A network analysis of the dynamics of information technology governance: A tactical model to guide IT governance implementation

Hafizah Mohamad Hsbollah (MSc, BAcct-Hons)

This thesis is presented for the degree of

Doctor of Philosophy of

The University of Western Australia

UWA Business School

Management & Organisations

2015
Abstract

This thesis contributes to understanding the processes that are related to the implementation of IT governance and IT infrastructure in organisations. Through the exploration of the relationships between IT governance arrangements (structures, processes, relational mechanisms) and IT infrastructure, this research provides insight into how and why IT governance emerges in an organisation.

Drawing upon actor network theory (ANT) as a theoretical lens, this dissertation explores the relationships that emerge from continuous interactions of the heterogeneous actors that constitute governance and infrastructure arrangements. The factors that affect the actors’ interactions are highlighted within their specific social, political, technical and historical contexts. Through an examination of the detail of how the actors’ conflicting interests become dynamically aligned, this thesis reveals how the implementation of IT governance and infrastructure shapes and is shaped by, the interactions of its actors.

The study of the relationships that exist between the IT governance arrangements and IT infrastructure is conducted using a mixed method approach. The first part of the exploratory research strategy adopts a qualitative approach. Through the study of four cases in two for-profit and two not-for-profit organisations in Australia and Malaysia, the process of how and why IT governance and IT infrastructure emerge is revealed. The analysis demonstrates that the relationship between the IT governance structures, processes, relational mechanisms and IT infrastructure emerge over time as an effect of their dynamic interactions. Their emergence is not only due to the entanglement of the social and the material, but also contingent upon specific organisational settings, such as business culture and historical background. The concept of a local/global network analysis is used to produce four IT governance trajectories. A cross case analysis of the four IT governance trajectories is conducted and as a result, the critical factors that contribute to the strengthening of IT governance trajectories are identified.

The factors contributing to IT governance trajectories are used to develop a tactical model of IT governance, which comprises four dimensions. The dimensions of clarifying expectations, establishing clear responsibility and accountability, fostering
commitment and increasing IT capabilities are proposed as having practical utility for the management of IT governance arrangements. The IT governance tactical model is tentatively validated by practitioners using an online questionnaire survey.

This thesis contributes to the IS literature by identifying the key link between governance practices and the IT infrastructure. The findings are summarised and conceptualised in a tactical model for IT governance. The IT governance tactical model has the potential to provide practitioners with the important strategies/tools for IT governance implementation. To improve on the understanding of the dynamics of IT governance implementation, similar future research can also be conducted in a range of other industries also possibly using a longitudinal approach.
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Acknowledgement

In the name of Allah, the Most Beneficent and the Most Merciful.

“Which then of the bounties of your Lord will you deny?” (55:13)

Alhamdulillah, all praises to Allah for the strengths and His blessing in completing this thesis.

I will forever be thankful to the helpful supervisors who have guided me to successfully complete this journey - Associate Prof Alan Simon and Associate Prof Nick Letch, both of whom have been very patient with my writing and provided me with continuous support, guidance and encouragement. Dear Alan and Nick, I feel so blessed to have had both of you as my supervisors.

A special thanks to my family without whose support I would never have had this opportunity: My husband, Mohamad Sofian; thank you for being with me through the good and the bad times... for your constant love and all the sacrifices you made until I managed to complete this adventurous journey.

My dearest children, Sulha, Sulaim and Sahnun, who missed out on a lot of “Umi” time while I was busy doing my work... Thank your for your love and understanding. My beautiful children, I couldn’t imagine life without all of you.

My beloved mother, Lara and aunt, Roseminah (having you a part of my life is the greatest gift of all, you were more of a mother to me) both of whom passed away before I started this journey.

My sisters, Kak Jan and Mama; thank you for your endless love.

My father, and parents-in-law (Haji Hussain), for their constant support, prayers and best wishes.

I wish to thank the Malaysian Ministry of Education and Universiti Utara Malaysia for their financial support. I also gratefully acknowledge the funding received from the University of Western Australia for a research grant and completion scholarship.

