by State Acts of Parliament and must meet specific governing body member

selection requirements which may reduce the number of external members with IT skills forming part of board composition.

Second, the cross-case results highlighted that four cases (A, F, H and I) were identified as predominantly exhibiting the presence of behaviours and processes that are best described by agency theory to govern IT (primary agency theory group), two cases (G and J) were identified as predominantly exhibiting the presence of behaviours and processes that are best described by stewardship theory to govern IT (primary stewardship theory group); four cases (B, C, D, E) exhibited the presence of behaviours and processes that are best described as combination of agency and stewardship theory (combined agency theory/stewardship theory group). The final case (K) was eliminated from the cross-case analysis due to lack of sufficient data.

The cross-case analysis of the primary agency theory group indicates a relationship between agency theory behaviours and processes and decentralised IT structures. The adoption of a decentralised IT structure appears to be path dependent as a result of the university's age, size and complexity. The cross-case analysis of the universities in this grouping appears to indicate that when IT is decentralised, agency theory provides a superior clarification for the processes and relationships surrounding the governance of IT.

The cross-case analysis of the primary stewardship theory group indicates a relationship between stewardship theory behaviours and processes and a centralised IT structure. The adoption of a centralised structure appears linked to the growing importance of IT and the need for universities to have a central student focused vision for their IT systems which assist their competitiveness in the marketplace. The results of the cross-case analysis of this group indicate that when IT is centralised, stewardship theory provides a superior elucidation of IT governance processes and relationships.

The combined agency/stewardship theory group cross-case analysis provides evidence that both stewardship theory and agency theory are required to explain IT under a federated IT structure. ITG maturity also impacted on the balance between the evidence of each theory.

The results from this chapter support the conclusion that the IT structure adopted by a university affects the presence or absence of behaviours and processes that are best described by different corporate governance theories of how we could frame the board involvement discussion. The cross-case analysis provides further insight into how boards govern IT and also provides insight into the structures component of the enterprise governance of IT framework (De Haes and Van Grembergen, 2009; Van Grembergen & De Haes, 2009b; Ko and Fink, 2010).

Chapter 9

Discussion and Conclusions

9.1   Introduction

In the introduction to this thesis I identified that the overarching research question was "***How do boards govern IT?***" In the subsequent chapters I have explored this issue with a quantitative study of whether the ITG model was applicable to board governance of IT followed by a qualitative inductive case based study of Australian university IT governance processes which examined whether three prominent corporate governance theories (agency theory, stewardship theory and resource dependence theory) provide a superior understanding of board governance of IT.

The findings of my research present evidence that all 11 Australian universities studied applied some combination of agency theory and stewardship theory mechanisms (behaviours and processes) to govern IT, but each university appeared to apply the mechanisms in a different blend. Thus, the mechanisms of no single theory appeared to be linked to how boards govern IT in all instances, but evidence of a combination of the mechanisms of two theories appeared to enhance understanding of this issue. The results also indicate there is a definite link between the IT structure under which a university operates (i.e. centralised, decentralised, or federated) and evidence of the processes and behaviours associated with stewardship and agency theory.

This chapter will present my key contributions in section 9.2, a discussion of the conclusions about the research studies and theories in section 9.3, the implications of the thesis in section 9.4, the limitations of the two studies and future research in sections 9.5 and 9.6 and final conclusions in section 9.7.

9.2 Thesis contributions

Overall, my thesis made five key contributions to corporate governance and ITG research. First, my thesis addressed a gap in the ITG literature by identifying a potential explanation for how boards govern IT within their organisations. Despite the increase in corporate and IT governance research over the last decade, no research had clearly established how boards govern IT or developed any holistic ITG theory or framework particularly focused on the board. My research indicates that Australian university boards appear to govern IT using a combination of agency and stewardship mechanisms and that IT structure is clearly linked to the theoretical behaviours observed.

Second, my qualitative study presented the first application of mainstream corporate governance theories to IT governance processes, which assists in answering the call for increased research on the link between corporate governance and ITG governance (Borth & Bradley, 2008; Musson & Jordan, 2005; Bhattacharjya & Chang, 2008). My work also provides insights into the links between corporate governance research and existing and emerging ITG research.

Third, my thesis is the first in-depth study of Australian university governance processes. I identified that universities appear to govern IT with a combination of agency and stewardship mechanisms and that IT structure is clearly linked to the application of each theory. My results indicate that where evidence of agency theory mechanisms was primarily observed, the four universities in this grouping were operating using a decentralised IT structure. In contrast, where evidence of stewardship theory mechanisms was primarily observed, the two universities were operating under a centralised IT structure. Where evidence was observed of both agency and stewardship theory mechanisms being applied in a more equal combination, the four universities in this grouping were operating under a federated or hybrid IT structure (combined centralised and decentralised structures). This indicates that the key contingency to board governance of IT in universities is the centralization of IT structure as centralization leads to changes in governance behaviour and processes, that is, from control oriented behaviours to more collaborative behaviours. My qualitative results add insight to the contexts in which agency and stewardship theories appear to be applicable and make a

contribution to the understanding of the structures component of the emerging enterprise governance of IT framework within ITG research (Van Grembergen, De Haes & Guldentops, 2004; De Haes and Van Grembergen, 2009; Van Grembergen & De Haes, 2009b; Ko and Fink, 2010)

Fourth, my thesis contributes to the debate on whether single corporate governance theories can effectively explain board processes or whether a multi-theoretic view provides a more comprehensive explanation of board governance of IT. My research identifies that in all 11 cases, a single theory's behaviours and processes did not appear to explain how boards govern IT, but a combination of two theory's behaviours and processes (agency and stewardship theory) provided an explanation. In six of the cases, the mechanisms of a single theory (either agency or stewardship theory) provided the most prominent explanation for board governance of IT with the mechanisms of the other theory playing a lesser role and in four cases, a more equal combination of the mechanisms of the two theories provided the explanation. One case did not provide sufficient data to provide an explanation. Thus, my results provide some support for a multi-theoretic view as my findings indicate that the mechanisms of more than one corporate governance theory was needed to explain board governance of IT. The combined agency theory/stewardship theory group where universities operate in a federated/hybrid structure warrants further exploration as the mechanisms of no particular theory was dominant in this group. Thus, other theories may provide some of the explanation for board governance of IT in this partly centralised/partly decentralised IT structure.

Finally, my thesis assists university boards to better understand the governance of IT within Australian universities and encourages them to consider the impact of IT structure on university ITG processes. My results have implications for managers and IT consultants in practice which will be explore more fully in section 9.4.

9.3   Summary of findings

The overall research question of this thesis has been to understand *"How do boards govern IT?".*   The ITG model studied in the first phase of my research program is commonly accepted by business and IT professionals and academics as providing a holistic view of IT governance. However, no one has previously studied or tested the model in its holistic form to see if boards are applying this model to the governance of IT. To assess this model, a quantitative study of the ITG model was undertaken to determine an answer to the subordinate research questions *"Does the ITG model represent how boards conceptualise their role in the governing IT?".*   The results of this study found that the ITG model could not be supported as being used by boards in conceptualizing their role in governing IT. The factor analysis indicated that the components of the model do not appear to be mutually exclusive and the model appears to be too simplistic a representation of the complexities of ITG to be relevant for board use.   As a result of this finding my investigation centred around the broader corporate governance literature to provide theoretical insight into board governance of IT.

Thus, I chose to conduct a qualitative inductive case based study of Australian university governance of IT to understand whether three prominent corporate governance theories (agency theory, stewardship theory and resource dependency theory) might provide deeper insights into how boards govern IT.   At the finalization of my qualitative study, I found evidence that both agency theory and stewardship theory behaviours and processes are required to explain a board's approach to the governance of IT within these universities. Agency theory behaviours and processes were evident in eight universities where I observed the monitoring of self-interested behavior of management, high levels of information asymmetry, lack of alignment between the risk profiles of the principal and agent, and the inability of the principal to clearly specify how IT should be governed within each university. In contrast, in six universities I observed stewardship behaviours and processes as evidenced by pro-organisational, empowered behavior on the part of IT management that did not require board monitoring. In these cases, the governing body advising and supporting management through fuller and frank discussions on IT issues and clearer specification of how the owners want IT to be governed was evident. All university cases indicated no evidence of resource dependence theory.

The cross-case analysis in chapter eight revealed that universities cluster in four clear groups based on my assessment of agency theory and stewardship theory applicability to the cases. The groups identified in figure 8.2 highlight that the agency theory grouping operated a decentralised IT structure. That is, where IT structure is decentralised, agency theory provides a superior explanation for the processes and relationship surrounding the governance of IT. The second grouping identified was the stewardship theory group and the universities in this group operated a centralised IT structure. That is, where the IT structure is centralised, stewardship theory provides an enhanced explanation of the governance of IT. The third group, the combined agency theory/stewardship theory group operated in a federated or hybrid structure (this structure combines both centralisation and decentralisation). Thus, where the IT structure is partly centralised and partly decentralised, a combination of agency theory and stewardship theory behaviours and processes are associated with the governance of IT. The degree of combination of the theories appears linked to the degree of centralisation and decentralisation of IT structure. Further analysis of the clusters revealed strong links between the IT structure adopted by each university and the theories observed in each cluster.

The conclusion to be drawn from my thesis on agency theory and stewardship theories is that they provide elucidation of the theoretical mechanisms that underlie board governance of IT and the results from my study identify new contexts in which these two theories are applicable. The conclusion with regard to resource dependence theory is that it does not provide an explanation for board governance of IT at Australian universities but future research may find links between this theory and board governance of IT. A further conclusion is that the combined agency theory/stewardship theory group warrants further exploration as no one theory was dominant in the IT governance in this group. Other theories may provide further explanation for this group.

9.4   Implications of the thesis

The implications for this thesis centre on IT governance and corporate governance research and ITG practice. First, my research indicates that the processes by which boards conceptualise their role in governing IT are not linked to the components of the ITG model (IT Governance Institute, 2003). The results of my quantitative study highlighted

that the use of this model by boards could not be supported because measures of each component would not load cleanly onto one exclusive factor for each component and the model components did not appear to be mutually exclusive of each other. The implication of this finding is that the ITG model may not be an appropriate theoretical model of ITG and its use should be questioned. Development of a new model appears to be needed or the relevance of this model for board use needs to be reassessed.

Second, based on the insights I gained in my qualitative study of ITG processes, two corporate governance theories (agency and stewardship theory) provide an insight into the theoretical mechanisms associated with board governance of IT. This finding supports the call of Van Grembergen, De Haes and Guldentops (2004) and De Haes and Van Grembergen (2009) for more detailed research on boards and the governance of IT. As a result, I consider that future holistic models of ITG need to include links between corporate governance and ITG to more fully identify the theoretical underpinnings of board governance of IT. Figure 8.1 illustrates the potential links my research reveals between corporate governance theories, the emergent enterprise governance of IT framework (Van Grembergen, De Haes & Guldentops, 2004; De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2009b; Ko & Fink, 2010) and the ITG model and builds on the prior model of Bhattacharjya & Chang (2008). This view may assist with the development of future holistic models of ITG.

Third, my thesis contributes to the research on mainstream corporate governance theories. My results indicate that no single corporate governance theory could explain board governance of IT and that varying combinations of two theories (agency and stewardship theory) were needed to explain this issue. The results of this study support the growing number of studies that have proposed and tested multi-theoretic explanations of board processes (Nicholson & Kiel, 2007; Sundaramurthy & Lewis, 2003; Tosi, Brownlee, Silva & Katz, 2003; Hillman & Dalziel, 2003; Lynall, Golden & Hillman, 2003). My research also adds to the research on agency and stewardship theories by providing a new practical context in which these two theories are applied and providing an important link between corporate governance and ITG, a link identified as being needed to advance the understanding of ITG (Borth & Bradley, 2008; Musson & Jordan, 2005).

Fourth, the identification of the importance of IT structure to the application of agency

and stewardship theories also makes an important contribution. This finding assists with our understanding of the contextual factors which impact on the application of corporate governance theories to particular board governance processes. My research provides important insights into the structures component of the enterprise governance of IT framework (see figure 8.1) but was unable to provide insight into the other two components of the framework (processes and relational mechanisms). Future research could explore these other two components in university ITG processes to increase insights into this important emerging framework. The research program also identified that there was considerable conjecture about the path dependency issues associated with how universities determined the IT structure under which they operated and how they chose to move to an alternative IT structure. My research did not study the process of development of IT in universities but future research on this issue would shed further light on the link between IT structure and ITG processes in universities.

Finally, the implications for practice from this thesis centre around two issues. This thesis has shown that boards do not appear to be using the ITG model (IT Governance Institute, 2003) to govern IT. This indicates that the ITG model may not be the best recommended model within the normative ITG literature for board use in the future. This finding may mean that the ITGI needs to review its board guidance literature and determine the continued suitability of the ITG model. To determine the appropriateness of the model, the ITGI may consider commissioning further research studies, testing the ITG model to determine whether this model is being used by boards to govern IT and whether it should continue to be recommended as a board governance model.

My qualitative study provides university boards with enhanced insight into the behaviours and processes associated with governance of IT at Australian universities. This may assist them to improve their governance of IT as a result. The identification of IT structure as an important contributor to the theoretical processes applicable to the governance of IT by university boards may also assist governing bodies, management and owners (state and federal governments jointly) to more effectively manage the governance of IT. My research identifies that university principals and governing bodies need to be aware that operating in a decentralised IT structure is likely to incur significant agency costs for the university and these costs need to be addressed through governing body monitoring and incentive processes. In contrast, when universities centralise their

IT processes/structures, they are able to reduce agency costs and make the most of the collaborative aspects of stewardship theory which assists the university to meet its key goals and objectives. In a federated or hybrid structure, it is harder to focus on agency costs and the collaborative aspects of the centralised and decentralised components, so the governing body in this IT structure would need to give IT governance an even greater focus. In addition, as agency theory supports different business models, each university would need to consider its business model and the impact of agency theory on this model.

My research only considered one function of universities, how the governing body (board) governs IT. Whether the IT function supports university goals and objectives (the effectiveness of ITG) was not considered by this study and would be a worthy topic of future research. In addition, by understanding the theoretical mechanisms that underlie board governance of IT, my research may assist university management to improve their management of IT within the university. My research may also encourage management to move away from a control type environment (agency theory) to a more collaborative environment (stewardship theory). This may also assist their interaction with the board and the owners. My research may also assist IT consultants to better advise university governing bodies and owners (federal and state governments jointly) on the governance of IT.

9.5   Limitations of the research

There were limitations to the first phase of my thesis. The first limitation related to the response rate for the survey instrument in the empirical testing of the ITG model. Forty-four responses across three populations was a less than ideal response rate for this testing process but was sufficient to conduct an exploratory factor analysis. Due to the nature of the distribution of the survey instrument it was not possible to determine the size of the membership of two of the target populations (WOB and ISACA) and thus I was unable to calculate and analyse a complete response rate for this phase of my research. However, the analysis of the empirical data provided a clear indication that the ITG model does not appear to represent how directors conceptualise their role in the governance of IT which was the goal of this phase of my research.

The second limitation of the quantitative study related to the measures used to test the ITG model. The measures of the components of the ITG model appeared appropriate based on the responses of participants in the pilot-testing phase and so were considered appropriate to re-use in the empirical testing phase of the study. However, when the empirical data was analysed using an explorative factor analysis, the measures did not load cleanly onto their appropriate ITG model component and instead cross loaded across seven key factors and no one factor could be linked to a component of the model. The factor analysis also identified a considerable number of problem variables which were loading onto more than one factor simultaneously and so could not definitively be linked to only one factor. Whilst some of the measures loaded cleanly onto their appropriate component, a number did not, which may mean that these measures may not be ideal assessments of the ITG components in question. This issue however, is an important finding for researchers to consider if using the model in their own study.

The limitations of the qualitative phase of my research centre on the limitations associated with the data collection method of interviews and the potential bias of the researcher in undertaking this process. For example, if the data had been coded by more than one researcher and cross comparisons made, this would have helped to overcome possible bias. However, I was very conscious of this and every effort was made to ensure bias was limited. Further, as this is a thesis, cross coding was not possible.

A further limitation of the qualitative study was the variation in the number and type of interview participants across cases (see table 5.8). This variation resulted in one case (K) providing insufficient information to be analysed. This case was consequently removed from the cross-case analyses in chapter 8. In the remaining ten cases the quality of the interview data collected and the quality of interview participants provided strong data sources for the qualitative analyses presented in chapters 6, 7 and 8.

The limitations discussed above do not indicate that this research or any of the findings are insignificant or invalid. The limitations are noted to recognise their existence and moreover to highlight the need for further research.

9.6　Future Research

There are considerable opportunities for future research which can be undertaken as a result of the findings of my thesis. My thesis should encourage future ITG researchers to focus on the development and testing of holistic models of ITG rather than just adding to the research on one of the components of ITG. There is a paucity of current research on holistic ITG models which needs to be addressed if the ITG research arena is to advance as a clear sub-set of corporate governance research. The results of my thesis clearly identify that corporate governance theories (agency and stewardship theory) provide an explanation for how boards govern IT in Australian universities. This result indicates that future holistic models of ITG should include mainstream corporate governance theories in their construction.

My research adds to the corporate governance research agenda by providing further insight in board governance processes. My results should encourage further research on the role of mainstream corporate governance theories in the governance of IT at Australian universities. As this was the first study to explore the links between ITG and corporate governance, future researchers should continue down this path of exploration. A repeat qualitative inductive study of board governance of IT within Australian universities in the near future would increase the robustness of the findings from my thesis. Extending my research findings to the study of how multi-national corporations govern their IT resources would provide a new insight into the links between ITG and corporate governance.

While my results identified that IT structure had an important link to the theoretical mechanisms applied in board governance of IT, my research did not delve any further into the historic development of IT structures (the reasons why particular IT structures have been adopted in universities over time). From my limited analysis, path dependency appeared to provide considerable insight into the IT structures currently operating within universities. Undertaking research that explores the development of IT structures in universities from a historical perspective or by considering the strategy as practice literature (e.g. Hendry & Kiel, 2004) may assist in gathering further insight into links between IT structure and ITG processes. This research may advance the knowledge on

the governance structures component of the enterprise governance of IT framework (Van Grembergen, De Haes & Guldentops, 2004; De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2009b; Ko & Fink, 2010).

Further research on the combined agency theory/stewardship theory group where universities operate in a federated/hybrid structure may be warranted as no particular theory was dominant in this group. Theories such as institutional theory could be studied as they may provide some of the explanation for board governance of IT in this partly centralised/partly decentralised IT structure.

9.7 Conclusion

IT governance research has primarily focused on the key components of the ITG model and little research has been conducted on the development or testing of holistic models of ITG or on the role of the board in relation to ITG processes. By conducting a mixed method study which firstly tested the extant ITG model to see if boards conceptualise their role based on the ITG model in order to govern IT and secondly implementing a broader more in-depth qualitative inductive study of Australian university boards and IT governance processes, I was able to explore the role of boards in the governance of IT. This research aimed to fill the gap in the ITG research on boards and ITG.

This thesis posed the overarching research question "*How do boards govern IT?*". The results of the quantitative and qualitative studies propose an answer to that question. Boards do not appear to conceptualise their role in the governance of IT as linked to the components of the ITG model, but a combination of agency and stewardship theory mechanisms (behaviours and processes) appear to explain how boards govern IT in Australian Universities. As a result of this program of ITG research, academics and practitioners should have a greater insight into how boards govern IT and this should lead to further research on holistic models of ITG and the links between ITG and corporate governance theories.

This research advances our understanding of how boards govern IT by providing a clearer insight into the theoretical principles (generative mechanisms) that underlie board

governance of IT within the Australian university sector. My research program in this thesis should provide impetus for future research on boards and the governance of IT and should encourage the continued exploration of the links between corporate and ITG research.

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Appendix 1   ITG model research tables

The following five tables provide a detailed analysis of the research on the five key focus areas of the ITG model from 2008. The detailed analyses of my research on these focus areas prior to 2008 is presented as Buckby (2008) in Buckby, Best and Stewart (2008). The studies prior to 2008 are listed but the detailed analysis is not included.

Table 1   Detailed analysis of international research on strategic alignment from 2008

Table 1A List of research studies analysed on strategic alignment prior to 2008.

Table 2   Detailed analysis of international research on value delivery of IT from 2008

Table 2A List of research studies analysed on value delivery of IT prior to 2008.

Table 3   Detailed analysis of international research on resource management of IT from 2008

Table 3A List of research studies analysed on resource management of IT prior to 2008.

Table 4   Detailed analysis of international research on risk management of IT from 2008

Table 4A List of research studies analysed on risk management of IT prior to 2008

Table 5   Detailed analysis of international research on performance measurement from IT from 2008

Table 5A List of research studies analysed on performance measurement from IT prior to 2008

<table>
<tr>
<td colspan="5" align="center">**Table 1**</td>
</tr>
<tr>
<td colspan="5" align="center">**Detailed Analysis of International Research on Strategic Alignment from 2008**</td>
</tr>
<tr>
<td>**Study**</td>
<td>**Method (s)**</td>
<td>**Organisations/Subjects**</td>
<td>**Issues Examined/Domain**</td>
<td>**Results**</td>
</tr>
<tr>
<td>Soetekouw (2010)</td>
<td>• Model Development</td>
<td>• No data</td>
<td>• Discusses the SAM model of Henderson & Venkatraman (1991, 1993, 1999) and the generic framework of Maes (1999) and links to a new integrated model of strategic alignment
• Discusses a model based alignment approach</td>
<td>• Develops a business modeling framework which allows a new approach to strategic alignment
• Discusses further directions for strategic alignment research</td>
</tr>
<tr>
<td>Schlosser, Wagner, Beimborn and Weitzel (2010)</td>
<td>• Measurement</td>
<td>• 154 German Banks</td>
<td>• Empirically evaluates how an organisation's internal alignment and ITG processes impact the service quality from IT outsource providers</td>
<td>• Found that good internal strategic alignment is linked to more accurate outsource provider control processes which in turn improve service level agreements with outsource providers</td>
</tr>
<tr>
<td>Van Grembergen & De Haes (2009a)</td>
<td>• Literature Review
• Measurement</td>
<td>• 10 Belgian Financial Services organisations</td>
<td>• Discusses the impact of enterprise governance of IT implementations on business-IT alignment
• Undertakes a business-IT alignment benchmarking study using the SAMA model (Luftman, 2003a)</td>
<td>• Identifies that there is no universal way to measure business-IT alignment
• Hard to compare measurement models currently in existence
• Found that the average business-IT alignment score for Belgian Financial Services organisations was 2.69 out of 5</td>
</tr>
<tr>
<td>Beimborn, Schlosser and Weitzel (2009)</td>
<td>• Model Development
• Model testing</td>
<td>• C Level executives at 149 US Banks</td>
<td>• Discusses the role of operational alignment and its inter-relationship with strategic alignment, executive support, ITG tools and process performance.</td>
<td>• Develops a new model of alignment
• The study found that executive support directly and significantly drives strategic and operational alignment but also ITG tools and indirectly the performance of business processes.</td>
</tr>
<tr>
<td>Brodbeck, Rigoni and Hoppen (2009)</td>
<td>• Survey</td>
<td>• 259 executives from 72 organisations in industrial centres in Southern Brazil</td>
<td>• Survey based on the model of Strategic alignment maturity assessment (Luftman, 2000). Tests business-IT alignment maturity in Brazilian organisations</td>
<td>• The study found that of the 6 criteria proposed by Luftman (2000), three of the criteria: communication, skills, and scope and architecture were considered the most important within the organisations surveyed</td>
</tr>
</table>

		Table 1		
		Detailed Analysis of International Research on Strategic Alignment from 2008		
Study	**Method (s)**	**Organisations/Subjects**	**Issues Examined/Domain**	**Results**
De Haes and Van Grembergen (2009)	• Delphi Method • Benchmarking • Case studies	• 10 Belgian Financial service organisations	• Considers how organisations are implementing IT governance and discusses the relationship between IT governance and business alignment	• Study found that IT governance is high on the agenda of case study organisations • Results suggested a clear relationship between the use of IT governance and business-IT alignment • Study found that it was easier to implement IT governance structures than IT governance processes. Relational mechanisms were found to be important at the beginning of an IT governance implementation project • The study also found that the involvement of boards in IT governance, whilst promoted in the literature, were not supported by the research findings
Silvius, De Haes & Van Grembergen (2009)	• Model Development • Survey	• 3 Dutch and 3 Belgian companies in the financial services sector	• Considers the impact of cultures on the maturity of business-IT alignment • Discusses the link between cultural framework and business IT alignment maturity	• The study found that that differences in business-IT maturity did exist between countries • The differences in governance maturity and skills maturity could be explained by cultural differences.
Tarafdar and Qrunfleh (2009)	• Case study	• Interviews with senior, middle and junior managers from IS and other functions	• Discusses processes associated with Tactical IT-Business alignment • Studies organisational mechanisms and structures that result in tactical alignment • Studies how tactical alignment is achieved in the sample organisations	• Illustrates four types of alignment states resulting from strategic and tactical alignment levels • Proposes alignment related managerial actions appropriate to the four types • Develops a two level alignment grid and characterizes two levels at which IT-business alignment takes place

Study	Method (s)	Organisations/Subjects	Issues Examined/Domain	Results
				• Makes contributions to practice
Dong, Liu & Yin (2008)	• Survey	• Surveys of MBA and EDP students in Guanghua School of Management – Peking University	• Used structural equation modeling to test the conceptual model • Used Miles & Snow's (1978) typology of prospectors, defenders and analysers to assess business strategy	• Study found that IS strategy was a better predictor of business performance than business strategy • The study built a conceptual model of the key components of strategic alignment which extended the Henderson & Venkatraman model (1991) and Byrd, Lewis and Bryan (2006). • The study measured strategic alignment components
Chan and Reich (2007a)	• Annotated Bibliography	• No data	• Detailed literature review of prominent articles on strategic alignment	• Provides details of a large number of studies on strategic alignment and discusses the key theories/concepts and findings of each study
Chan and Reich (2007b)	• Conceptual • Literature review	• No data	• Discusses the key literature on strategic alignment	• Presents a comprehensive review of IT strategic alignment to date
Luftman and Kempaiah (2007)	• Measurement	• 197 global 1000 organisations in America	• Measurement of organisations using the SAMA model (Luftman, 2000)	• Found no alignment silver bullet exists • Alignment is linked to six components and that then measured on a 5 level maturity model • Found most organisations at level 3 maturity • Found positive links between maturity of IT-business alignment and IT organisational structure, CIO's

Study	Method (s)	Organisations/Subjects	Issues Examined/Domain	Results
				reporting structure and firm performance
Gartlan and Shanks (2007)	• Theory development • Expert interviews • Cross industry survey	• Six experts with extensive consulting experience on business and IT strategy • CIO's and CEO's of top 500 Australian organisations	• Synthesizes the literature on strategic alignment to determine 10 key factors which are important to business-IT alignment • Undertakes expert interviews to confirm and refine factors • Undertakes survey of factors which have been organized under clusters of people, process and organisation	• People factors were found to be important and successfully performed by most respondents • Process and organisational factors were found to be important and successfully performed by about one third of respondents
Gregor, Hart and Martin (2007)	• Detailed case study of the Australian Bureau of Statistics (ABS) • Theory development • Multiple qualitative research method adopted	• ABS processes • Archival and publicly available documents • Nine semi-structured interviews of ABS executives • Eight follow up discussions	• Aims to test how an enterprise architecture can be used to enable positive alignment outcomes • Considered four major themes of inquiry.	• Develops a possible theory of strategic alignment • ABS found to be an exemplar of a well aligned organisation that has successfully developed 60% of its analytical business software, has a loyal workforce and has survived government outsourcing initiatives and reviews • Identified ABS enterprise architecture characteristics • Found a close alignment between agency business strategy and support IT at the ABS and that it is possible to combine business and IT using internally developed enterprise architecture.

		Table 1		
		Detailed Analysis of International Research on Strategic Alignment from 2008		
Study	**Method (s)**	**Organisations/Subjects**	**Issues Examined/Domain**	**Results**
Kearns and Sabherwal (2006-7)	• Survey	• 274 senior information officers	• Discusses that prior research has indicated that strategic alignment facilitates the business effect of IT and that contextual factors affect strategic alignment • Research considers an extension of this discussion by examining how planning behaviours and top management knowledge of IT mediate the effects of organisational emphasis on knowledge management and centralization of IT decisions on strategic alignment	• Results indicate that organisational emphasis on knowledge management and centralization of IT decisions affect top managers' knowledge of IT which positively impacts on strategic alignment • The quality of IT project planning and implementation issues in IT projects impact on the relationship between strategic alignment and the business effects of IT • These results highlight the importance of planning IT projects on strategic alignment
Olugbode, Richards and Bliss (2007)	• Detailed case study of Cornish Building Firm	• Building firm executives and staff	• Experiences of integrating an organisation's IT systems to meet their business strategy	• Adoption of an integrated IT system has aided the achievement of the organisation's strategic development goals.
Byrd, Lewis and Bryan (2006)	• Survey	• Companies in the south eastern US that manufacture fabricated metal products	• Examines the influence of strategic alignment on the payoff of IT investments • Investigated four different perspectives of strategic alignment	• Study found there was a synergistic coupling between strategic alignment and IT investment with firm performance • Identified that where strategic alignment is good, firms can invest in IT resources and know they will be used effectively. • Study found that the concept of strategic alignment of business and IT strategy is robust.

Table 1
Detailed Analysis of International Research on Strategic Alignment from 2008

Study	Method (s)	Organisations/Subjects	Issues Examined/Domain	Results
Weiss, Thorogood and Clark (2006)	• Interviews • Case studies	• 4 cases	• Discusses the growing issue in strategic alignment research that one size does not fit all for strategic alignment to be effective • Extends strategic alignment research by linking three strategic alignment profiles to different business objectives • Discusses that despite IT governance and strategic alignment models to date, CIO's are still dissatisfied with strategic alignment	• Develops a diagnostic framework which assists business and IT leaders to agree on the purpose and nature of IT before IT investments are approved. The framework diagnoses and prescribes IT alignment internally and externally • Developed three types of strategic alignment being technical resource, business enabler and strategic weapon • Develops profiles for each of these types across internal and external forces • Applies the model to four cases
Flint (2005)	• Prescriptive	• No Data	• Discusses the use of a governance framework and IT strategy to get better alignment between business and IT • Outlines 5 key drivers to improve business-IT alignment	• Indicates key issues organisations should consider in trying to improve business-IT alignment
Dedene, Viaene, Cumps and De Backer (2004)	• Conceptual	• Two case studies	• Uses model of Maes (1999) to propose a possible method that can be used for business-ICT alignment at the operations level. • This paper examines the lower three quadrants of the Maes (1999) model	• Found that the operations level of the Maes (1999) model can be related to Business activities, I/C service activities and technology activities • Discussed the proposed operational alignment elements using two case studies being an ERP implementation and an educational web service case.

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Table 1				
Detailed Analysis of International Research on Strategic Alignment from 2008				
Study	**Method (s)**	**Organisations/Subjects**	**Issues Examined/Domain**	**Results**
Luftman (2004)	• Measurement Literature Review • Measurement testing	• 25 Fortune 500 companies	• Discusses the literature on the measurement of business-IT alignment including the SAMA model (Luftman, 2000) • Tests the SAMA model (Luftman, 2000) on 25 Fortune 500 companies	• Results indicated that organisations measured were at a maturity level of 2+ out of 5 for business-IT alignment
Luftman (2003b)	• Tool development • Measurement scale development	• No data	• Extends the work of Luftman (2000) and discusses the development of a tool to help organisations assess whether their organisation is on the path to business-IT alignment • Discusses 6 dimensions used to measure business-IT alignment	• Identifies a measurement scale to be adopted in measuring the 6 dimensions of business-IT alignment and provides instructions on how to perform the assessment
Luftman (2003a)	• Tool development • Measurement scale development	• No data	• Follows on from Luftman (2000) and expands the discussion of the six main components needed to assess an understanding of business-IT alignment • Develops a maturity assessment process related to business-IT alignment	• Refines the development of a measurement scale to be used in measuring the maturity of business-IT alignment using the 6 dimensions examined.
Tallon and Kraemer (2003)	• Survey • Process level study	• 63 firms	• Tests the frequently argued concept that strategic alignment enables firms to realize greater IT payoffs • Discusses the dimensions of strategic alignment and develops a model based on two dimensions of IT shortfall and IT under utilisation • Develops a model of classifying firms by strategic intent for IT	• The study found a positive and significant relationship between strategic alignment and IT payoffs at the process level • Also uncovered evidence of an alignment paradox where increases in strategic alignment only lead to increased payoffs from IT up to a certain point and then after this point the IT payoffs lower. • Develops a model of the value chain to evaluate the link between strategic alignment and business value

</table>

236

Table 1				
Detailed Analysis of International Research on Strategic Alignment from 2008				
Study	**Method (s)**	**Organisations/Subjects**	**Issues Examined/Domain**	**Results**
Cragg, King & Hussin (2002)	• Survey	• 256 Small UK Manufacturing firms	• Focuses on strategic alignment in small firms • Discusses the issue of fit between business and IT strategies between these small firms	• Examines three hypotheses concerned with the achievement of strategic alignment in small firms • Developed a measure of IT alignment so firms could be broken into two groups • Identified the major factors that influence strategic alignment as IT maturity, technical IT sophistication and CEO's software knowledge
Sabherwal, Hirschheim and Goles (2001)	• Case Studies • Model development	• Three case studies	• Describes the evolution of IS alignment with organisational strategy and structure • Uses a deductive, theory based view of alignment • Examines the dynamics of changes in alignment through strategy/structure interactions in the business and IS domains • Considers the issue of how alignment evolves over time • Describes theory-based alignment patterns for six types of alignment identified from prior literature	• The cases found that a pattern of alignment may continue over a long period due to either high alignment or management not recognising low alignment as a problem • Developed a punctuated equilibrium model to examine dynamics of alignment
Luftman (2000)	• Model Development	• Case data	• Discussed an approach for assessing the maturity of strategic alignment • Discussed the difficulties in achieving and sustaining strategic alignment. • Developed a detailed model on how to assess strategic alignment maturity and assist organisation with sustaining strategic alignment	• Strategic alignment maturity model is developed with five levels of strategic alignment maturity and six strategic alignment maturity criteria • The six strategic alignment maturity criteria are communications, competency/value measurements, governance, partnership, scope & architecture and skills • Conducts a strategic maturity

Study	Method (s)	Organisations/Subjects	Issues Examined/Domain	Results
				• assessment • Contains a detailed appendix of strategic alignment maturity assessment experiences
Teo and King (1999)	• Model development	• Empirically data from prior study	• Follow up study to Teo & King (1996) on the integration of IS planning and business planning on organisational performance	• The empirical data of prior study was re-analysed using path analysis to determine the direct and indirect impacts of business planning and IS planning integration • Results substantiated the importance of this form of strategic alignment
Luftman (1998)	• Conceptual	• Executives from 800 US Companies across 15 industries	• Discusses a five year study to assess business-IT alignment • Involved executives assessing the perceived strength of alignment in their organisations	• Study identified the six most important factors in alignment as being executive support for IT, IT management's involvement in strategy development, IT's understanding of the business, the existence of a partnership between business and IT leaders, the level of prioritization of IT projects and IT management's leadership abilities • Also identified key inhibitors of Business-IT alignment
Chan, Huff, Barclay and Copeland (1997)	• Mail Survey	• North American financial services and manufacturing firms	• Discusses the fit between strategic orientation and IS strategic orientation • Measures business and IS strategic orientation and IS strategic alignment and related them to perceived IS effectiveness and business performance	• Found that IS strategic alignment is modeled best by utilizing holistic systems approaches instead of dimension-specific bi-variate approaches • Three generic IS strategic orientations were detected and IS