Special thanks to my colleagues and friends, for always being supportive.
Statement of Candidature

I hereby declare that the content of this thesis are original and have not been submitted to any other university. The thesis is my own composition, all sources have been acknowledged and my contribution is clearly identified in the thesis. For any work in the thesis that has been co-published with other authors, I have the permission of all co-authors to include this work in my thesis:


________________________
Student: Hafizah Mohamad Hsbollah

________________________
Supervisor: Associate Prof Alan Simon

________________________
Supervisor: Associate Prof Nick Letch
CHAPTER 1: INTRODUCTION

Introduction

As information technology (IT) becomes critical to organisations, there is intense pressure to ensure that they have invested in the right technology and are doing the right thing to minimise its associated risks. Organisations, however, differ significantly in their efforts to establish IT governance. This variation is due to the different organisational settings (i.e., for profit vs not for profit), type of technology used (i.e., IT infrastructure, such as enterprise resource planning - ERP), the historical background and their unique business culture. Hence, an argument has been made that IT governance requires a holistic approach (Peterson, 2004a; Van Grembergen et al., 2004) in order to acknowledge its complex and dynamic nature, consisting of a set of interdependent subsystems that deliver a powerful whole... It should address both the current and emerging requirements and thus be able to continuously evolve (Van Grembergen et al., 2004, p. 20).

While it is true that a holistic approach is required to understand the emergence of IT governance in organisations; is recognising IT governance as only a set of relational framework of structures, processes and relational mechanisms, sufficient? If governance influences the decision to invest in IT infrastructure’s development, deployment and implementation (e.g., IT governance shapes IT infrastructure), what role does technology play in shaping the governance processes?

Study Background

Ever since a plethora of business failures and corporate scandals, like the collapse of Enron, WorldCom Inc., and Global Crossing, governing the process of IT decision making goes beyond the narrow aspect of IT management. Management no longer has the option to ignore, delegate or avoid IT decisions (Van Grembergen et al., 2004). Instead, they have to take charge of IT (Peterson, 2004b) by taking responsibility and accountability to ensure that IT investment can deliver business value and minimise its associated risks. In this context, IT should be considered a corporate asset (Gillies,
2005; Van Grembergen & De Haes, 2009b; Weill, 2004) that needs to be governed properly to achieve its full potential. At the same time, organisations will continuously invest in their IT infrastructure development to support business process automation, provide timely information for communicating with customers and business partners, and create the ability to discover new opportunities for competitive advantage. This has called for a specific requirement in IT governance.

IT governance is not only about managing the technology, but also the decision making process which management takes to direct and control IT resources to align with the business’ strategic goal. Previous research indicated that top performing enterprises, with clear business and IT strategies and appropriate IT accountability for IT usage, were able to generate returns on IT investment up to 40% greater than their competitors (Weill & Ross, 2004). Accordingly, firms with superior IT governance have more than 25% profits as compared to companies with low IT governance (Weill & Ross, 2004).