Study	Method (s)	Organisations/Subjects	Issues Examined/Domain	Results
				• strategic alignment is a better predictor of IS effectiveness than is strategic orientation • Business strategic orientation, IS strategic alignment and IS effectiveness have positive impacts on business performance
Luftman (1997)	• Conceptual • Case studies	• 500 companies	• Extends the SAM of Henderson & Venkatraman (1991, 1993) by describing the measures and strategic planning approaches appropriate to the strategy execution, technology potential, competitive potential and service level perspectives of the SAM • Discusses the enablers and inhibitors to strategic alignment	• Identifies that the key to strategic alignment is about process. It's about what management does to achieve its IT goals. • Identifies enablers and inhibitors to strategic alignment • Uses cases to discuss the four key perspectives of the strategic alignment model and how they can be aligned
Henderson, Venkatraman and Oldach (1996)	• Conceptual • Model Development	• No data	• Introduces and updates the original SAM (Henderson & Venkatraman, 1991, 1993) • Discusses the SAM (Henderson & Venkatraman, 1991,1993) components in more detail	• Provides detailed explanations of the SAM (Henderson & Venkatraman, 1991, 1993) and four related alignment perspectives being strategy execution, technology potential, competitive potential and service level
Luftman (1996)	• Conceptual • Model Development	• Case examples	• Extends the understanding of the SAM (Henderson & Venkatraman, 1991,1993) by discussing the domain anchors which are the catalyst or enabler of each of the four alignment perspectives	• Identifies key enablers and inhibitors to alignment • Applies key cases to the alignment perspectives

Study	Method (s)	Organisations/Subjects	Issues Examined/Domain	Results
Table 1				
Detailed Analysis of International Research on Strategic Alignment from 2008				
Reich and Benbasat (1996)	• Conceptual • Case studies	• 10 business units in 3 large Canadian Life Insurance companies	• Discusses the issue of the linkage between IS plans and organisational objectives • Clarifies the nature of the linkage construct in terms of its importance in the business-IT alignment process • Discusses the linkage construct as having two dimensions being intellectual and social	• Defined the term linkage as it applies to business-IT alignment • Develops measures of the social dimension of linkage • Applies these measures to 10 case studies • Found two viable measures of the social dimension of linkage • Found the existence of two distinct aspects of social linkage based on time being short-term and long-term
Teo and King (1996)	• Conceptual • Hypothesis development	• Matched pair field survey of business planners and IS executives	• Discussed the issue of integration of IS planning and business planning as a form of strategic alignment	• Considered this type of strategic alignment in four ways being administrative, sequential, reciprocal and full integration and the degree to which strategic alignment was achieved • Study validated the importance of IS/business planning integration in relation to strategic alignment of the organisation
Papp (1995)	• Model Development • Model Testing	• 300 Organisations	• Empirically tested the SAM developed by Henderson and Venkatraman (1991, 1993) • Also tested the extensions identified in this paper related to four new individual perspectives and four permutations of fusion perspectives by developing associated hypotheses and measures • Developed and tested the correlations between firm performance and strategic alignment	• Identified from a pre- and post-assessment of alignment that managers are focusing their attention inappropriately • The impact of title/function and industry issues were explored and both were found have a significant impact on alignment • The industry in which the firm is grouped is also a determinant of alignment

240

Study	Method (s)	Organisations/Subjects	Issues Examined/Domain	Results
				• Found empirical support for the SAM of Henderson & Venkatraman (1991, 1993).
Glazer (1993)	• Case study • Model development	• Electronics Inc.	• Discusses the view that management of information itself becomes the mechanism which enables firms to link business and IT and achieve strategic alignment	• Develops a model of the value of a firm's information • Suggest that information intensive firms are more likely to use information technology for competitive advantage
Venkatraman, Henderson and Oldach (1993)	• Model Development	• No data	• Further details of the development of the SAM (Henderson & Venkatraman, 1991, 1993)	• Provides further details of the use of the SAM (Henderson & Venkatraman, 1991, 1993) including consideration of four dominant alignment perspectives including strategy execution, technology potential, competitive potential, service level • Also identifies four alignment mechanisms that assist with achieving strategic control being value management, governance, technological capability and organisational capability

Table 1

Detailed Analysis of International Research on Strategic Alignment from 2008

Table 1A
The detailed analyses of International Research on Strategic Alignment completed as part of this thesis prior to 2008 are presented by Buckby (2008) in Buckby, Best and Stewart (2008) on pages 7-13. The names of the authors of the studies analysed prior to 2008 are included here for completeness.
Studies analysed prior to 2008
Van Grembergen, De Haes and Van Brempt (2007)
Van Lier and Dohmen (2007)
Cumps, Vianene, Dedence and Vandenbulcke (2006)
Strnadl (2006)
Wagner, Beimborn, Franke, Weitzel (2006)
Coughlan, Lycett and Macredie (2005)
De Haes and Van Grembergen (2005)
IT Governance Institute (2005e)
Martin, Gregor and Hart (2005)
Sledgianowski and Luftman (2005)
Avison, Jones, Powell and Wilson (2004)
Bergeron, Raymond and Rivard (2004)
D'Souza and Mukherjee (2004)
Luftman (2003c)
Kearns and Lederer (2003)
Peak and Guynes (2003)
Gold (2002)
Croteau and Bergeron (2001)
Hirschheim and Sabherwal (2001)
Smaczny (2001)
Maes, Rijsenbrij, Truijens and Goedvolk (2000)
Reich and Benbasat (2000)
Burn & Szeto (1999)
Luftman & Brier (1999)

Table 1A
The detailed analyses of International Research on Strategic Alignment completed as part of this thesis prior to 2008 are presented by Buckby (2008) in Buckby, Best and Stewart (2008) on pages 7-13. The names of the authors of the studies analysed prior to 2008 are included here for completeness.
Luftman, Papp & Brier (1999)
Maes (1999)
Papp (1999)
Van Der Zee and De Jong (1999)
Bruce (1998)
Broadbent and Weill (1993)
Henderson and Venkatraman (1993, 1999)
Luftman, Lewis and Oldach (1993)
Henderson and Thomas (1992)
Henderson & Venkatraman (1991)
Erikson, Magee, Roussel and Saad (1990)
Henderson (1990)
Henderson & Sifonis (1988)
Henderson , Rockart & Sifinos (1987)

	Table 2			
	Detailed Analysis of International Research on Value Delivery from IT from 2008			
Study	**Method (s)**	**Organisations/Subjects**	**Issues Examined/Domain**	**Results**
Davern and Wilkin (2010)	• Literature review	• No data	• Identifies and discusses the two disparate streams of IT value measurement literature • Discusses the need for an Integrated perspective IT value measurement	• Develops an integrated measurement model based on ERP systems and hotel management • Identifies a further need for the development of further integrated measures of IT value
Guldentops (2007)	• Conceptual • Model Development	• Interviews with 15 Chief Information officers of organisations that were fairly mature in terms of IT governance	• Discusses the seven principles of the VAL IT framework	• Provides the results of a test of IT value management principles in industry • Found that adoption of these principles is not yet well advanced
Kumar (2004)	• Conceptual • Model development	• Illustrative case	• Discusses how prior research has recognized the importance of a flexible IT infrastructure as a source of competitive advantage • Discusses the concept that IT value is not a static concept	• Expands on the idea that the value of an IT infrastructure depends on its use in an organisational context • Develops a dynamic model of IT value which calculates average IT infrastructure value over a period of time • The model builds on the idea that IT flexibility is a significant source of value
Thatcher and Pingry (2004)	• Model development	• No data	• Discusses models and cost functions to consider the impact of IT investments on economic performance	• Develops a series of two-stage duopoly models of quality-price competition and a series of monopoly models of quality-price choice to examine the impact on IT investments on profitability, productivity and consumer welfare • Found that market structure and cost structure play a critical role in the relationship between IT investment and economic measures

			Table 2	
		Detailed Analysis of International Research on Value Delivery from IT from 2008		
Study	**Method (s)**	**Organisations/Subjects**	**Issues Examined/Domain**	**Results**
Carr (2003)	• Conceptual	• No data	• Discusses how value from IT has changed over time as IT has become more available • Given the rapid pace of technology's advance, delaying IT investments can be a powerful way to cut costs • Discusses new rules of IT management and value delivery from IT	• Identified that the key to IT value in the future is to minimize spending on IT, manage costs of IT infrastructure and manage risks • Identified that companies that spent less on IT were the best performers in terms of profitability • Identified that wasted storage costs was an enormous unnecessary expense for most organisations
Legrenzi (2003)	• Conceptual • Survey	• 320 survey responses from companies in French-speaking Europe	• Discusses how value creation from IT must rely on strategy, management and organisational frameworks	• Identifies that traditional approaches to managing IT must evolve. Technological aspects have monopolized management attention for too long • Identified that approach must move to a value centred focus not a cost centred focus • Found that the incapacity to measure the value of IT accurately forces management to focus on cost
Rajaji (2002)	• Conceptual	• No data	• Discusses the difficulty with measuring value	• Provides recommendations on how to make shareholder value the guidance for IT investments
Wilkin (2001)	• Measurement development	• Trials of measurement instrument	• Discusses the difficulties with measuring the effectiveness of delivered systems	• Develops an instrument to measure the effectiveness of delivered IT systems • Broadens understanding of IS success • Identified that quality is a more useful criterion for effectiveness than prior measures of use and user satisfaction

Table 2				
Detailed Analysis of International Research on Value Delivery from IT from 2008				
Study	**Method (s)**	**Organisations/Subjects**	**Issues Examined/Domain**	**Results**
Brynjolfsson and Hitt (2000)	• Conceptual	• Case examples	• Discusses how IT can be considered as a general purpose technology and should contribute larger economic returns than other capital investments • Discusses the evidence on how investments in IT are linked to higher productivity and organisational transformation at the firm (organisation) level.	• Reviews the evidence on how investments in IT are linked to higher productivity and organisational transformation with emphasis on studies conducted at a firm level • Identified that a significant component of the value of IT is its ability to enable complementary organisational investments such as business processes and work practices which in turn leads to productivity increases by reducing costs and increase output quality • Found that firms that adopt decentralized organisational structures and work structures appear to have a higher link between IT and productivity
Ward, Taylor and Bond (1996)	• Survey • Model development	• 60 Senior IS/IT and business management in Times top 100 companies +150 large organisations	• Evaluation and realization of IS/IT benefits	• Identifies the issues that affect the ability of organisations to realize the full benefits of IS/IT investments • Develops a new benefits management process model
Barau, Kriebel and Mukhopadhyay (1995)	• Conceptual • Model development • Model testing	• Business units in the manufacturing sector	• Discusses the question whether the anticipated economic benefits of IT are being realized considering IT investments constitute more than 50% of all new capital investments by major US companies • Prior literature had indicated that productivity gains from IT investments had been neutral or negative • Discusses prior measurement problems	• Proposes and tests a process-oriented methodology for ex post measurement to audit IT impacts on business unit or profit centre's performance • Model uses both intermediate and higher level output variables for measuring IT contributions • Model found significant positive impacts of IT at the intermediate level

Table 2A
The detailed analyses of International Research on Value Delivery from IT completed as part of this thesis prior to 2008 are presented by Buckby (2008) in Buckby, Best and Stewart (2008) on pages 15-18. The names of the authors of the studies analysed prior to 2008 are included here for completeness.
Studies analysed prior to 2008
Thatcher & Pingry (2007)
ITGI (2006a)
Kwon and Watts (2006)
Thorp (2006)
Gregor, Fernandez, Holtham, Martin, Stern, Vitale and Pratt (2005)
ITGI (2005f)
ITGI (2005e)
Kohli and Devaraj (2004)
Melville, Kraemer and Gurbaxani (2004)
Rau (2004a)
Weill (2004), Weill and Ross (2004)
Dedrick, Gurbaxani & Kraemer (2003)
McKay, Marshall and Smith (2003)
Chan (2000)
Davern and Kauffman (2000)
Lee and Menon (2000)
Ryan and Harrison (2000)
Sircar, Turnbow and Bordoloi (2000)
Tallon, Kraemer and Gurbaxani (2000)

Table 3				
Detailed Analysis of International Research on Management of IT Resources from 2008				
Study	**Method (s)**	**Organisations/Subjects**	**Issues Examined/Domain**	**Results**
Ko and Fink (2010)	• Model development • Case study research	• Four Australian Universities	• Extends the work of prior researchers on the enterprise governance of IT framework • Conducts semi-structured interviews as part of case research	• Develops a complimentary and collaborative model of ITG • The model extends the understanding of structures, processes and relational mechanisms identified in Van Grembergen and De Haes (2009b); De Haes and Van Grembergen (2009) and gathers more detailed knowledge on these three elements from the case research
Van Grembergen and De Haes (2009b)	• Framework development • Case study research	• Insurance, steel and chemical organisations	• Considers best practice for enterprise governance of IT • Discusses how ITG is deployed as part of enterprise governance using structures, processes and relational mechanism	• Develops the enterprise governance of IT framework which links structures, processes and relational mechanisms to enterprise governance • Identifies that IT structures including how IT is organized is important to effective ITG • Conducts and discusses case studies on the enterprise governance of IT
De Haes and Van Grembergen (2009)	• Literature review • Case study research • Delphi method research • Benchmark research	• Belgian financial sector organisations	• How are organizations implementing ITG • What is the relationship between strategic alignment and ITG	• Discusses how ITG is deployed using a variety of governance structures, processes and relational mechanisms • Structures includes how IT is organized (centrally, decentrally or federated) • Processes refers to the formalisation of strategic IT decision-making or monitoring processes • Relational mechanisms refers to the relationships between the key people involved in ITG processes

Table 3				
Detailed Analysis of International Research on Management of IT Resources from 2008				
Study	**Method (s)**	**Organisations/Subjects**	**Issues Examined/Domain**	**Results**
Gellings (2007)	• Framework development • Case studies in the banking industry • Expert interviews	• German banking sector	• Outsourcing and its relationship to IT governance • How IT governance mechanisms are contractually implemented	• Found that service level agreements and penalty reward mechanisms are key success factors for establishing ITG mechanisms that contribute to outsourcing success
Simonsen (2007)	• Problem mapping technique	• Vendor from large software supplier • Customer organisation	• Top management support for IT assists with business alignment • Problem mapping technique assists with customer understanding of project	• Outcome of the project was a report comprising the analysis of the customer's requirements and recommendations for subsequent implementation • Strategic alignment linked to report recommendations
Bedell (2005)	• Survey	• 900 North American IT and business decision makers	• Organisations approach to IT governance • Discussed continuum of centralisation to decentralisation	• 60% indicated their company took a centralised approach to IT management • Move to centralise peaked in 2003 but growing drive to improve efficiency and transparency may lead to a further increase in centralisation in the future • Identified that ideal solution of managing IT strategy may be a combination of centralised and autonomous IT management

Table 3A
The detailed analyses of International Research on Management of IT Resources completed as part of this thesis prior to 2008 are presented by Buckby (2008) in Buckby, Best and Stewart (2008) on pages 24-29. The names of the authors of the studies analysed prior to 2008 are included here for completeness.
Studies analysed prior to 2008
Willcocks, Feeny and Olson (2006)
Wilcoxson and Chatham (2006)
Van Grembergen, De Haes and Moons (2005)
Van Grembergen, De Haes and Guldentops (2004)
De Haes and Van Grembergen (2004)
Meyer (2004)
Peterson (2004a)
Powell and Yager (2004)
Rau (2004b)
Sherer (2004)
Schwarz and Hirschheim (2003)
Young and Jordan (2003)
Broadbent (2003a, 2003b)
Kim (2003)
Ribbers, Peterson and Parker (2002)
Sohal and Fitzpatrick (2002)
Keyes-Pearce (2002)
Mukherji (2001)
Peterson (2001)
Karimi, Bhattacherjee, Gupta and Somers (2000)
Doughty(2000)
Hamaker (2000)
Peterson, Callaghan and Ribbers (2000)
Sambamurthy and Zmud (1999)
Broadbent and Weill (1997)
Karake (1992)

		Table 4		
		Detailed Analysis of International Research - Risk Management of IT from 2008		
Study	**Method (s)**	**Organisations/Subjects**	**Issues Examined/Domain**	**Results**
Williams (2007)	• Framework Development	• No data	• Explores the different roles and responsibilities that contribute to effective IT security including consideration of organisational structures and roles of audit committee, Chief Information Security Officer (CISO), Board roles and executive management roles	• Concludes that the Chief Information Security Officer (CISO) cannot be solely responsible for information security and that some of the other roles discussed must take more responsibility for IT security issues

Table 4A
The detailed analyses of International Research on Risk Management of IT completed as part of this thesis prior to 2008 are presented by Buckby (2008) in Buckby, Best and Stewart (2008) on pages 19-23. The names of the authors of the studies analysed prior to 2008 are included here for completeness.
Studies analysed prior to 2008
Gewald and Helbig (2006)
IT Governance Institute (2006b)
Pareek (2006)
Pironti (2006)
Ross (2006)
Bahli and Rivard (2005)
Benvenuto and Brand (2005)
Chapin and Akridge (2005)
Gerber and Von Solms (2005)
IT Governance Institute (2005d)
IT Governance Institute (2005c}
Van Solms (2005)
Broadbent, Kitzis and Hunter (2004)
Stewart (2004)
Von Solms and Von Solms (2004)
Kliem (2004)
Levine (2004)
Committee of the Sponsoring organisations of the Treadway Commission (COSO) (2004)
Standards Australia (2004)
SAS Ltd (2004)
Ataya (2003)
Hadden, De Zoort and Hermanson (2003)
Wiederkehr (2003)
Young and Jordan (2003)

Table 5				
Detailed Analysis of Measurement of Performance of IT Systems from 2008				
Study	**Method (s)**	**Organisations/Subjects**	**Issues Examined/Domain**	**Results**
Simonsson, Johnson and Ekstedt (2010)	• Case Studies	• 35 interviews	• Considered the links between ITG maturity and IT governance performance	• Study found a positive correlation between ITG maturity and ITG performance • Internal structures, clearly defined organisational structures and relationship, mature quality management and cost allocation were most related to ITG performance
Van Grembergen & De Haes (2009d)	• Case Study	• Case study of major Canadian Financial Group	• Discusses the use of the IT BSC as an instrument for Enterprise Governance of IT	• Found that to leverage the IT BSC as a management and alignment instrument need to apply cause and effect relationships between measures • These measures are outcome and performance driver measures.
Ali & Green (2007)	• Web survey	• 176 members of ISACA	• Discusses the mechanisms that make up effective IT governance • Develops a measure of effectiveness for IT governance based on six mechanisms	• Finds a significant positive relationship between the overall level of effective IT governance and corporate communication systems and an IT strategy committee

<table>
<thead>
<tr>
<th colspan="5" align="center">Table 5</th>
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<tr>
<th colspan="5" align="center">Detailed Analysis of Measurement of Performance of IT Systems from 2008</th>
</tr>
<tr>
<th>Study</th>
<th>Method (s)</th>
<th>Organisations/Subjects</th>
<th>Issues Examined/Domain</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowen, Cheung and Rohde (2007)</td>
<td>

In-depth case study of one organisation
Interviews
Model development
Develops and tests hypotheses

</td>
<td>

One case organisation which operates across Australia and NZ
9 senior managers
13 IT and non-IT participants

</td>
<td>

Increases understanding of factors influencing IT governance structures, processes and outcome metrics
Aims to address gap between theoretical frameworks, prior empirical research and effective IT governance practices
Develops a model of IT governance
Determines an IT governance effectiveness score based on objectives from Weill & Ross (2004)

</td>
<td>

Investigated factors influencing IT governance effectiveness and project implementation success
Found that higher levels of IT governance effectiveness are associated with a shared understanding of IT and business objectives and a more active IT steering committee comprised of a balanced representation of senior business and IT management
Found that a lack of comprehensive and poorly communicated IT strategies and policies reduces the effectiveness of IT governance
Found that a critical step in implementing effective ITG is the development of the discipline to track and communicate individual IT projects

</td>
</tr>
<tr>
<td>Peterson (2004a)</td>
<td>

Model development

</td>
<td>

Case examples

</td>
<td>

Presents a holistic view of IT governance and develops a ITGAP model of ITG architecture and effectiveness

</td>
<td>

The model developed attempts to link IT value and IT architecture to measure ITG effectiveness.