Sambamurthy and Zmud (1999) argue that the mode of corporate governance has a significant impact on the governance of IT arrangements. An organisation that embeds centralised corporate governance will adopt a centralised arrangement for their IT governance, and vice versa. The argument highlighted by Sambamurthy and Zmud (1999) shows the connection between corporate governance and IT governance. Both are inextricably interrelated (Al Omari et al., 2013; De Haes & Grembergen, 2008; Debreceny & Gray, 2013; Pereira & Da Silva, 2011; Sethibe et al., 2007) because corporate governance and IT governance address the responsibility of the Board and executive management (IT Governance Institute, 2003) and share the same core processes (Hamaker & Hutton, 2004). Whilst organisations must address corporate governance, there is no mandated requirement to specifically address IT governance. However, Callahan et al., (2004) suggest that it is essential for management to address IT governance together with their other governance responsibilities to ensure the interests of corporate stakeholders’ are protected. Hence, IT governance arrangements of structures, processes, and relational mechanisms are set in place (Peterson, 2004b; Van Grembergen & De Haes, 2008a; Van Grembergen et al., 2004) so that firms can effectively manage and sustain their IT investment.
Despite the increasing interest in IT governance development, its relationships with IT investment (Xue et al., 2008) and its impact on business performance (Liang et al., 2011), there has been little attention given to how IT governance arrangements (i.e., structures, processes and relational mechanisms) and IT infrastructure emerge in organisations. The literature cited thus far acknowledges that each organisation has its own IT governance arrangements, but the arrangements vary across organisations. This variation is seen as resulting from unique factors in IT governance implementation, as well as the need to respond to the environment within which an organisation exists (Brown & Grant, 2005; Lunardi et al., 2013; Sambamurthy & Zmud, 1999). Due to the above contingencies, a single optimal framework for IT governance does not exist (Bowen et al., 2007; De Haes & Grembergen, 2008; Lunardi et al., 2013; McElheran, 2012; Pereira & Da Silva, 2012a, 2012b). For this reason, researchers have struggled to understand the state of how and why IT governance arrangements and IT infrastructure emerge and the underlying nature of the foundation on which IT governance lies. What is lacking most is evidence of how IT governance emerges in organisations in ‘real life’. Unless the reality is explored, the evolving phenomenon of the emergence of IT governance arrangements and IT infrastructure remains vague.

**Research Aims and Objectives**

This thesis aims to address a missing link between IT governance arrangements and IT infrastructure that has not been sufficiently highlighted in the IS literature. Accordingly, this dissertation will shed new light on understanding how and why IT governance arrangements and IT infrastructure emerge in organisations. Through exploring the relationships between the governance arrangements and IT infrastructure, this thesis provides insight into how the emergence of these relationships influences the way IT governance is implemented in organisations.

To fulfil the research aims, the following research objectives are outlined:

1. To explore the emergence of IT governance arrangements and IT infrastructure in an organisation;
2. To investigate the complex relationships between IT governance structures, processes, relational mechanisms and IT infrastructure;
3. To identify the factors supporting the implementation of IT governance, and
4. To develop a tactical model to guide IT governance implementation in an organisation.

**Research Questions**

In order to achieve the thesis’ aims and objectives, the following research questions (RQs) are postulated.

- **RQ1**: How do IT governance arrangements and IT infrastructure emerge in an organisation?
- **RQ2**: How do IT governance structures, processes, relational mechanisms and IT infrastructure become dynamically aligned to support IT governance implementation?
- **RQ3**: What factors contribute to the alignment of interests during the process of implementing governance and infrastructure arrangements?

These research questions are constructed from an understanding of how and why IT governance arrangements and IT infrastructure emerge and the underlying nature of the foundation on which IT governance lies and these have not been discussed in the literature in detail. The problems are due to the isolated treatment of both domains in the literature. The focus of IT infrastructure is frequently on its sociomaterial assemblage (Hanseth & Lundberg, 2001; Monteiro & Hanseth, 1996; Star & Ruhleder, 1996), while IT governance is often viewed as an organisational problem related to its implementation (Dahlberg & Kivijarvi, 2006; Van Grembergen et al., 2004; Viale Pereira et al., 2013). Viewing these two domains separately overlooks the complex relationships between people, structures, technology and processes involved in the implementation of IT governance.

Nevertheless, two major frameworks for understanding IT governance implementation are found to be prominent in the literature. Firstly, Weill & Ross’ (2004) framework focuses on decision-making structures, alignment processes and communication approaches. These authors identified a matrix of governance arrangements (business monarchy, IT monarchy, feudal, duopoly and anarchy) for specific decisions in IT governance. Secondly, Van Grembergen and De Haes’ (2009b) framework highlights

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1 This fourth objective also relates to the third research question.
the IT governance arrangements of structures, processes and relational mechanisms (further explanation on these two frameworks is provided in Chapter 2). Both frameworks suggest best practice to assist organisations in determining their IT governance goals and objectives. Lazic and Heinzl (2011) however, claimed that the outcomes from any IT governance models are often descriptive and prescriptive, which reflects a lack of theoretical foundation in IT governance. A similar concern is raised by Brown and Grant (2005). These authors argue that some disparity of viewpoints still remains in the IT governance literature. Researchers tend to focus on the practical view of IT governance with little regard for theoretical frameworks.

This study concurs with Lazic and Heinzl’s (2011) and Brown and Grant’s (2005) perspectives that most IT governance models focus on the practical view of IT governance. It is contended that while they provide strong practical guidance for implementing “best practice”, both Weill and Ross’ and Van Grembergen and De Haes’ frameworks do not provide a theoretical account of how and why IT governance arrangements emerge in organisations. In addition, even though organisations invest heavily in developing IT infrastructure to support a wide range of organisational tasks, these two models do not clearly explicate the relationship between IT governance arrangements and IT infrastructure. As a result, most of the research concerning IT governance implementation does not provide a clear stand point on the role of IT infrastructure in relation to IT governance and vice versa.

Therefore, to address the paucity of literature in examining the relationships between IT governance arrangements and IT infrastructure, this thesis subscribes to the premise that both domains are complex. This complexity is due to the dynamic interactions of the heterogeneous entities that reside in IT governance arrangements of structures, processes, and relational mechanisms, and IT infrastructure. In this context, the complex relationships between IT governance structures, processes, relational mechanisms and IT infrastructure are emerging, and that relationships are the outcome from their interactions. Hence, to understand this complexity, there is a need to examine how and why actors in IT governance arrangements and IT infrastructure development take action to achieve stable IT governance practices.
The discussion on the emerging interactions between IT governance arrangements and IT infrastructure creates an interest to understand the processes through which the relationships are initiated and maintained. This thesis suggests for a specific need to situate IT governance arrangements (structures, processes, relational mechanisms) and IT infrastructure within a wider context of their technological (i.e., material) and social (e.g., historical and institutional arrangements). Within this wider context, IT governance arrangements and IT infrastructure are viewed as emergent phenomena because their relationship emerges from the interaction of various actors residing in the governance arrangements and IT infrastructure. The focus of analysis should be given to the human actors, the technological artefacts (i.e., nonhuman actors or material) and also to the context in which they reside (e.g., the social). Based on this suggestion, this study subscribes to the perspective of sociomateriality to understand the assemblage of the social and the material that emerge during the interactions of the structures, processes, relational mechanisms and IT infrastructure. Orlikowski (2010) explained sociomateriality as

Thus, the social and the technical are posited to be ‘ontologically inseparable from the start’ (Introna, 2007, p.1) and, as Suchman (2007, p. 257) notes, ‘the starting place comprises configurations of always already interrelated, reiterated sociomaterial practices’. On this view, capacities for action are seen to be enacted in practice and the focus is on constitutive entanglements (e.g., configurations, networks, associations, mangles, assemblages, etc.) of humans and technologies (pp. 134-135).

The continuous interactions between the actors in the governance structures, processes, relational mechanisms and IT infrastructure are entangled together in a network of relationships. The actors’ interactions are directed towards ensuring that their competing interests can be aligned for purpose of establishing an alliance to enhance the governance of IT. Therefore, the perspective of sociomateriality is used to help the analysis of the underlying issues (i.e., lack of evidence that can link how IT governance and IT infrastructure emerge in organisations in ‘real life’).

**Significance of the Study**

IT governance defines the process of what investment decisions should be made in relation to IT, who makes the decisions and how IT helps deliver business value. However, the IT governance literature fails to fully acknowledge the relationship that
exists between IT governance arrangements and IT infrastructure. This failure is due to treatment in IT governance domains that have traditionally seen human (organisations) and technology as separate entities. As a result, the role of IT infrastructure that shapes, and is shaped by the governance process, is neglected in IT governance literature.