</td>
</tr>
</tbody>
</table>

Table 5A
The detailed analyses of International Research on Measurement of Performance of IT Systems completed as part of this thesis prior to 2008 are presented by Buckby (2008) in Buckby, Best and Stewart (2008) on pages 30-31. The names of the authors of the studies analysed prior to 2008 are included here for completeness.
Studies analysed prior to 2008
Dahlberg and Lahdelma (2007)
Lambeth (2007)
Dahlberg and Kivijarvi (2006)
Blumenberg and Hinz (2006)
Van Grembergen and De Haes (2005b)
Van Grembergen and De Haes (2005a)
Warland and Ridley (2005)
Hardy and Guldentops (2005)
Murray (2004)
Fairchild (2004)
Pederiva (2003)
Van Grembergen, Saull and De Haes (2003, 2004)
Van Grembergen, De Haes and Amelinckx (2003)
Guldentops (2003)
Gold (2003)
Guldentops, Van Grembergen and De Haes (2002)
Van Grembergen and Amelinckx (2002, 2004)
Van Grembergen (2000)
Saull (2000)
Van Grembergen and Van Bruggen (1997)

Appendix 2   **Quantitative study survey instruments**

1. Empirical Study of ITG Model Survey Instrument

2. Pilot Study of ITG Model Survey Instrument

QUT Queensland University of Technology
Brisbane Australia

Survey to identify the critical Information Technology (IT) Governance issues that the Board (Governing Body) should review

Hi, My name is Sherrena Buckby from the Faculty of Business at QUT. I am conducting research on the critical IT Governance issues that Boards (governing bodies) of Australian organisations (including Universities) should review.

IT Governance (ITG) is defined as "the management process which ensures delivery of the expected benefits of IT in a controlled way to enhance the long-term, sustainable success of the enterprise" (IT Governance Institute, 2000 p 27)

As part of this research I am asking participants to RATE the importance of a set of issues that Boards could consider in their review of IT Governance.

How long will it take?
The survey will take approximately 5-10 minutes to complete.

Who is asked to participate?
Any person who is knowledgeable about Board processes would be an ideal participant in this process. Your participation in this survey is voluntary and you may discontinue with the survey at any time without comment or penalty. Your decision to participate will in no way impact upon your current or future relationship with QUT.

How do I complete the survey?
 Go to the list of Critical Board ITG Issues and rate their importance, using the scale: Not important at all to Very important.
In Item 30 add any further issues which you consider should have appeared in the list of critical Board ITG issues and indicate the rating you would give the additional items.

Who will see my answers?
Your responses will be used to refine the Critical Board ITG Issues in my research. Only my supervisors and I will have access to the information you provide. Your anonymity and confidentiality will be safeguarded in any publication of the results of this research.

Who do I contact if I have any queries or comments?
If you have any questions about this research project please contact me at QUT on (07) 3138 4324 or by email at s.buckby@qut.edu.au. If you have any concerns or complaints about the ethical conduct of the project you can contact the Research Ethics Officer on 3138 2340 or at ethicscontact@qut.edu.au or by writing to the Research Ethics Officer, Office of Research, O Block Podium, QUT GP Campus, GPO Box 2434, Brisbane 4001. You may also contact my principal supervisor Professor Peter Best on (07) 3138 2739 or by email at p.best@qut.edu.au with any queries on this project.

Please rate the importance of each of the following potentially critical ITG issues that Boards should consider in their review of IT Governance.					
	Not important at all	Unimportant	Neither Important/ Unimportant	Important	Very important
1. Operational alignment of Business & IT strategy	☐	☐	☐	☐	☐
2. The IT department is strategically aligned with mission and goals of the organisation	☐	☐	☐	☐	☐
3. Information Technology is a key component in every business initiative and development	☐	☐	☐	☐	☐
4. Executive Management are supportive of the IT Division and regularly communicate with the head of this division.	☐	☐	☐	☐	☐
5. The IT Division has clearly defined roles and responsibilities within the organisation and communicates this well to the community	☐	☐	☐	☐	☐
6. The Board has established performance measurement processes to regularly monitor the level of strategic alignment	☐	☐	☐	☐	☐
7. The Board ensures an enterprise risk assessment is conducted each year	☐	☐	☐	☐	☐
8. The Board is conversant with Enterprise Risk models and their suggested risk management policies	☐	☐	☐	☐	☐
9. The Board considers IT risks separately from enterprise risk assessment processes	☐	☐	☐	☐	☐
10. The Board ensures the organisation has appropriate IT internal controls and procedures in place to minimise IT risks	☐	☐	☐	☐	☐
11. Senior management and the Board regularly review and monitor organisational IT risks	☐	☐	☐	☐	☐
12. The Board ensures that the organisation has a sound IT security framework in place	☐	☐	☐	☐	☐
13. The Board regularly reviews the organisation's IT continuity plans	☐	☐	☐	☐	☐
14. The Board ensures the organisation's security and business continuity plans are regularly tested and monitored	☐	☐	☐	☐	☐
15. The Board has established suitable performance measurement processes to regularly monitor the level of IT risk within the business	☐	☐	☐	☐	☐

	Not important at all	Unimportant	Neither Important/ Unimportant	Important	Very important
16. The Board focuses on delivery of value from organisational IT systems and ensures this issue is addressed in the organisation's IT strategic plans	☐	☐	☐	☐	☐
17. Senior Management have established processes to deliver value from IT resources	☐	☐	☐	☐	☐
18. Business and IT divisions are well aligned and focus on achieving business objectives together	☐	☐	☐	☐	☐
19. The Board has established an IT steering or other board sub-committee to focus on achieving value from IT investments	☐	☐	☐	☐	☐
20. The Board regularly seeks stakeholder assessment of value delivery from IT systems	☐	☐	☐	☐	☐
21. The Board has established suitable performance measurement processes to regularly monitor the level of value being delivered from organisational IT resources	☐	☐	☐	☐	☐
22. The Board is focused on managing its IT resources effectively and efficiently	☐	☐	☐	☐	☐
23. The IT division takes regular inventory of its IT resources and reports this to the Board	☐	☐	☐	☐	☐
24. The IT division is well structured to achieve optimal IT decision-making	☐	☐	☐	☐	☐
25. The Board has established a sub-committee to focus on effective management of IT resources	☐	☐	☐	☐	☐
26. The IT division has a good system of coordination of organisational IT resources	☐	☐	☐	☐	☐
27. The Board has established suitable policies and processes for replacement or upgrading of IT resources	☐	☐	☐	☐	☐
28. The Board ensures that all IT projects have clear budgets and timelines and that projects are regularly monitored for excess costs or time overruns	☐	☐	☐	☐	☐
29. The Board has established suitable performance measurement processes to regularly monitor the management of IT resources in the organisation	☐	☐	☐	☐	☐

30. Insert Any other ideal factor here that has not been included in items 1 to 29 and choose the rating applicable to this factor.

Please choose **one** of the following:	Please enter your comment here
☐ Not important at all ☐ Unimportant ☐ Neither Important/Unimportant ☐ Important ☐ Very important	

31. Insert Any other ideal factor here that has not been included in items 1 to 29 and choose the rating applicable to this factor.

Please choose **one** of the following:	Please enter your comment here
☐ Not important at all ☐ Unimportant ☐ Neither Important/Unimportant ☐ Important ☐ Very important	

Submit Your Survey.

Thank you for completing this survey. Please fax your completed survey to: .

Welcome to the
Survey of Information Technology (IT) Governance Processes in Australian Organisations

What is the aim of this survey?

Hi, My name is **Sherrena Buckby** and I am a doctoral student in the Faculty of Business at QUT. This survey aims to gather perceptions about IT Governance processes in Australian organisations and forms part of the validation phase of my doctoral research. My research question is "What Factors do Governing Bodies (Boards) consider are important in reviewing IT Governance".

IT Governance is defined as "the management process which ensures delivery of the expected benefits of IT in a controlled way to enhance the long-term, sustainable success of the enterprise" (IT Governance Institute, 2000 p 27)

How long will it take?

The survey will take approximately 10 minutes to complete and will gather important information about IT Governance in Australian organisations and will assist me in validating the factors identified from the IT Governance literature as important to Boards when reviewing ITG within Australian organisations.

Who is asked to participate?

The following questions are for members of a Board, Management of IT divisions, IT divisional staff, any other business or professional staff. Your participation in this survey is voluntary and you may discontinue with the survey at any time without comment or penalty. Your decision to participate will in no way impact upon your current or future relationship with QUT.

How do I complete the survey?

Just proceed from Q1 to Q11 and return to the **collection box at the seminar.**

Who will see my answers?

Your responses will be used to refine the Board ITG Factors identified in my research. Only my supervisors and I will have access to the information you provide. Your anonymity and confidentiality will be safeguarded in any publication of the results of this research.

Who do I contact if I have any queries or comments?

If you have any questions about this research project please contact me at QUT on (07) 3864 4324 or by email at s.buckby@qut.edu.au. If you have any concerns or complaints about the ethical conduct of the project you can contact the Research Ethics Officer on 3864 2340 or at ethicscontact@qut.edu.au or by writing to the Research Ethics Officer, Office of Research, O Block Podium, QUT GP Campus, GPO Box 2434, Brisbane 4001. You may also contact my principal supervisor Professor Peter Best on (07) 3864 2739 or by email at p.best@qut.edu.au with any queries on this project.

Survey of Information Technology (IT) Governance Processes in Australian Organisations

1. **From your perspective: What is the main purpose of IT Governance processes in Australian Organisations?**

    Check any that apply
    - □ Business and IT strategies are aligned with the mission of the organisation
    - □ IT risk is well managed in the organisational environment
    - □ Value is delivered from IT resources across the organisation
    - □ IT resources are well managed and controlled in the business environment
    - □ Other, please specify

2. **Do you consider IT Governance to be important to your organisation?**

Strongly disagree	Disagree a little	Neutral	Agree a Little	Strongly agree
○	○	○	○	○

3. **Do you consider IT governance to be important to your business sector?**

Strongly disagree	Disagree a little	Neutral	Agree a little	Strongly agree
○	○	○	○	○

4. **If you believe that IT governance is important to your business sector but not your organisation, why is this the case?**

    Choose one
    - ○ IT resources at my business organisation are too small to require IT Governance processes
    - ○ Budget constraints at my business organisation do not allow ITG to be considered or implemented
    - ○ IT Governance is already well managed in my organisation
    - ○ Other, please provide details

5. **Do you consider that IT governance will become <u>more</u> important in your organisation in the future?**

    - □ YES because
    - □ NO because

262

6. **Do you consider that IT Governance is difficult to achieve in your organisation?**

Strongly disagree	Disagree a little	Neutral	Agree a little	Strongly agree
○	○	○	○	○

7. **Why do you consider IT Governance is difficult to achieve in your organisation? Please specify.**

8. **If your organisation has IT Governance processes in place, at what level of the organisation does the review of IT Governance currently occur?**

    Choose any that apply
    - ○ Assessed by the full Board at a Board Meeting
    - ○ A special sub-committee of the Board dealing with ITG
    - ○ Assessed by IT department Head
    - ○ Assessed by DVC – IT or IT CEO
    - ○ Assessed by the Audit Committee
    - ○ Other please specify

9. **How often is ITG monitored within your organisation?**
    - ○ Yearly
    - ○ Monthly
    - ○ Weekly
    - ○ Only when ITG problems arise
    - ○ Other please specify

10. Which of the following factors do you consider are IMPORTANT to the review of IT Governance by Boards?

FACTORS	Not important at all	Unimportant	Neither Important / Unimportant	Important	Very Important
Alignment of Business & IT strategy is evident across the organisation	☐	☐	☐	☐	☐
The IT department is strategically aligned with organisational mission and goals	☐	☐	☐	☐	☐
Information Technology is a key component in every business initiative and development	☐	☐	☐	☐	☐
Executives are supportive of the IT Division and regularly communicate with the Head of this division.	☐	☐	☐	☐	☐
The IT Division has clearly defined roles and responsibilities within the organisation and communicates these well to the community	☐	☐	☐	☐	☐
The Board has established performance measurement processes to regularly monitor the level of strategic alignment	☐	☐	☐	☐	☐
The Board ensures a Business organisation-wide enterprise risk assessment is conducted each year	☐	☐	☐	☐	☐
The Board is conversant with Enterprise Risk models and their suggested risk management policies	☐	☐	☐	☐	☐
The Board ensures the organisation has appropriate IT internal controls and procedures in place to minimise IT risks	☐	☐	☐	☐	☐
Senior management and the Board regularly review and monitor organisational IT risks	☐	☐	☐	☐	☐
The Board ensures that the organisation has a sound IT security framework in place	☐	☐	☐	☐	☐

FACTORS	Not important at all	Unimportant	Neither Important / Unimportant	Important	Very Important
The Board & Executives regularly reviews Business organisation IT continuity plans	□	□	□	□	□
Executives ensure security and business continuity plans are regularly tested and monitored	□	□	□	□	□
The Board has established suitable performance measurement processes to regularly monitor the level of IT risk within the business organisation	□	□	□	□	□
The Board focuses on delivery of value from organisational IT systems and ensures this issue is addressed in organisational IT strategic plans	□	□	□	□	□
Senior Management have established processes to deliver value from IT resources	□	□	□	□	□
Business and IT divisions are well aligned and focus on achieving business objectives together	□	□	□	□	□
The Board has established an IT steering or other board sub-committee to focus on IT Governance issues	□	□	□	□	□
The Board regularly seeks stakeholder assessment of value delivery from IT systems	□	□	□	□	□
The Board has established suitable performance measurement processes to regularly monitor value being delivered from organisational IT resources	□	□	□	□	□
The Board is focused on managing its IT resources effectively and efficiently	□	□	□	□	□
The IT division takes regular inventory of its IT resources and reports this to the Board	□	□	□	□	□
The IT division is well structured to achieve optimal IT decision-making	□	□	□	□	□

FACTORS	Not important at all	Unimportant	Neither Important / Unimportant	Important	Very Important
The Board has established a sub-committee to focus on effective management of IT resources	☐	☐	☐	☐	☐
The IT division has a good system of coordination of organisational IT resources	☐	☐	☐	☐	☐
The Board has established suitable policies and processes for replacement or upgrading of IT resources	☐	☐	☐	☐	☐
The Board ensures that all IT projects have clear budgets and timelines and that projects are regularly monitored for excess costs or time overruns	☐	☐	☐	☐	☐
The Board has established suitable performance measurement processes to regularly monitor the management of IT resources	☐	☐	☐	☐	☐
Any other factors you consider important which are not covered above.					

11. Finally, can you please provide some background information?

A. Where is your organisation situated?

Choose one
- ○ Queensland
- ○ New South Wales/ACT
- ○ Victoria
- ○ South Australia
- ○ Western Australia
- ○ Northern Territory
- ○ Tasmania

B. How many staff do you currently have working in your organisation?

- ○ <10,000
- ○ 10,000 – 14,999
- ○ 15,000 – 19,999
- ○ 20,000 to 24,999
- ○ 25,000 to 29,999
- ○ 30,000 or more

C. What is the annual gross income of your organisation?
- ○ Less than $50 Million
- ○ $50million – $99 Million
- ○ $100 Million – $199 Million
- ○ $200 Million – $299 Million
- ○ $300 Million – $399 Million
- ○ Greater than $400 Million

D.   **What position do you hold in your organisation?**
- ○ Board Member
- ○ CEO
- ○ Executive Management
- ○ Head of IT Department
- ○ Professional staff member
- ○ Technology Services Staff member
- ○ Other please specify

E.   **What Sector does your organisation belong to:**
- ○ Private Sector
- ○ Tertiary Education Sector
- ○ Public Sector

F.   **Any final thoughts on IT Governance in Australian Organisations? (optional)**

Thank-you for participating in this survey.