Therefore, it is argued that this dissertation is significant because it provides an explanation of how IT governance arrangements and IT infrastructure can be linked in a network of relationships, which has not been addressed in the IS and IT governance literature. Based on the argument that both IT governance and IT infrastructure are emergent phenomena, this thesis explores the dynamic interaction between the governance and infrastructure arrangements to reveal the emergence of their relationships. Understanding these relationships will shed light on the complex entanglement of the heterogeneous elements (e.g., the social, the material, human actors, practices) residing in governance and infrastructure arrangements. Hence, the question of how and why IT governance arrangement and IT infrastructure emerge in organisations can be revealed. The findings of this study have the potential to assist organisations to understand their governance arrangements and IT infrastructure implementation practices and also the process of how the governance arrangements can be maintained and stabilised.

Outline of the Thesis

This thesis comprises ten chapters.

Chapter 1, the introduction, provides the background of the research. Here the research aims, objectives and questions, and the significance of the study, are discussed.

Chapter 2 reviews the literature on IT governance and IT infrastructure, the two important subjects of the study. In particular, it discusses how IT governance arrangements and IT infrastructure are linked, thereby filling an identified gap in the literature.
Chapter 3 describes the theoretical lens of actor network theory used in the study. Two network analysis approaches of translation process and a local/global network approach, are discussed.

Chapter 4 the research methodology, is concerned with the relevant research paradigms and the two phased research design. A qualitative exploratory approach aims at addressing the first and second research questions, where the focus is on exploring how IT governance emerges in an organisation and how alignment of interests can be achieved (i.e., the first three objectives). A quantitative approach is used in response to the third research question (in respect of the related fourth objective) of how to validate the IT governance tactical model. The data collection and analysis methods are described in detail.

Chapter 5 presents the historical background analysis of IT governance implementation at the participating organisations.

Chapter 6 analyses IT governance implementation (structures, processes, relational mechanisms and IT infrastructure) at Group ABC, Company B, and Universities X and Y using actor network theory (ANT) as a theoretical lens. A translation process and a local/global network analysis approach are used to examine the IT governance implementation. The IT governance trajectories are then developed to support an analysis of how IT governance structures, processes, relational mechanisms and IT infrastructure become dynamically aligned.

Chapter 7 is a discussion and cross case analysis. It firstly discusses the findings from the four case studies described in Chapters 6. This cross case analysis is conducted to determine the common factors that contribute to an understanding of what actions are taken by IT governance actors to strengthen their IT governance trajectories. In this chapter, ANT is once again used to guide interpretation of the cross-case findings.

Chapter 8, model development, explains how the factors that contribute to the strengthening of IT governance trajectories are recast into an IT governance tactical model. Each tactic is cross referenced to relevant supporting literature.
Chapter 9, model validation, presents the findings from the survey of practitioners aimed at strengthening the IT governance tactical model. The revised IT governance tactical model is presented at the end of this chapter.

Chapter 10, the conclusion, summarises the findings of the study in the light of the research questions posed in Chapter 1. A final IT governance tactical model is presented here, with several important insights from practitioners highlighted. Limitations and potential directions for future research are put forward.

**Summary**

This chapter discusses the basis for this research by providing the background to the study and the research aims and objectives. The research problems were identified with a view to addressing an identified gap in the literature. The significance of the study and the outline of the structure of the thesis is provided. In this chapter, the overarching theme of the thesis, which is to understand the state of how and why IT governance arrangements and IT infrastructure emerge and the underlying nature of the foundation on which IT governance lies; was presented. This study investigates the emergence of IT governance arrangements and IT infrastructure by analysing their dynamic interactions using a sociomateriality perspective. This is important for both researchers and practitioners because it offers a way of understanding the assemblage of the social and the material that emerge during IT governance implementation. The results contribute to the exploration of the strategies developed by the IT governance actors in order to maintain a stable network of relationships. The next Chapter 2 reviews the literature on IT governance and IT infrastructure to inform the development of the research questions highlighted in this first chapter.
CHAPTER 2: IT GOVERNANCE AND IT INFRASTRUCTURE

2.0 Introduction

While both IT governance and IT infrastructure have been widely written about in IS literature in terms of the processes by which decisions are made regarding IT investment and the benefits of developing IT infrastructure, a closer look at the literature suggests that discussions of IT governance and infrastructure are frequently disconnected. IT governance is often viewed as an organisational strategy to address the social aspects of governance development (e.g., De Haes and Grembergen (2008); Peterson (2004b)). On the other hand, literature on IT infrastructure focuses on its capability (e.g., Wang et al. (2013); Lu and Ramamurthy (2011); (Bhatt & Grover, 2005); Bharadwaj (2000) and flexibility (e.g., Ngai et al. (2011); Prasad et al. (2010); Ravinchandran and Lertwongsatien (2005)) for the achievement of competitive advantage. Viewing these two domains separately overlooks the complex relationships between people, structures, technology and process involved in the development of IT governance in organisations.

This chapter summarises the literature in both the IT governance and IT infrastructure domains. The aim is to bridge the gap between IT governance arrangements (structures, processes and relational mechanisms) and IT infrastructure implementation practices, so that the process of how and why IT governance and IT infrastructure emerge in organisations can be addressed. As an alternative to treating the two domains separately, this thesis adopts a sociomaterial perspective to explore IT governance and IT infrastructure as complex and dynamic sociomaterial assemblages. This chapter also makes the case for the development of the research questions presented in Chapter 1.

2.1 Preamble to IT Governance

The use of IT in organisations is critically important to support organisational day-to-day operations so as to enhance the growth of a business. IT is not only important for the survival and prosperity of an enterprise, but also provides an opportunity to
differentiate, conducing to competitive advantage (De Haes & Van Grembergen, 2004). As IT is widely used in organisations, concern arises with respect to (1) how it can be used to its maximum potential in delivering business value as a source of competitive advantage; and (2) whether an organisation can receive adequate return on IT investment.

The IT Governance Institute was established by the Information Systems Audit and Control Association (ISACA) in 1998. The ISACA as a professional body, focuses on promoting and advocating the practise of governing IT in organisations for achieving IT/business alignment, optimising IT investment, managing IT-related risks and opportunities and delivering business value. The IT Governance Institute is actively involved in developing the practical business framework known as COBIT (Control Objectives for Information and Related Technology) to assist IT value delivery and risk management (further explanation is provided in subsection 2.4.2). The Institute (2003) defined IT governance as

the responsibility of the Board of Directors and executive management. It is an integral part of enterprise governance and consists of leadership and organisational structures and processes that ensure the organisation’s IT sustains and extends the organisation’s strategies and objectives (p. 10)