Appendix 3   **Tests of quality/trustworthiness in qualitative case study design**

Tests of quality and trustworthiness	Possible tactics identified by researchers to improve quality/trustworthiness	How quality/trustworthiness tactics were applied to my study	Phase of research in which element occurs
External validity/transferability			
Also known as generalizability, external validity refers to the belief that theories must be shown to account for phenomena both in the setting being studied and other settings (Gibbert et al., 2008; Yin 1994) Transferability is the degree to which the findings of this inquiry can apply or transfer beyond the bounds of the project (Lincoln & Guba, 1985).	The researcher must clearly establish the boundaries of the qualitative study	Case study protocol document 1 in Appendix 5 establishes the boundaries of the study including the number of cases, the number of interviews, how data is to be collected, the number and length of interviews and the time period over which the data was collected.	**Research Design**
	The researcher needs to provide background data to establish the context of the study and a detailed description of the phenomenon in question to allow comparisons to be made	Background data on IT governance, universities and theoretical approach to the research established in chapters 2, 3 and 5 ensures the context of study was well understood prior to commencing.	
	There must be a clear rationale for case study selection	Clear rationale for case selection including the selection of the sector, unit of analysis and cases using a theoretical sampling approach is provided in section 5.2.3.	
	Using a theoretical sampling approach	The approach to the theoretical sample for the study was to use a purposeful maximum variation stratified approach to select cases outlined in section 5.2.3.2.	
	Use replication logic via multiple case studies	Data collection was replicated across 11 university case studies. Primary data from interviews and secondary data from websites was collected in all cases.	

Tests of quality and trustworthiness	Possible tactics identified by researchers to improve quality/trustworthiness	How quality/trustworthiness tactics were applied to my study	Phase of research in which element occurs
Construct validity/credibility			
Construct Validity- the extent to which a study investigates what it claims to investigate. That is, the extent to which a procedure leads to an accurate observation of reality (Gibbert et al., 2008; Yin 1994) Credibility is an evaluation of whether or not the research findings represent a credible conceptual interpretation of the data drawn from the participants' original data (Lincoln & Guba, 1985, p.296)	Adoption of research methods well established in qualitative investigation	Adopted sound qualitative investigation practices as detailed in Figure 5.1 and operationalised in Table 5.1.	**Data Collection**
	Development of early familiarity with the culture of participating organisations	Prior to my qualitative study, I conducted a focus group on IT governance with university IT directors in late 2007. This assisted in developing early familiarity with participating universities and their IT governance processes. I also observed one university's ITG committee processes for two years (2007-08) which assisted familiarity and understanding of the culture of participating universities prior to commencement of data collection.	
	Indication of data collection circumstances and explanation of data analysis	The data collection circumstances and the expected data analysis processes were detailed in my case study protocol document which was developed prior to the commencement of data collection. The case study protocol was used to guide the data collection processes. This document is included in Appendix 5.	
	Use of multiple sources of evidence and triangulation of these data sources	Gathered multiple sources of data from each of the cases. Each of the cases in my study included up to 6 independent interviews so triangulation occurred between interviews and also with secondary documentation which was collected from university annual reports	

269

Tests of quality and trustworthiness	Possible tactics identified by researchers to improve quality/trustworthiness	How quality/trustworthiness tactics were applied to my study	Phase of research in which element occurs
		and university web sites.	
	Establish a clear chain of evidence gathering	Discussed chain of evidence processes in section 5.3.6. Detailing data collection circumstances and data analysis processes within the case study protocol document prior to the commencement of data collection processes assisted the chain of evidence processes. Established a document database that tracked all data collected and establishing interview schedules for each case. Linked data from Nvivo 8 coding analysis to evidence ratings for each theory in the tables in Appendix 6.	
	Use of probes and iterative questioning in interview protocol	Developed an interview protocol that included probes and iterative questions in section 5.3.4.3.	
	Use tactics to help ensure honesty in informants data	Interview participants were given the opportunity to refuse to participate in my project at the time of invitation. Thus participants who agreed to be part of the interview process were obviously willing to take part in the research project and offer their data on university ITG freely. I offered to turn off the tape recorder or cease the interview if participants required this during the interview process. I gathered secondary data to triangulate with interview data.	

Tests of quality and trustworthiness	Possible tactics identified by researchers to improve quality/trustworthiness	How quality/trustworthiness tactics were applied to my study	Phase of research in which element occurs
	Production of field notes re interviews including reflective commentary on interview	At the end of each interview I produced field notes reflecting on each interview. These field notes assisted with data analysis processes as well as data collection.	
	Review of transcripts by peers/key informants	As part of my research ethics processes, transcripts from each interview were sent back to the interview participant for review and verification for correctness and trustworthiness. My supervisor also reviewed a sample of these transcripts. This occurred prior to data analysis.	
	Frequent debriefing between researcher and supervisor on interviews	I frequently debriefed after interviews and cases with my thesis supervisor to discuss the progress of interviews and to discuss issues that were emerging from the data collection and iterative data analysis processes.	
Reliability/dependability			
Reliability refers to the ability of subsequent researchers to arrive at the same insights if they conduct the study using the same processes (Gibbert et al., 2008; Yin, 1994) Dependability is an assessment of the quality of the integrated processes of data collection, data analysis, and theory generation.	Develop Interview Schedules	Developed detailed interview schedules for each case	**Data collection**
	Develop a well-designed interview questionnaire (protocol)	Developed a well-designed interview protocol as detailed in section 5.3.4.3.	
	Use case study protocol	Developed a case study protocol for use in data collection process.	
	Develop case study database	Used a case study document database to record and track the collection of data was beneficial to my data collection and analysis processes –Appendix 5 item 9.	

271

Tests of quality and trustworthiness	Possible tactics identified by researchers to improve quality/trustworthiness	How quality/trustworthiness tactics were applied to my study	Phase of research in which element occurs
	Employment of overlapping methods	Used interview field notes and transcripts to overlap data collection and data analysis processes along with archival data collected during this process.	
Internal validity/confirmability			
Also called logical validity and refers to the causal relationships between variables and results. The researcher must provide a plausible causal argument to defend the research conclusions (Gibbert et al., 2008; Yin 1994) Confirmability is a measure of how well the inquiry's findings are supported by the data collected (Lincoln & Guba, 1985)	Formulate a clear research framework and research questions	Formulated a clear research framework see Figure 5.1 and Table 5.2 and a clear research question in section 5.3.2.	**Data Analysis**
	Apply an in-depth methodological description to allow integrity of research results	Established a clear methodology in Figure 5.1 outlining how the data analysis would occur iteratively throughout the data collection processes. This process is described in section 5.3.5. This methodology was based on my critical realist research approach.	
	Undertake Pattern-matching, Explanation building, Time Series Analysis	Applied pattern matching to my study by searching for generative mechanisms (a priori constructs of three theories) using an inductive data analysis approach.	
	Theory triangulation	Undertook theory triangulation by applying different theoretical lenses and bodies of literature as a means of interpreting the findings.	
	Triangulation to reduce effect of investigator bias	Triangulation of data sources (interviews and secondary documents) to reduce the effect of investigator bias.	
	Admission of researcher's beliefs and assumptions	To limit the impact of beliefs and assumptions I applied the interview protocol questions and probes to keep all the interviews unbiased. Clear	

Tests of quality and trustworthiness	Possible tactics identified by researchers to improve quality/trustworthiness	How quality/trustworthiness tactics were applied to my study	Phase of research in which element occurs
		articulation of my ontological and epistemological position outlined in Chapter 3.	
	Recognition of shortcomings in study's methods and their potential effects	Limitations of study's methods and their effects identified in section 9.5.	
	Audit trail of research process	I established a clear audit trail of my data collection processes by establishing a document database. An academic colleague with no links to the study also conducted an audit of the document database to verify its contents.	

Appendix 4   Full version of Table 5.9 - Development of the semi-structured interview protocol

Theory Elements (Generative Mechanisms)	Theory Constructs (Theoretical Events)	Expected Evidence gathered from Interviews (Theoretical Experiences)	Interview Questions developed to gather the expected data
AGENCY THEORY **Conscious self-interest**			
Self-interested behaviour of the agent (principal-agent conflict)	**Agent (management) acts in own interests rather than interests of the governing body (board) and the principal (Federal/State Governments)**	Evidence that the agent acts in their own interests rather than interests of the governing body (board) and the principal (state & federal governments	• What do you think about software purchasing around the university do you think it is well governed or a bit ad hoc? • What about software purchases are they centrally controlled or are assets centrally controlled in terms of purchase or is it more devolved to the Faculties? • Do you think governing body members have a general feeling of what a major IT implementation costs overall? • It's still a lot of money being spent? • Is the governing body really just rubber stamping management decisions to some extent?
	Information Asymmetry: agent deliberately does not share information with university or governing body/principal	Evidence that the agent chooses not to disseminate information to the university and principal/governing body	• Do you think university management provide sufficient information up to the governing body for them to make decisions? • Do you think that would actually allow the information to flow better to the governing body? • Do you think a lot of IT goes from those committees forward to the governing body or do you think there is filtering? • Does the governing body ask regular questions about how an IT implementation is going? • Do you think the governing body is being given enough information about IT?

Theory Elements (Generative Mechanisms)	Theory Constructs (Theoretical Events)	Expected Evidence gathered from Interviews (Theoretical Experiences)	Interview Questions developed to gather the expected data
	Governing body/owners monitor the agent to reduce the self-interested behaviour of the agent	Evidence that the governing body is monitoring the agent through the use of performance measurement processes	• Do you think the governing body asks questions about how a major implementation is happening when they are at the governing body meetings? • What about performance measurement? Is that sort of a key part of IT governance do you think at your university? • I notice that in the [governing body] minutes there are a lot more KPIs being implemented. Is that becoming a bigger issue for you? • So you seem to have worked quite strongly on developing performance measurement processes, is that a fairly recent thing?
AGENCY THEORY **Unconscious self-interest**			
Differing risk profiles between principal and agent	**Agent's risk profile does not align with the risk profile of the governing body and principal**	Evidence that the risk profile of the agent differs from the risk profile of the governing body/principal	• What about risk management, do you think that's a key issue? • What about risk? Is that addressed explicitly in IT? • What about risk management, is that something that the university is focusing on? • So is there a risk management committee or is it part of the audit committee responsibilities? • Do you do an enterprise wide risk assessment?

Theory Elements (Generative Mechanisms)	Theory Constructs (Theoretical Events)	Expected Evidence gathered from Interviews (Theoretical Experiences)	Interview Questions developed to gather the expected data
AGENCY THEORY **Principal's problems**			
Principal may not be able to clearly specify to management how they want IT to be governed	**Governing body is unable to clearly specify on behalf of the principal how IT should be governed within the university**	Evidence that the principal/governing body is not able to clearly specify how the agent should govern IT processes	• So have you seen the situation where the governing body has actually been strategically driving some IT issue? • What do you see as the role of the governing body here in terms of overseeing IT? • How does the IT plan link to the university's strategic planning?
Governing body may not select competent management	**Governing body may not have selected competent IT management on behalf of the principal**	Evidence that the governing body may not have selected competent IT management	• What about the managing of the IT resources, do you think that is handled well in the university? • So that's his role, can you give me any examples of that?
Principal may not select governing body members with IT knowledge and skills	**Principal may not have selected competent governing body members**	Evidence that the principal may not have selected governing body members with sufficient IT knowledge Evidence that governing body members are not able to clearly specify the risk profile required for the agent	• So who do you think are the real key players in IT governance? • Do you think governing body members are interested in asking questions about IT?

Theory Elements (Generative Mechanisms)	Theory Constructs (Theoretical Events)	Expected Evidence gathered from Interviews (Theoretical Experiences)	Interview Questions developed to gather the expected data
STEWARDSHIP THEORY **Conscious stewardship focus**			
Steward acts in the best interests of governing body/owners	**Steward acts in organisational interests rather than own interests**	Evidence that the IT decisions made by steward (management) serve the needs of the organisation.	• What was the aim of centralizing? • Do you think speed and convenience of IT puts pressure on the governance of IT? • Is that a bit unique having a specific person focus on IT? • Does having business systems owners involved in the governance of IT make it better governed? • Do you think that has been the platform that we've build on from IT governance? • So do you think the governance of IT is very much wrapped up with the corporate governance processes? • So therefore the management of IT governance becomes more critical do you think to the university? • What do you think IT governance entails at your university? What is university management's role in the governance of IT?
	Information Symmetry: **Steward voluntarily shares information with the university community/governing body/owners**	Evidence that the steward chooses to disseminate information to the university and principal/governing body as it assists the university.	• So you feel you've got a full and frank style of reporting on IT up to the governing body? • So they would be reported up and they can question them in the minutes of meeting documents? • So would I be fair in saying that you have good lines of communication up and down on IT issues? • So what about communicating, as in communicating IT issues to other parts of the university?

Theory Elements (Generative Mechanisms)	Theory Constructs (Theoretical Events)	Expected Evidence gathered from Interviews (Theoretical Experiences)	Interview Questions developed to gather the expected data
			• So do you feel that you (governing body chair) get full information on what's happening in IT? Is it the full information you require? Do you feel it's being filtered at all? • So if you have some disaster happen within the university IT processes, would the governing body be aware of the issue and be interested to find out what's happening? • Do you think there is a good open process of communication between your level up through council and back down again??
	The steward voluntarily reports performance information to governing body/owners	Evidence that the steward chooses to report performance information to the governing body/owners as it assists the university.	• What about performance measurement, are you doing much performance measurement across your IT processes? • Performance measurement? How is that working? • How is IT performing as part of university processes? • Do the performance measures appear in your annual report? • Are they reviewed fairly regularly? To see if they are sort of tracking trend wise, they are improving?
STEWARDSHIP THEORY **Unconscious stewardship focus**			
Similar risk profiles between governing body/owners and stewards	**Steward's risk profile aligns with risk profile of the governing body/owners**	Evidence that the owner/governing body can clearly indicate to the steward the risk profile required	• Do you think that risk and strategic alignment are perhaps more important than other ITG components? • Is than an enterprise risk plan or just an IT plan? • Risk management that's an important part of the process? • What is your perception about the role of the

Theory Elements (Generative Mechanisms)	Theory Constructs (Theoretical Events)	Expected Evidence gathered from Interviews (Theoretical Experiences)	Interview Questions developed to gather the expected data
			governing body sub-committees in providing feedback to the governing body and university management on IT issues? • So do you think the governing body is focusing a little more on the risk side or opportunity side or do you try to have balance? • Do you think centralizing IT services in recent times, do you think that's helped to deliver value?

STEWARDSHIP THEORY
Owner-manager alignment

Theory Elements (Generative Mechanisms)	Theory Constructs (Theoretical Events)	Expected Evidence gathered from Interviews (Theoretical Experiences)	Interview Questions developed to gather the expected data
Owner/governing body clearly specifies to the steward how they should govern IT	**Governing body is able to clearly specify on behalf of the owners how IT should be governed within the university**	Evidence that governing body/owners have established a clear direction on how stewards should govern IT. Evidence of trusted relationships between stewards and the governing body/owners. Evidence of a cohesive governance team	• Do you think centralizing a fair bit, makes IT easier to govern or harder to govern? • So those plans are obviously linked up to the university plans? • Do you find the governing body is particularly interested in IT issues? Are they proactive in their views of IT? • Do you think the governing body has a proactive strategic approach to IT governance? Are they involved in the strategic decision-making? • Do you think it is easier to govern IT because you (DVC IT) are focusing more on that particular issue?
Governing body has selected appropriate IT management	**Governing body has selected competent IT management on behalf of the owners**	Evidence that IT management is competent	• What's your role in the governance of IT within the university? • Do you think a second life users group is a good example of how you've helped pull an innovative group together?\ • So you have a more specific IT role here? Do you think that makes your role in terms of IT governance different because you manage a

Theory Elements (Generative Mechanisms)	Theory Constructs (Theoretical Events)	Expected Evidence gathered from Interviews (Theoretical Experiences)	Interview Questions developed to gather the expected data
			specific portfolio that includes IT? • Do you think having a DVC IT specifically helps the management of IT at your university?
Governing body members are competent	**Stewards or governing body members are competent**	Evidence that stewards are competent and governing body members are proactively governing IT processes	• So, you have some IT skills based within the governing body? • Do you think having governing body members with IT skills helps the role of the governing body in oversighting IT and its processes? • Do you think that having IT skills on the governing body has been helpful? • So you think IT skills on the governing body are essential? Do you think that's really helped the governing body's understanding of IT issues?
RESOURCE DEPENDENCE THEORY			
Outside governing body members provide advice and counsel to management to minimize external dependencies relating to IT	**Outside governing body members assist management to minimize external dependencies**	External governing body members provide advice and counsel to management	• Do you think there is a good open process of communication between your level up through council and back down again? • What about communication by the governing body, as in providing advice and counsel to management? • So you feel you share both good and bad information with the governing body about what's happening with IT?
Outside Governing body members provide preferential access to external IT resources and knowledge	Outside governing body members link the university governing body to external IT resources	External governing body members assisted the governing body with access to external IT resources and knowledge	• Do you think that having IT skills on the governing body has been helpful? • So you think IT skills on the governing body are essential? Do you think that's really helped the governing body's understanding of IT issues?

Appendix 5   **Qualitative Study Documents**

1. **Case Study Protocol**

2. **Letter of Invitation to Vice Chancellor of selected universities seeking permission for the university to participate in the study**

3. **Letter of Invitation to potential participants at approved universities seeking their participation in the study**

4. **Proforma Permission Reply from Vice Chancellors**

5. **Invitation proforma email to potential participants**

6. **Participant Information Sheet and Consent Form**

7. **List of Interviews to be conducted in each case**

8. **Interview Protocol**

9. **Document Collection Database**

Case Study Protocol – IT Governance and Governing Bodies in Australian Universities

Contents

1. Purpose

The purpose of this case study protocol is to set out the procedures and general rules in conducting case studies of multiple Australian universities. The case studies will be conducted to explore IT governance processes at Universities and in particular the role of the board (governing body) in these processes. The purpose of this document is to increase the reliability of the case study research and to guide the investigator in carrying out the case study.

2. Key features of the Case study Method

The key features of the case study method are that cases are selected using a stratified purposeful theoretical sample, permission is sought from each case university via the Vice Chancellor before any case participants are contacted. Potential participants are identified based on the ability to add depth and richness to the case study. Case data is gathered via interviews with participants and perusal of secondary source documents on the university web sites. The case analysis will occur using a qualitative inductive method.

3. Case Study Investigator: Desired Skills

Development of my Case Study Skills

Investigator Case Study Skills (Yin, 1994)	Investigator Requirements (Yin, 1994)	Development and application of skills by chief researcher to this study
Question Asking	• Must be able to ask semi-structure interview questions and to interpret the answers	• I will conduct two pilot interviews with thesis supervisor observing to ensure I have a good questioning and interpretation techniques
	• Must have an inquiring mind during data collection as identifying important case information is not predictable	• I will ask further questions and probed on responses to questions to elicit rich data from each interview • I will read documents from each university website prior to interviews to get a feel for each case and to develop my enquiring mind in relation to each case
Listening	• Must be able to observe and sense more generally and not be limited by aural modality	• As the research issues are very interesting to me, I believe my listening skills will be very focused during the interviews
	• Must be able to assimilate large amounts of new information without bias	• I will be able to assimilate the large amounts of new information from interviews without bias due to my depth of knowledge about IT governance and related theory
	• Must be able to apply listening skills to the inspection of documentary evidence	• When inspecting supporting documents on university websites and annual reports I will be careful to look for evidence which supported the purpose of the case study.

Investigator Case Study Skills (Yin, 1994)	Investigator Requirements (Yin, 1994)	Development and application of skills by chief researcher to this study
Adaptiveness and Flexibility	• Ability to adapt as the case study changes and maintain an unbiased perspective and the rigor of the original case study design	• As I move from one case to another, I will be careful to maintain an unbiased perspective and look for new insights in each new case whilst remaining focused on the overall purpose of the case study research
Grasp of Issues being studied	• Must understand the purpose of the case study investigation and the theoretical issues to be able to make informed judgments during the data collection phase • Must be able to interpret data as it is being collected and determine where additional evidence is required	• Due to the extensive IT governance literature review I undertook prior to commencement of case study and observation of a university ITG committee I believe I will make informed judgements during the case interviews and keep focused on the purpose of the case. This will assist me to interpret the data as it is collected and to determine what other information will assist the richness of the case.
Lack of Bias	• Must be able to reduce bias by being open to contrary findings during the data collection	• I will be able to reduce bias by viewing each new interview and case as separate from others and being open to contrary findings

4.   Procedures for each case

4.1   Selecting Case Universities

To gain a detailed understanding of the diversifying characteristics of universities, a detailed spreadsheet is developed firstly of all the key attributes of universities including age of university, student numbers, staff numbers, research intensity ratings, teaching quality ratings, type of University network, type of governing body, complexity, ITG maturity rating. All variables will be considered as possible stratification methods. At the end of this process, two attributes, complexity and ITG maturity rating, were chosen as the most appropriate stratification methods for this research study.

Universities will be selected as case universities based on a purposeful sample of all universities based across two categorisations (Complexity of the university) and (ITG maturity rating).

To perform this sampling process, all Australian public universities will be categorised into one of nine quadrants in a purposeful sample (See Table below) across complexity and IT governance maturity. This stratified purposeful sample will form the basis for the selection of universities as cases for this case study research. Purposeful sampling is used in this research to select information rich cases for in depth study. Stratified purposeful sampling has been chosen to facilitate comparisons between cases and to ensure that maximum variation was identified between university cases. The aim is to undertake one case from each of the quadrants containing universities (8 quadrants).

Stratified Purposeful Sample of Australian Universities for Case Study Research

University Complexity / ITG Maturity	High Complexity	Medium Complexity	Low Complexity	Totals
Well Established IT Governance Processes	- Monash - Melbourne - UQ	- Curtin - Griffith - QUT - UniSA	- JCU - USQ	9
Established IT Governance Processes		- ANU - Deakin - Macquarie - RMIT - Newcastle - UTS	- Ballarat - W'gong	8
Not so Well Established IT Governance Processes	- UNSW - Sydney	- La Trobe - Adelaide - UWA - UWS - Tasmania	- ACU - CDU - CSU - ECU - Flinders - Murdoch - SCU - Swinburne - Canberra - UNE - VU - CQU - Sunshine Coast	20
Totals	**5**	**15**	**17**	**37**

3.2 Inviting selected universities to participate in study

As some quadrants of the purposeful sample contained a large number of universities, the investigator will randomly select two universities from each quadrant and invite the Vice Chancellor of each of the 16 randomly chosen universities to given permission for their university to participate in the study. Vice Chancellors who agree will need to fax or email back a signed permission slip to the investigator. Samples of each document are contained in Appendix 5.

If the two randomly selected universities do not agree to participate, then two further universities will be invited until one university has agreed to participate in each quadrant of the sample.

3.3 Determining potential participants at each case

In order to gather the richest data from each case, I will develop a list of potential participants at each university who are likely to be the most knowledgeable about IT governance and board processes. From knowledge of university processes and structures from searches of university websites and knowledge as a university academic, I will select potential participants who will add rich data to each case.

Three potential participants are important to the research study but may be the most difficult to gain access to being the Chairperson of the governing body (Council, Senate, Board of Trustees) who is usually the Chancellor of each University and two other member of the governing body (one external and one internal). These three potential participants should be able to provide rich descriptive data on the board's (governing body) role in ITG processes within the university.

The other three participants I felt from my experience in university ITG processes should be able to add rich data to the study and are thus important to the research study are the Vice Chancellor (effectively the CEO of the University), the Deputy Vice Chancellor responsible for IT operations (DVC IT or DVC Operations or COO), the IT director or CIO (Head of IT division/operations). These three potential participants often attend governing body meetings and are also familiar with the IT operations of the university and are responsible for implementing IT governance processes within the university. They represent the key IT executives of the university.

Thus the six people the investigator sought to invite to participate in the case study at each university were these six:

- Head of Governing Body (usually Chancellor)
- Governing Body Member (External)
- Governing Body Member (Internal)
- Vice Chancellor
- Deputy Vice Chancellor (IT or equivalent)
- Director of IT (or equivalent)

3.4   Inviting participants to participate in case

After permission has been received from the Vice Chancellor of the University, a document containing a table is sent to the Vice Chancellor's office or other designated university contact to gather the appropriate contact details of the above six potential participants so they can be invited to participate in the study. The participants are then sent an email with a personal letter of invitation to the study on university letterhead (See Appendix 5), an interview participant's information and consent form document (See Appendix 5) and a copy of their Vice Chancellor's signed permission slip. If the potential participants agree to an interview, they email back the signed consent form.

3.5   Organising Interview Times and Places
Once a potential participant agrees to participate in the study and signs the consent form, I will email them or phone them to arrange an interview time and place. This may be at their university or over the phone or some other agreed place. Participants will have agreed when signing the consent form to my audio-taping the interviews.

4.   Establishing the Case Study Database
All interviews will be recorded in a document database to allow tracking of the conduct of the interview and the transcription of the interviews. This database is contained in Appendix 5 and will be audited by a colleague external to my study for completeness and accuracy.

5. Developing the case study interview instrument

The case study interview protocol will be developed to gather data on the IT governance processes of the case universities and patterns about the theoretical principles underlying boards and how they govern IT. The interview protocol will focus on semi-structured, open-ended interview questions with some prompts that aim to gather data on the theoretical constructs of three corporate governance theories (agency theory, stewardship theory, resource dependence theory). The interview protocol is included in Appendix 5.

6. Analysis Plan and Case Study Reports

The cases will be analysed using a qualitative inductive approach involving a constant comparison approach where data from my interviews and secondary sources will be repeatedly compared with each other and the three theories to discern major categories, dimensions, themes or processes.

6.1 Structure of case study reports

Case study reports will be constructed which group the data from the primary and secondary sources under a number of key headings which will be determined during the analysis of the data. The data will be coded for both ITG issues and theoretical issues.

6.2 Cross-case Analysis

Within-case analyses will be conducted to identify behaviours and processes may best be explained by one of the three theories.

The cross-case analysis will consider the findings of the with-in case analysis and will consider the commonalities' and differences in the results between the cases.

2.

28th July, 2008

{Vice Chancellor's Name}
{Vice Chancellor's Title}
{Address 1}
{Address 2}
{Address 3}

Dear {Vice Chancellor's Name}

Invitation to Participate in Research Study: IT Governance in Universities and the role of Governing bodies

The management of IT resources is critical to all elements of University life, yet we know little about how information technology is governed at Universities. As a result, I am undertaking a major project designed to determine how IT is governed within Australian Universities. If you would like to participate in this project, I can offer you a brief report of the key findings of my research, along with some insights on how IT governance at {University Name} differs from other Universities.

As a lecturer and PhD student within the Faculty of Business at the Queensland University of Technology, I need your permission to contact key personnel from your university (around 4-5 in total) to participate in the study e.g. the DVC responsible for IT, The Head of University governance, and the IT Director. Since I am particularly interested in the strategic governance of IT at universities, I would also like to approach the Chancellor and some members of your Council. My aim is to gain a deeper understanding of how IT governance is enacted within the Australian university sector, the role of key personnel in the IT governance process and to gather qualitative data on the role of governing bodies (Councils/Senates) in university IT governance processes.

Since you might have some other questions, I have attached a sample participant information schedule for the project. QUT has granted ethical approval for the project: 0800000483.

Should you decide to participate, the name of your university and the name of any interviewees will not be disclosed. In my reporting, however, I anticipate referring to the role of the interviewee (i.e. Vice Chancellor) and the University type to which you belong (e.g. ATN). These would be the only identifiers for your institution and any participants. Further details on confidentiality and other aspects of the project are attached in the participant information sheet.

   What action is required?
   ➢ If you are happy for your university and its key personnel to be invited to participate in this research you can **fax or email the attached permission advice** (Fax no: (07) 3138 1812, email: s.buckby@qut.edu.au)
   ➢ I will be contacting you shortly to see if you have any other questions about the project.
   ➢ After I receive your acceptance to proceed, I will send an email to key {University Name} personnel inviting them to participate in the interview process for this research.

As someone at the "pointy end" of IT decisions, I am sure you would agree that the governance of IT is critical to the higher education sector. I hope that you can find the time to lend your valuable insights to my research and would be delighted to hear from you if you have any suggestions for or questions about the project.

Thank you for your valuable time.

Yours sincerely,

Sherrena Buckby
Lecturer/Phd Student
Faculty of Business

Queensland University of Technology
Faculty of Business
2 George Street GPO Box 2434
Brisbane Qld 4001 Australia
Phone +61 7 3138 2050 Fax +61 7 3138 1537
Email bus@qut.com
www.bus.qut.com

3.

Date

Professor X

Vice Chancellor

University X

Address

Dear Professor X,

Invitation to Participate in Research Study: IT Governance in Universities and the role of Governing bodies

The management of IT resources is critical to all elements of University life, yet we know little about how information technology is governed at Universities. As a result I am undertaking a major project designed to determine how IT is governed within Australian Universities. Your Vice Chancellor has been consulted about this study and has given permission for your university to participate in the project and for me to contact you to invite you to participate in an interview concerning these issues. Please see attached permission advice.

As a lecturer and Phd student within the Faculty of Business at the Queensland University of Technology, I would like to invite you to participate in the research project via a half hour interview which has been designed gather a deeper understanding of how IT governance is enacted within the university sector, the role of key personnel in the IT governance process and to gather qualitative data on the role of governing bodies in university IT governance processes. If you would like to participate in this project, I can offer you a brief report of my research, along with some insights on how IT governance at (University name) differs from other universities.

Further information on the project and its aims and details of participation and confidentiality are attached in the Participant Information Sheet. QUT has granted ethical approval for the project: 0800000483. Should you decide to participate, the name of your university and your name will not be disclosed. In my reporting, however, I anticipate referring to the role of the interviewee (i.e. Vice Chancellor) and the University type to which you belong (e.g. ATN). These would be the only identifiers for your institution and yourself as a participant.

Please read this carefully and sign the attached consent form and return to me by email. After receipt of this consent, I will arrange an interview time and place with you by return email.

If you have any queries about this project, please contact any member of the research team, or myself. We would be delighted to hear from you.

Thank you for your valuable time.

Yours sincerely,

Sherrena Buckby

Lecturer/Phd Student

Faculty of Business

QUT
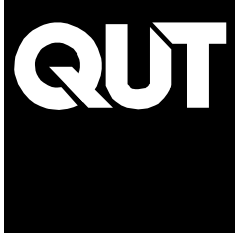
Queensland University of Technology
Faculty of Business
School of Accountancy
Gardens Point Campus
GPO Box 2434
Brisbane QLD 4001

4.

Fax Transmission

To: Sherrena Buckby, School of Accountancy QUT	From:
Attention: Sherrena Buckby	**Phone:**
Fax: (07) 3138 1812	**Fax:**
Date:	**International:**
Re: IT Governance in Universities	**Pages: 1** (including cover sheet)

Permission Advice

I , [Vice Chancellors Name] give permission for Sherrena Buckby from Queensland University of Technology to contact staff members of [University Name] to participate in the Research Study: - IT Governance in Universities and the role of Governing bodies.

_____   _____

[Vice Chancellors Title]   Date

To:	XXXX
Subject:	IT Governance in Universities Research Project
Attachments:	Final Letter to participants.DOC; Interview participant information schedule- ITG in Unis Interviews.doc; Permission Advice Proforma - Final.doc

Dear X,

Please find attached a letter of invitation to participate an interview for the above project together with supporting documents. I would really appreciate being able to speak to you to gain a full understanding of the governance of IT at X University and the role of the governing body in these processes.

kind regards

sherrena

Sherrena Buckby | Lecturer | PhD student | School of Accountancy | Faculty of Business | Queensland University of Technology | www.bus.qut.com
GPO Box 2434, Brisbane, Queensland, 4001 Australia Room: B343 |
phone: 07 3138 4324 | fax: 07 3138 1812 | email: s.buckby@qut.edu.au | CRICOS No. 00213J

QUT PARTICIPANT INFORMATION for QUT RESEARCH PROJECT

QUT Ethics Approval No.: 0800000483	
Research Team Contacts	
Sherrena Buckby (Lecturer and PhD Student) Faculty of Business/School of Accountancy Phone: 3138 4324 Email: s.buckby@qut.edu.au	**Dr Gavin Nicholson** (Phd Supervisor) Faculty of Business/School of Accountancy Phone: 3138 9299 Email: g.nicholson@qut.edu.au

Description

This research is being undertaken by Sherrena Buckby, a lecturer and PhD student within the Faculty of Business, Queensland University of Technology as part of her doctoral research on IT Governance in Australian Universities.

The aims of this phase of my research are:
- To better understand how IT governance is enacted within Australian Universities
- To identify who are the key players (people and bodies) involved in IT Governance processes within Australian Universities
- To better understand the activities undertaken in IT governance processes
- To understand the role of the university governing bodies in the governance of university IT systems.

To achieve the aims of the project I am seeking to interview members of the governing body and executive team of the university to seek their views on how IT governance is enacted within their university.

Participation

Your participation in this project is voluntary. If you do agree to participate, you can withdraw from participation at any time during the project without comment or penalty. Your decision to participate and your comments will in no way impact in any negative manner upon your current or future relationship with QUT. Your participation will involve an interview of approximately 30 minutes with myself, undertake at a time and place agreed with you.

Expected benefits

It is expected that this project may benefit you by providing you with a better understanding of how IT governance processes are currently enacted within Australian universities.

Risks

There are no risks beyond normal day to day living associated with your participation in this project.

Confidentiality

All comments and responses are anonymous and will be treated with confidentiality. Your name and the name of your university will not be divulged in relation to any of the interview data or responses. Due to the nature of the research I will need to use some of the qualitative statements made by interviewees to indicate the diversity of responses on a number of issues. Only your role and the university network to which your university belongs will be provided next to the comments to ensure your confidentiality is protected.

Consent to Participate

I have sought permission from the Vice Chancellor of your university for permission for your university to participate in this project.

I would like to ask you to sign a written consent form (enclosed) to confirm your agreement to participate in the interview process and your agreement to audiotape the interview.

I would also like to seek you agreement to audiotape the interview, so that I can listen to your comments again after the interview and transcribe them to ensure all messages from the interview are captured. Transcriptions

will be stored securely and will be identified only by an interview number to protect the confidentiality of interviewees.

It is possible to participate in the project without being recorded; however I would like to stress that only I and my supervisor would ever hear the tapes or read the transcripts. All tapes would be subsequently destroyed once the transcriptions have been verified as a true and correct record of the interview by the interviewee.

Questions / further information about the project

The researcher, Sherrena Buckby is a Phd student and lecturer in the School of Accountancy, Faculty of Business at Queensland University of Technology. Please contact Sherrena if you require further information about the project, or to have any questions answered. As this interview research process forms part of Sherrena's PhD, her supervisor Dr Gavin Nicholson can also be contacted by phone (07 3138 9299) or email (g.nicholson@qut.edu.au) with any further questions.

Concerns / complaints regarding the conduct of the project

QUT is committed to researcher integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the project you may contact the QUT Research Ethics Officer on 3138 2340 or ethicscontact@qut.edu.au. The Researcher Ethics Officer is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.

Statement of Consent

By agreeing to participate in the interview process, you will indicate to the research team that you:

- Agree to participate in the project

- Have read and understand the information document regarding this project

- Understand that the project will include audio recording

- Have had any questions answered to your satisfaction

- Understand that if you have any additional question you can contact the research team

- Understand that you are free to withdraw at any time, without comment or penalty

- Understand you may decline to answer any questions

- Understand that you can contact the Research Ethics Officer on 3138 2340 or ethicscontact@qut.edu.au if you have concerns without the ethical conduct of the project

Name_____

Signature_____

Date_____/_____/__

Interview List – List of participants at Institution X

Interview No	Doc No	Date	Participant	Title	File No	Status
Interview 1	A1		John Smith		WS 12345	Interview completed. Ready to be transcribed.
Interview 2						
Interview 3						
Interview 4						
Interview 5						
Interview 6						

I would complete these details as I did interviews. I would update status as I completed each step of process from completing interview, transcribing, check transcription, emailing to participant, receiving back verification etc.