Nevertheless, in the vast IT governance literature, researchers often use overlapping definitions to refer to IT governance (Abu-Musa, 2002; Bowen et al., 2007; De Haes & Grembergen, 2008; ISACA, 2002; IT Governance Institute, 2003; Pereira & Da Silva, 2012a; Peterson, 2004b; Simonsson & Johnson, 2006; Van Grembergen, 2007; Webb et al., 2006; Weill & Ross, 2004). Table 1 below provides some examples of definitions of IT governance found in the literature.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Sambamurthy and Zmud (1999)</td>
<td>The patterns of authority for key IT activities in business firms, including IT infrastructure, IT use, and project management</td>
</tr>
<tr>
<td>Korac-Kakabadse and Kakabadse (2001)</td>
<td>The structure of relationships and processes to develop, direct and control IS/IT resources in order to achieve the enterprise’s goals through value adding contributions, which account for balancing risk versus return over IS/IT resources and its processes</td>
</tr>
<tr>
<td>ISACA (2002)</td>
<td>A structure of relationships and processes to direct and control the enterprise in order to achieve the enterprise’s goals by adding value while balancing risk versus return over IT and its processes</td>
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<tr>
<td>Authors</td>
<td>Definition</td>
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<tr>
<td>Ribbers et al. (2002)</td>
<td>The mechanisms that enable business and IT executives to integrate business and IT decisions, implement and monitor decision implementation, and learn from their effectiveness</td>
</tr>
<tr>
<td>Abu-Musa (2002)</td>
<td>A structure of relationships which links IT processes; IT resources; and information to organisation strategies and objectives to direct and control the organisation in order to achieve the organisation’s strategies and objectives</td>
</tr>
<tr>
<td>Schwarz and Hirschheim (2003)</td>
<td>IT related structures or architectures (and associated authority pattern) implemented to successfully accomplish (IT imperative) activities in response to an enterprise’s environmental and strategic imperatives</td>
</tr>
<tr>
<td>Peterson (2004a)</td>
<td>The distribution of IT decision-making rights and responsibilities among enterprise stakeholders and the procedures and mechanisms for making and monitoring strategic decisions regarding IT</td>
</tr>
<tr>
<td>Weill and Ross (2004)</td>
<td>Specifying the decision rights and accountability framework to encourage desirable behaviour using IT</td>
</tr>
<tr>
<td>Webb et al. (2006)</td>
<td>The strategic alignment of IT with the business such that maximum business value is achieved through the development and maintenance of effective IT control and accountability, performance management and risk management</td>
</tr>
<tr>
<td>Bowen et al. (2007)</td>
<td>The IT related decision making structure and methodologies implemented to plan, organise, and control IT activities</td>
</tr>
<tr>
<td>Van Grembergen and De Haes (2009b); Van Grembergen (2010)</td>
<td>An integral part of corporate governance and addresses the definition and implementation of processes, structures and relational mechanisms in the organisation that enable both business and IT people to execute their responsibilities in support of business/IT alignment and the creation of business value from IT-enabled business investments **Renamed IT governance as Governance of Enterprise IT - GEIT (Van Grembergen, 2010)</td>
</tr>
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</table>

The latest trend refers to IT governance as ‘enterprise governance of IT’ (IT Governance Institute, 2011). Van Grembergen (2010) explains that the change in the definition of IT governance to enterprise governance of IT is necessary to reflect the important role of business involvement towards value creation. Given that both IT governance and governance of enterprise IT are similar, this study uses IT governance as a universal term to reflect the way enterprises govern their IT.

Despite not having a uniform definition of IT governance, researchers generally agree that IT governance includes three important facets; (1) who is entitled to make the decision; (2) who is accountable for implementing the decision; and (3) what is the objective of the decision. Decision-rights and accountability are related to the role of Board of Directors, executives and senior management (i.e., top management). Meanwhile, the objective of the decision refers to the achievement of business value, improvement of organisational performance and minimisation of risks.
The latest trend refers to IT governance as ‘governance of enterprise IT’ (IT Governance Institute, 2011). Van Grembergen and De Haes (2009b) defined governance of enterprise IT as:

an integral part of corporate governance and addresses the definition and implementation of processes, structures and relational mechanisms in the organisation that enable both business and IT people to execute their responsibilities in support of business/IT alignment and the creation of business value from IT-enabled business investments (p. 3).

Given that both IT governance and governance of enterprise IT are similar, this study uses IT governance as a universal term to reflect the way enterprises govern their IT. The definition provided by Van Grembergen and De Haes (2009b) above is adopted in this thesis for the following reasons. Firstly, the definition is comprehensive because it highlights IT governance to be a part of corporate governance (e.g., decision-rights) and explain who is accountable for implementing the IT decisions (e.g., IT and business people). Secondly, the benefits of implementing IT governance are also acknowledged in this definition (e.g., creation of business value and business/IT alignment). Lastly, the definition provides information on the arrangements that need to be in place in regards to IT governance (i.e. structures, processes and relational mechanisms).