Document No- relates to a document database I established, which tracks all the interview process. This allows you source documents etc to be verified.

IT Governance –Australian Universities Project

Interview Protocol

Introduction

Hi, my name is Sherrena Buckby, and I am a lecturer and Phd student within the Faculty of Business at the Queensland University of Technology. I am undertaking a project on IT Governance within universities. The interview I am about to conduct with you aims to help me:

- To better understand the meaning of IT governance and its importance within Australian Universities
- To identify who are the key players (people and bodies) involved in IT Governance processes within Australian Universities
- To better understand the activities undertaken in IT governance processes
- To understand the role of the university governing body in the governance of university IT systems.

In commencing the interview questions, I acknowledge your signing of the statement of consent form for this project and your understanding of the project participant information document.

Line of Questioning

1.1 What does IT governance entail in your university and what do you do in relation to ITG

1.1.1 Does ITG includes 4 key components of ITG (value delivery, strategic alignment, IT resource management, risk management)

1.1.2 What else would you consider ITG entails in your university?

1.1.3 Can you give me an example of ITG in each of these four areas (processes, perspectives, other)?

1.1.4 Are there any additional areas of ITG other than these four areas that you could provide details of

1.2 Is the governance of IT important to your university?

1.2.1 Do you think having large IT resources, distance education processes, research intensity has necessity the need for more IT governance processes in your university.

1.3 To what degree, if any, is ITG integrated into your university's corporate governance processes?

1.3.1 If yes, how is it integrated? (Get specific examples of this integration)

1.3.2 What the benefits or problems do you think are associated with integration.

1.3.3 What outcomes are achieved from linking ITG to corporate governance?

1.3.4 If not integrated, why is it separate?

1.4 **What do you consider is the role of your governing body (i.e. Senate, Council) in the governance of IT?**
1.4.1 Can you give me specific info about what the governing body actually does re ITG

1.5 **What is your role in the governance of IT within your university and what specifically do you do in this role?**
1.5.1 What is your structural position in your university?

1.6 **Who else is fundamental to the governance of IT in the university?**
1.6.1   Is their role strategic, operational, both?, other? What do they do? Get their structural position

1.7 **Who do you think makes the key strategic decisions about the governance of IT at your university?**

1.8 **How are these strategic IT decisions linked to your university's strategic plans?**
1.8.1   Can you provide me with any examples of such links i.e. what is the IT strategy and the University strategy?
1.8.2   Can you indicate what is actually DONE to operationalise these links?

							Interview Length (mins)			
	Doc No	**Document Name**	**Type of Document**	**Date**	**Interview Location**	**Interview Time**	**Interview transcript (words)**	**Name of File**	**Type of File**	
University										**Verification**
					DATABASE OF PRIMARY DATA - INTERVIEWS AND TRANSCRIPTS					

University	Doc No	Document Name	Type of Document	Date	Interview Location	Interview Time	Interview Length / transcript (words)	Name of File	Type of File	Verification
A	A1	Interview 1	Audio of Interview with DVC IT	1/09/2008	University A Main Campus	11:00AM	24.27M	AWS_10023	WMA	N/A
A	A2	Interview 2	Audio of Interview with GB member	1/09/2008	University A Main Campus	2:00PM	40.58M	AWS_10024 &AWS_10025	WMA	N/A
A	A3	Interview 3	Audio of Interview with GB Member	2/09/2008	University A Main Campus	10:00: AM	27.09M	AWS_10026	WMA	N/A
A	A4	Interview 4	Audio of Interview with Head of Governance	2/09/2008	University A Main Campus	2:00 PM	48.01M	AWS_10028 &AWS_10029	WMA	N/A
A	TA1	Transcript	Transcript of Interview with DVC IT	5/09/2008	N/A	N/A	3,941W	University A Interview 1	Word 2007	Verified without changes
B	A5	Interview 1	Audio of Interview with Other IT management	9/09/2008	University B Main Campus	12:30PM	32.46M	BWS_10033	WMA	N/A
B	A6	Interview 2	Audio of Interview with IT Director	9/09/2008	University B Main Campus	1:00 PM	37.14M	BWS_10034	WMA	N/A
B	A7	Interview 3	Audio of Interview with Head of Governance	9/09/2008	University B Main Campus	2:30PM	37.23M	BWS_10035	WMA	N/A
B	A8	Interview 4	Audio of Interview with other IT	15/09/2008	By Telephone	11:00AM	19.13M	BWS_10036	WMA	N/A

297

University	Doc No	Document Name	Type of Document	Date	Interview Location	Interview Time	Interview Length (mins) / Interview transcript (words)	Name of File	Type of File	Verification
			Management							
B	A9	Interview 5	Audio of Interview with IT Director	15/09/2008	By Telephone	2:30PM	31.23M	BWS_10037	WMA	N/A
A	A10	Interview 5	Audio of Interview with DVCIT	16/09/2008	By Telephone	2:00PM	42.09M	AWS_10038	WMA	N/A
A	TA4	Transcript	Transcript of Interview with Head of Governance	17/09/2008	N/A	N/A	7,427W	University A Interview 4	Word 2007	Verified with slight changes
C	A11	Interview 1	Audio of Interview with Other IT management	19/09/2008	University C Main Campus	10:00 AM	38.09M	CWS_10039	WMA	N/A
C	A12	Interview 2	Audio of Interview with other IT management	19/09/2008	University C Main Campus	11:00 AM	27.09M	CWS_10040	WMA	N/A
A	A13	Interview 6	Audio of Interview with IT Director	22/09/2008	By Telephone	4:00 PM	42.13M	AWS_10041	WMA	N/A
D	A14	Interview 1	Audio of Interview with IT Director	26/09/2008	By Telephone	10:00 AM	39.34M	DWS_10042	WMA	N/A
C	A15	Interview 3	Audio of Interview with DVCIT	26/09/2008	University C Main Campus	2:30 PM	24.19M	CIC-A0002	WMA	N/A

DATABASE OF PRIMARY DATA - INTERVIEWS AND TRANSCRIPTS

| | | | | | | | Interview Length (mins) | | | |
| | **Doc No** | **Document Name** | **Type of Document** | **Date** | **Interview Location** | **Interview Time** | **Interview transcript (words)** | **Name of File** | **Type of File** | **Verification** |
University										
							DATABASE OF PRIMARY DATA - INTERVIEWS AND TRANSCRIPTS			
E	A16	Interview 1	Audio of Interview with GB Member	29/09/2008	University E Main Campus	11:30 AM	37.58M	EWS_10043	WMA	N/A
E	A17	Interview 2	Audio of Interview with IT Director	29/09/2008	University E Main Campus	2:00 PM	37.01M	EWS_10044	WMA	N/A
D	A18	Interview 2	Audio of Interview with DVC IT	1/10/2008	By Telephone	9:30 AM	28.46M	DWS_10045	WMA	N/A
A	TA2	Transcript	Transcript of Interview with GB Member	2/10/2008	N/A	N/A	6,075W	University A Interview 2	Word	Verified without changes
D	A19	Interview 3	Audio of Interview with GB Member	2/10/2008	By Telephone	10:00 AM	19.04M	DWS_10047	WMA	N/A
F	A20	Interview 1	Audio of Interview with IT Director	10/10/2008	University F main Campus	11:00 AM	37.37M	FWS_10048	WMA	N/A
F	A21	Interview 2	Audio of Interview with Other IT management	10/10/2008	University F main Campus	11:30 AM	37.25M	FWS_10049 &FWS_10050	WMA	N/A
F	A22	Interview 3	Audio of Interview with Head of Governance	10/10/2008	University F main Campus	3:00 PM	34.33M	FWS_10051	WMA	N/A
H	A23	Interview 1	Audio of Interview with IT Director	20/10/2008	By Telephone	9:00 AM	29.04M	HWS_10052	WMA	N/A
G	A24	Interview 1	Audio of	21/10/2008	By Telephone	9:00 AM	21.18M	GWS_10053	WMA	N/A

University	Doc No	Document Name	Type of Document	Date	Interview Location	Interview Time	Interview Length (mins) / Interview transcript (words)	Name of File	Type of File	Verification
			Interview with GB Member							
G	A25	Interview 2	Audio of Interview with GB Chair	23/10/2008	City Coffee Shop	12:00 PM	22.02M	GWS_10054	WMA	N/A
I	A26	Interview 1	Audio of Interview with GB Member	30/10/2008	University I Main Campus	11:00 AM	43.03M	IWS_10055	WMA	N/A
I	A27	Interview 2	Audio of Interview with DVC IT	30/10/2008	University I Main Campus	2:00 PM	30.06M	IWS_10056	WMA	N/A
I	A28	Interview 3	Audio of Interview with IT Director	30/10/2008	University I Main Campus	4:00 PM	39.24M	IWS_10057	WMA	N/A
G	A29	Interview 3	Audio of Interview with Vice Chancellor	30/10/2008	City Hotel	7:00 PM	33.38M	GWS_10058&GWS_10059	WMA	N/A
G	A30	Interview 4	Audio of Interview with DVC IT	31/10/2008	University G main campus	10:00 AM	39.28M	GWS_10060 & GWS_1061	WMA	N/A
G	A31	Interview 5	Audio of Interview with IT Director	31/10/2008	University G main campus	11:00 AM	26.37M	GWS_10062	WMA	N/A
C	A32	Interview 4	Audio of Interview with IT Director	7/11/2008	University C Main Campus	1:00 PM	19.23M	CWS_10063	WMA	N/A
C	A33	Interview 5	Audio of Interview with Head of Governance	7/11/2008	University C Main Campus	3:00 PM	17.06M	CWS_10064	WMA	N/A

The table title is: **DATABASE OF PRIMARY DATA - INTERVIEWS AND TRANSCRIPTS**

University	Doc No	Document Name	Type of Document	Date	Interview Location	Interview Time	Interview Length (mins) / Interview transcript (words)	Name of File	Type of File	Verification
			DATABASE OF PRIMARY DATA - INTERVIEWS AND TRANSCRIPTS							
I	A34	Interview 4	Audio of Interview with GB Member	10/11/2008	By Telephone	3:30 PM	17.54M	IWS_10065	WMA	N/A
B	TB1	Interview 1	Transcript of Interview DVC IT	17/11/2008	N/A	N/A	4,636W	University B Interview 1	word	Verified without changes
J	A35	Interview 1	Audio of Interview with DVC IT	24/11/2008	University J Main Campus	2:00 PM	36.45M	JWS_10066	WMA	
A	TA5	Interview 5	Transcript of Interview with DVCIT	26/11/2008	N/A	N/A	7,510W	University A Interview 5	Word	Verified without changes
A	TA3	Interview 3	Transcript of Interview with GB Member	26/11/2008	N/A	N/A	4,311W	University A Interview 3	WMA	Verified without changes
J	A36	Interview 2	Audio of interview with Vice Chancellor	27/11/2008	University J Main Campus	11:00 AM	27.02M	JWS_10067	WMA	N/A
K	A37	Interview 1	Audio of Interview with IT Director	8/12/2008	By Telephone	12:30 PM	32.50M	KIC_B001	WMA	N/A
J	A38	Interview 3	Audio of Interview with IT Director	10/12/2008	University J Main Campus	2:30 PM	33.50M	JWS_10069	WMA	N/A
A	TA6	Interview 6	Transcript of Interview with IT Director	12/12/2008	N/A	N/A	5,497W	University A Interview 6	Word	Verified without changes
J	A39	Interview 4	Audio of Interview with GB Chair	15/12/2008	University J Main Campus	10:00 AM	52.08M	JWS_10070	WMA	N/A

301

| | | | | | | | Interview Length (mins) | | | |
| | | | | | | | Interview transcript | | Type of | |
University	Doc No	Document Name	Type of Document	Date	Interview Location	Interview Time	(words)	Name of File	File	Verification
J	A40	Interview 5	Audio of Interview with GB Member	16/12/2008	City Office	2:00 PM	23.52M	JWS_10071	WMA	N/A
B	TB2	Transcript 2	Transcript of Interview with IT Director	20/12/2008	N/A	N/A	6,515W	University B Interview 2	Word	Verified without changes
J	A41	Interview 6	Audio of Interview with Head of Governance	14/01/2009	University J Main Campus	9:30 AM	37.22M	JWS_10073	WMA	N/A
B	TB3	Transcript	Transcript of Interview with Head of Governance	15/12/2008	N/A	N/A	4,536W	University B Interview 3	word	Verified without changes
B	TB4	Transcript	Transcript of Interview with Other IT management	16/12/2008	N/A	N/A	2,818W	University B Interview 4	word	Verified without changes
B	TB5	Transcript	Transcript of Interview with DVC IT	17/12/2008	N/A	N/A	3,621W	University B Interview 5	word	Verified without changes
C	TC1	Transcript	Transcript of Interview with Other IT Management	18/12/2008	N/A	N/A	6,013W	University C Interview 1	word	Verified with slight changes
C	TC2	Transcript	Transcript of Interview with other IT management	19/12/2008	N/A	N/A	4,082W	University C Interview 2	word	Verified without changes

The table title spans the top: **DATABASE OF PRIMARY DATA - INTERVIEWS AND TRANSCRIPTS**

University	Doc No	Document Name	Type of Document	Date	Interview Location	Interview Time	Interview Length (mins) Interview transcript (words)	Name of File	Type of File	Verification
					DATABASE OF PRIMARY DATA - INTERVIEWS AND TRANSCRIPTS						
C	TC3	Transcript	Transcript of Interview with DVC IT	20/12/2008	N/A	N/A	3,404W	University C Interview 3	word	Verified with slight changes
C	TC4	Transcript	Transcript of Interview with IT Director	21/12/2008	N/A	N/A	3,679W	University C Interview 4	word	Verified without changes
C	TC5	Transcript	Transcript of Interview with Head of Governance	22/12/2008	N/A	N/A	2,580W	University C Interview 5	word	Verified without changes
D	TD1	Transcript	Transcript of Interview with IT Director	23/12/2008	N/A	N/A	5,283W	University D Interview 1	word	Verified without changes
D	TD2	Transcript	Transcript of Interview with Head of Governance	2/01/2009	N/A	N/A	3,969W	University D Interview 2	word	Verified without changes
D	TD3	Transcript	Transcript of Interview with GB Member	3/01/2009	N/A	N/A	3,200W	University D Interview 3	word	Verified without changes
E	TE1	Transcript	Transcript of Interview with GB Member	4/01/2009	N/A	N/A	5,741W	University E Interview 1	word	Verified without changes
E	TE2	Transcript	Transcript of Interview with IT Director	5/01/2009	N/A	N/A	5,067W	University E Interview 2	word	Verified without changes
F	TF1	Transcript	Transcript of Interview with IT Director	6/01/2009	N/A	N/A	6,214W	University F Interview 1	word	Verified without changes

							Interview Length (mins)			
University	Doc No	Document Name	Type of Document	Date	Interview Location	Interview Time	Interview transcript (words)	Name of File	Type of File	Verification

DATABASE OF PRIMARY DATA - INTERVIEWS AND TRANSCRIPTS

University	Doc No	Document Name	Type of Document	Date	Interview Location	Interview Time	Interview transcript (words)	Name of File	Type of File	Verification
F	TF2	Transcript	Transcript of Interview with IT Director	7/01/2009	N/A	N/A	5,848W	University F Interview 2	Word	Verified without changes
F	TF3	Transcript	Transcript of Interview with Head of governance	8/01/2009	N/A	N/A	4,976W	University F Interview 3	word	Verified without changes
G	TG1	Transcript	Transcript of Interview with GB Member	9/01/2009	N/A	N/A	3,321W	University G Interview 1	word	Verified without changes
G	TG2	Transcript	Transcript of Interview with GB Chair	10/01/2009	N/A	N/A	3, 298W	University G Interview 2	word	Verified without changes
G	TG3	Transcript	Transcript of Interview with Vice Chancellor	11/01/2009	N/A	N/A	5,336W	University G Interview 3	word	Verified without changes
G	TG4	Transcript	Transcript of Interview with DVC IT	12/01/2009	N/A	N/A	6,875W	University G Interview 4	word	Verified without changes
G	TG5	Transcript	Transcript of Interview with other IT Management	13/01/2009	N/A	N/A	4,139W	University G Interview 5	word	Verified without changes
H	TH1	Transcript	Transcript of Interview with IT Director	14/01/2009	N/A	N/A	3,739W	University H Interview 1	word	Verified without changes
I	TI1	Transcript	Transcript of Interview with GB Member	15/01/2009	N/A	N/A	5,535W	University I Interview 1	word	Verified without changes

304

University	Doc No	Document Name	Type of Document	Date	Interview Location	Interview Time	Interview Length (mins) Interview transcript (words)	Name of File	Type of File	Verification
			DATABASE OF PRIMARY DATA - INTERVIEWS AND TRANSCRIPTS							
I	TI2	Transcript	Transcript of Interview with DVC IT	16/01/2009	N/A	N/A	4,361W	University I Interview 2	word	Verified without changes
I	TI3	Transcript	Transcript of Interview with IT Director	17/01/2009	N/A	N/A	5,018W	University I Interview 3	word	Verified without changes
I	TI4	Transcript	Transcript of Interview with GB Member	18/01/2009	N/A	N/A	2,169W	University I Interview 4	word	Verified without changes
J	TJ1	Transcript	Transcript of Interview with DVC IT	19/01/2009	N/A	N/A	5,115W	University J Interview 1	word	Verified without changes
J	TJ2	Transcript	Transcript of Interview with Vice Chancellor	20/01/2009	N/A	N/A	4,156W	University J Interview 2	word	Verified without changes
J	TJ3	Transcript	Transcript of Interview IT Director	20/1/2009	N/A	N/A	6,356W	University J Interview 3	Word	Verified without changes
J	TJ4	Transcript	Transcript of Interview with GB Chair	21/01/2009	N/A	N/A	8,026W	University J Interview 4	word	Verified with slight changes
J	TJ5	Transcript	Transcript of Interview with External GB Member	22/01/2009	N/A	N/A	3,324W	University J Interview 5	word	Verified without changes
J	TJ6	Transcript	Transcript of Interview with Head of Governance	22/1/2009	N/A	N/A	6,064W	University J Interview 6	Word	Verified with minor changes

305

							Interview Length (mins)			
University	Doc No	Document Name	Type of Document	Date	Interview Location	Interview Time	Interview transcript (words)	Name of File	Type of File	Verification
						DATABASE OF PRIMARY DATA - INTERVIEWS AND TRANSCRIPTS				
K	TK1	Transcript	Transcript of Interview with IT Director	23/01/2009	N/A	N/A	3,651W	University K Interview 1	Word	Verified without changes
H	A42	Interview	Interview with External GB member	16/02/2009	By Telephone	2:00 PM	41.51	HWS-10001	word	N/A
H	TH2	Transcript	Transcript of Interview with External GB Member	10/03/2009	N/A	N/A	5,925W	University H Interview2	word	Verified without changes

UNIVERSITY	DOCUMENT NO	DOCUMENT NAME	DATE
DATABASE OF SECONDARY DATA - UNIVERSITY DOCUMENTS			
A	D1	University Act of Parliament	1/09/2008
A	D2	University A Annual Report 2007	1/09/2008
A	D3	Council Minutes 2008-2009	1/09/2008
A	D4	Organisational Chart	1/09/2008
A	D5	University A code of Conduct for governing body and its committees	15/4/2009
A	D6	University A Council objectives	1/06/2009
A	D7	Governance and Webpage documents	10/09/2008
A	D8	Statement of Strategic Intent	10/09/2008
A	D9	AUQA Audit Report	10/09/2008
A	D10	Governing Body Member Biographies	10/09/2008
A	D11	Interview Notes	2/09/2008
B	D12	University B Annual Report 2007	9/09/2008
B	D13	University B Organisational Chart	9/09/2008
B	D14	University B Governing Body – statement of responsibility	9/09/2008
B	D15	University Act of Parliament	9/09/2008
B	D16	Interview notes	9/09/2008
B	D17	University Strategic Planning web pages	9/09/2008
C	D18	Annual Report 2008	19/09/2009
C	D19	University C Act of Parliament	19/09/2008
C	D20	Governing Body member biographies	26/09/2008
C	D21	University Management biographies	26/09/2008
C	D22	University Key Statistics	26/09/2008
C	D23	University Organisation Chart	26/09/2008
C	D24	IT governance committee Membership	26/09/2008
C	D25	University Governing Body profile Web pages	26/09/2008
C	D26	Minutes of Governing Body Meetings 2008	26/05/2009
C	D27	Governing Body committees profiles	26/09/2008
C	D28	University Strategic Plan	26/09/2008
C	D29	Interview notes	26/09/2008
D	D30	Annual Report 2008	1/10/2009
D	D31	University D Act of Parliament	1/10/2008
D	D32	Governing Body committees profiles	2/10/2008
D	D33	Governing body Standing Orders	2/10/2008
D	D34	Governing Body Minutes of Meetings 2008	2/10/2008
D	D35	University Governance Web pages	2/10/2008
D	D36	Interview notes	2/10/2008
E	D37	Annual Report 2008	28/09/2009
E	D38	Annual Report 2007	28/09/2008
E	D39	University Act of Parliament	28/09/2008
E	D40	Governance Structure Diagram	28/09/2008
E	D41	Protocols for committees of the governing body	28/09/2008
E	D42	Governing Body membership from Website	28/09/2008
E	D43	Governing Body Minutes 2008-2009	28/07/2009
E	D44	AUQA Audit Report 2007	28/09/2008

UNIVERSITY	DOCUMENT NO	DOCUMENT NAME	DATE
		DATABASE OF SECONDARY DATA - UNIVERSITY DOCUMENTS	
E	D45	Planning, reporting and Review Cycle - from University Website	28/09/2008
E	D46	Draft IT Strategic Plan	28/9/2008
E	D47	Interview Notes	28/09/2008
F	D48	Annual Report 2008	9/10/2009
F		University F Act of Parliament	9/10/2008
F	D49	Governing Body sub-committee profiles	9/10/2008
F	D50	University Governance Web pages	
F	D51	Interview notes	9/10/2008
G	D52	University G Annual Report	30/10/2008
G	D53	university Act of Parliament	30/10/2008
G	D54	The role of University G Governing body and duties of members of the governing body	30/10/2008
G	D55	Governance Web page documents	30/10/2008
G	D56	Organisation Chart	30/10/2008
G	D57	Governing Body Members Information - University Website	30/10/2008
G	D58	Council Minutes 2008-2009	1/10/2009
G	D59	Executive Committee and Audit and Risk Committee Terms of Reference	30/10/2008
G	D60	Audit and Risk Committee Charter	30/10/2008
G	D61	Interview Notes	30/10/2008
H	D62	University H Act of Parliament	19/10/2008
H	D63	University Annual Report 2008	20/06/2009
H	D64	University Governing Body Web pages	19/10/2008
H	D65	University Governing Body Sub-committee Web pages	19/10/2008
H	D66	IT Division organisational Web pages	19/10/2008
H	D67	University Strategic Planning Web pages	19/10/2008
H	D68	University Governance Web pages	19/10/2008
H	D69	Interview Notes	19/10/2008
I	D70	Annual Report 2008	30/09/2009
I	D71	University Act of Parliament	30/10/2008
I	D72	IT governance committee terms of reference	30/10/2008
I	D73	Interview Notes	30/10/2008
J	D74	Annual Report 2008	30/09/2009
J	D75	University Act of Parliament	15/12/2008
J	D76	IT governance Model from Web pages	15/12/2008
J	D77	University Strategic Plan	15/12/2008
J	D78	Interview Notes	14/01/2010
K	D79	University K Act of Parliament	8/12/2008
K	D80	University Governing Body Web pages	8/12/2008
K	D81	University Governing Body member profiles	8/12/2008
K	D82	University Governing Body minutes	8/12/2009
K	D83	University Strategic Planning web pages	8/12/2009
K	D84	Interview Notes	8/12/2009

Appendix 6 Chain of evidence tables for agency and stewardship theory analyses

Table 1 Chain of evidence for the conscious self interest of the agent mechanism of agency theory

Themes	Explicit Self Interest of the Agent			Information asymmetry exploited by agent					Governing body (board) monitoring			Overall qualitative rating(see table 6.1a)
Issues	Evidence of the agent acting in his/her own interests rather than the interests of the governing body/principal			Evidence of the agent (management) not disseminating information to university community		Evidence of the agent not providing information to the governing body/principal		Rating for both issues	Evidence of the governing body monitoring to reduce the self interested behaviour of the agent			
Cases	Nvivo 8 Coding		Qualitative Rating for this issue for each case	Nvivo 8 Coding		Nvivo 8 Coding		Qualitative rating for both issues for each case	Nvivo 8 Coding		Qualitative Rating for this issue for each case	Overall qualitative rating for each case
	No. of Interview Sources	No. of Interview References		No. of Interview Sources	No. of Interview References	No. of Interview Sources	No. of Interview References		No. of Interview Sources	No. of Interview References		
A	1	2	H	0	0	5	15	H	4	9	M	H
B	0	0	L	2	4	1	1	M	4	5	M	M
C	0	0	L	0	0	5	8	M	1	2	L	M-
D	1	1	M	0	0	0	0	L	0	0	L	M-
E	0	0	L	0	0	2	6	M	0	0	L	M-
F	0	0	L	0	0	2	3	M	0	0	L	M-
G	0	0	L	0	0	1	1	L	0	0	L	L
H	0	0	L	1	2	1	1	H	0	0	L	H
I	2	3	H	0	0	2	4	H	0	0	L	H
J	0	0	L	1	1	2	2	L	1	2	L	L
K	0	0	L	0	0	1	1	L	0	0	L	L

H= High; M=Medium; L= Low

Table 2 **Chain of evidence for the unconscious self interest of the agent mechanism of agency theory**

Themes	Agents Risk Profile does not Align with the Risk Profile of the Principal/Governing Body												
Issues	**Evidence that the risk profile of the agent differs from the risk profile of the governing body and principal**			**Evidence that the agent has difficulty understanding the risk profile of the governing body and principal**			**Evidence that the agent determines IT decisions without consideration of the risk profile of the governing body and principal**			**Evidence that the principal & governing body seeks reassurance on the IT risk profile of the agent**			**Overall qualitative rating (see table 6.1b)**
Cases	**Nvivo 8 Coding**		**Rating for each case**	**Nvivo 8 Coding**		**Rating for each case**	**Nvivo 8 Coding**		**Raring for each case**	**Nvivo 8 Coding**		**Raring for each case**	**Overall qualitative rating for each case**
	No. of Interview Sources	**No. of Interview References**		**No. of Interview Sources**	**No. of Interview References**		**No. of Interview Sources**	**No. of Interview References**		**No. of Interview Sources**	**No. of Interview References**		
A	4	6	**H**	5	8	**H**	5	19	**H**	6	13	**H**	**H**
B	4	7	**H**	2	2	**L**	1	1	**L**	0	0	**L**	**M-**
C	1	1	**L**	2	2	**L**	0	0	**L**	0	0	**L**	**L**
D	2	5	**M+**	1	1	**L**	1	1	**L**	1	1	**L**	**M**
E	1	1	**L**	1	3	**M**	0	0	**L**	0	0	**L**	**M-**
F	2	4	**M**	3	11	**H**	1	1	**L**	0	0	**L**	**H-**
G	0	0	**L**	2	5	**M**	1	1	**L**	0	0	**L**	**M-**
H	2	6	**H**	1	2	**L**	0	0	**L**	0	0	**L**	**H-**
I	2	2	**L**	2	2	**L**	0	0	**L**	2	6	**H**	**H-**
J	0	0	**L**	3	4	**M**	1	1	**L**	3	3	**M**	**L**
K	0	0	**L**	1	1	**L**	0	0	**L**	0	0	**L**	**L**

H= High; M=Medium; L= Low

Table 3 **Chain of evidence for the principal's problems mechanism of agency theory**

Themes	The governing body may not be able to clearly specify how IT should be governed																		The governing body may not have selected competent IT management or IT management are incompetent			The principal may not have selected knowledgeable and competent governing body members			Overall qualitative rating (see table 6.1c)
Issues	Evidence that the governing body is not able to clearly specify its role in the governance of IT			Evidence of the lack of clear direction by the principal on IT projects across the university			Evidence of the agent and the governing body recognise the lack of IT governance processes within the university			Evidence that the principal may not be able to clearly specify what should be reported to the governing body by the agent			Evidence that the governing body may not have selected competent IT management on behalf of the principal			Evidence that the principal may not have selected governing body members with sufficient IT knowledge			
	Nvivo 8 Coding			Nvivo 8 Coding			Nvivo 8 Coding			Nvivo 8 Coding			Nvivo 8 Coding			Nvivo 8 Coding			Overall qualitative rating for each case
Cases	No. of Interview Sources	No. of Interview References	Rating for each case	No. of Interview Sources	No. of Interview References	Rating for each case	No. of Interview Sources	No. of Interview References	Rating for each case	No. of Interview Sources	No. of Interview References	Rating for each case	No. of Interview Sources	No. of Interview References	Rating for each case	No. of Interview Sources	No. of Interview References	Rating for each case	
A	6	42	**H**	6	57	**H**	5	18	**H**	1	1	**L**	3	7	**H**	3	9	**H**	**H**
B	5	28	**H**	3	4	**M**	5	18	**H**	0	0	**L**	0	0	**L**	2	2	**L**	**M**
C	5	22	**H**	2	2	**L**	5	8	**M**	1	1	**L**	0	0	**L**	0	0	**L**	**M-**
D	3	19	**H**	1	1	**L**	3	22	**H**	0	0	**L**	0	0	**L**	1	1	**L**	**M**
E	0	0	**L**	0	0	**L**	2	10	**M**	0	0	**L**	0	0	**L**	1	3	**M**	**M**
F	3	10	**M**	2	5	**M**	3	19	**H**	1	2	**L**	0	0	**L**	2	4	**M**	**H-**
G	4	7	**L**	1	1	**L**	3	18	**H**	0	0	**L**	0	0	**L**	2	5	**M**	**M-**
H	2	3	**L**	0	0	**L**	2	5	**M**	0	0	**L**	0	0	**L**	1	2	**M**	**M-**
I	4	15	**M**	2	4	**M**	3	14	**H**	0	0	**L**	0	0	**L**	0	0	**L**	**M**
J	3	7	**L**	2	2	**L**	4	10	**M**	0	0	**L**	0	0	**L**	1	1	**L**	**L+**
K	1	1	**L**	0	0	**L**	0	0	**L**	0	0	**L**	0	0	**L**	0	0	**L**	**L**

H= High; M=Medium; L= Low

Table 4   Chain of evidence for the conscious stewardship focus mechanism of stewardship theory

Theme	Information sharing to reduce information asymmetry by the steward						The explicit organisational focus of the steward									Voluntary assurance by the steward			Overall qualitative rating (see table 7.1a)
Issues	Evidence of the steward voluntarily disseminates and seeks information to/from other parts of the university			Evidence of the steward voluntarily sharing full and frank ITG information with the governing body/owners			Evidence of Steward voluntarily acts in the best interests of the governing body/owners			Evidence of the steward actively works to achieve the strategic goals of the university			Evidence of the steward taking clear responsibility for ITG processes			Evidence of management undertaking voluntary performance measurement and reporting			
	Nvivo 8 Coding		Rating for each case	Nvivo 8 Coding		Rating for each case	Nvivo 8 Coding		Rating for each case	Nvivo 8 Coding		Rating for each case	Nvivo 8 Coding		Rating for each case	Nvivo 8 Coding		Rating for each case	Overall Qualitative rating for each case
Case	No. of Interview Sources	No. of Interview References		No. of Interview Sources	No. of Interview References		No. of Interview Sources	No. of Interview References		No. of Interview Sources	No. of Interview References		No. of Interview Sources	No. of Interview References		No. of Interview Sources	No. of Interview References		
A	1	1	L	6	15	M	6	31	H	6	34	M	0	0	L	1	1	L	L+
B	2	3	L	2	4	L	5	19	M	5	65	H	1	1	L	1	2	L	M-
C	4	13	H	3	3	L	5	18	M	5	65	H	0	0	L	2	2	L	M
D	1	3	L	0	0	L	2	14	M	3	29	M	0	0	L	2	3	L	L
E	1	5	L	2	3	L	2	11	M	2	40	M	1	2	L	2	4	L	L
F	3	21	H	3	5	L	2	13	M	3	47	M	0	0	L	2	5	M	L+
G	3	4	L	4	28	H	2	10	M	5	54	H	2	11	H	3	3	L	H
H	1	3	L	2	3	L	2	11	M	2	35	M	0	0	L	2	3	L	L
I	2	2	L	2	5	L	3	12	M	4	33	M	2	8	M	4	7	H	L
J	3	8	M	6	27	H	4	5	L	6	60	H	4	16	H	4	6	H	H
K	1	2	L	1	1	L	1	4	L	1	9	L	1	2	L	0	0	L	L

H= High; M=Medium; L= Low

Table 5 **Chain of evidence for the unconscious stewardship focus mechanism of stewardship theory**

Themes	Alignment of the risk profiles of the owner and steward		Overall rating (see table 7.1b)
Issues	Evidence that the steward clearly aligns his/her risk profile with that of the governing body/owners		
	Nvivo 8 Coding		Overall rating per case
Case	No. of Interview Sources	No. of Interview References	
A	1	1	L
B	2	6	M
C	4	7	M
D	3	3	L+
E	0	0	L
F	3	3	L+
G	3	5	M
H	2	2	L
I	2	5	M
J	6	14	H
K	1	2	L

H= High; M=Medium; L= Low

Table 6   **Chain of evidence for the owner-manager mechanism of stewardship theory**

Themes	Owners are able to clearly specify how IT should be governed within the University						Selection of competent management			Owners have selected competent governing body members			Overall qualitative rating (see table 7.1c)
Issues	Evidence that the owners established a clear IT direction			Evidence that management is part of a cohesive and trusting governance team			Evidence that the governing body has selected appropriate IT management			Evidence that governing body members are proactively governing IT processes			
Cases	Nvivo 8 Coding		Rating for each case	Nvivo 8 Coding		Rating for each case	Nvivo 8 Coding		Rating for each case	Nvivo 8 Coding		Rating for each case	Overall qualitative rating per case
	No. of Interview Sources	No. of Interview References		No. of Interview Sources	No. of Interview References		No. of Interview Sources	No. of Interview References		No. of Interview Sources	No. of Interview References		
A	2	9	**L**	0	0	**L**	3	6	**M**	1	2	**L**	**L**
B	4	10	**L**	1	1	**L**	2	3	**L**	1	2	**L**	**L**
C	5	22	**M**	1	1	**L**	0	0	**L**	0	0	**L**	**M-**
D	2	10	**L**	0	0	**L**	0	0	**L**	1	2	**L**	**L**
E	2	8	**L**	1	3	**L**	0	0	**L**	1	1	**L**	**L**
F	3	16	**M**	2	2	**L**	0	0	**L**	0	0	**L**	**L+**
G	5	41	**H**	4	18	**H**	0	0	**L**	4	13	**H**	**H**
H	2	14	**M**	1	1	**L**	0	0	**L**	2	4	**M**	**M**
I	4	24	**M**	1	6	**M**	0	0	**L**	0	0	**L**	**M-**
J	6	67	**H**	4	19	**H**	0	0	**L**	3	7	**H**	**H**
K	1	8	**L**	0	0	**L**	0	0	**L**	0	0	**L**	**L**

H= High; M=Medium; L= Low