The implementation of IT governance is important because of its ability to assist organisations to obtain benefits in five areas of strategic alignment, risk management, value delivery, resource management and performance measurement (IT Governance Institute, 2003, 2011). Firstly, implementing IT governance can contribute to the achievement of strategic alignment between enterprise IT and business strategy. The positive impacts of strategic alignment include to maximise return on investment (ROI), achieve competitive advantage through IS usage and provide flexibility and direction for taking advantage of new opportunities (Avison et al., 2004).

Secondly, the degree to which the IT is aligned with the business strategy helps enterprises to deliver business value. In this context, IT adds value to the business through enhancing efficiency and productivity (Yao et al., 2010), increasing profitability and improving the integrity and accuracy of business information (IT Governance Institute, 2003).
Thirdly, in order to ensure that IT decisions optimise IT value delivery, management needs to highlight the issues of safeguarding IT assets, disaster recovery and continuity of operations. Risk management is important in helping the organisations to manage IT related risks and reduce the failure rate in relation to IT implementation and its usage. Schmidt et al. (2001) provide several examples of IT risks, such as environmental change, inadequate user involvement, unavailability of key IT personal resources and poor validation of system requirements.

Fourthly, closely related to risk management is the ability of IT governance to help organisations to manage their resources. Resource management is crucial to assist organisations to make proper allocation of IT infrastructure for optimising the value of IT investment.

Lastly, performance measurement is a mechanism used to ensure that IT is properly governed and managed thoroughly. Measuring IT performance provides a basis for supporting the following: (1) alignment, by assessing the strategic fit between IT and business strategies; (2) risk management, by monitoring whether risks associated with IT have been addressed, managed and mitigated correctly; (3) resource management, by assessing the effectiveness and efficiencies of IT resources; and (4) value delivery, by monitoring how strategic alignment, risk management, and IT resources produce business value for an organisation.

2.2 Focus Areas for IT Governance

The IT Governance Institute was established in 1998 by ISACA (Information Systems Audit and Control Association) with the aim of advancing international thinking and standards in directing and controlling an organisation’s IT. As a body that offers original research on global practices and perceptions relative to governance and management of IT, the institute has identified two objectives of IT governance. These are IT value delivery to a business and the mitigation of IT risk (IT Governance Institute, 2003). Both objectives are driven by alignment of IT, the availability and management of adequate resources and the measurement of performance to monitor progress towards the achievement of IT governance objectives. In the Global Status Report on the Governance of Enterprise IT, the Institute (2011) revealed that IT governance initiatives should take a balanced and holistic view of the following five focus areas to
ensure the transparency of IT supply and demand and facilitate decision making for IT value delivery. The five focus areas in the IS literature are explained briefly below:

1. **Strategic Alignment**

Strategic alignment focuses on how an enterprise’s IT investment can be aligned with strategic objectives. This alignment is in terms of intent, current strategy, and goal in building the necessary organisational capabilities to deliver business value (IT Governance Institute, 2003). Strategic alignment assists an organisation to maximise return on investment (ROI), achieve competitive advantage through IS usage and provide flexibility and direction for taking advantage of new opportunities (Avison et al., 2004). In IS literature, strategic alignment is synonymous with fit, linkage, cohesion, fusion, integration, and harmony (Avison et al., 2004; Chan & Reich, 2007; Luftman, 2005). Many studies have been conducted from both academic and practical perspectives (Vargas et al., 2007). The literature has evolved from various alignment dimensions (i.e., strategic and intellectual, structural, the informal structure, social, and cultural dimensions) to diverse levels of alignment and different measures. For example, Luftman et al. (1999) identified enablers and inhibitors of business-IT alignment. Further, Luftman (2003) developed an IT-business alignment tool (six criteria of communication maturity, competency/value measurement maturity, governance maturity, partnership maturity, scope and architecture maturity, and skills maturity) for assessing the maturity level of an organisation to improve the alignment of IT with the business. Van Grembergen and De Haes (2009c) applied Luftman’s maturity model to study the business/IT alignment maturity in the Belgian financial services sector. They found seven practices that are crucial for enabling business/IT alignment. These are an IT steering committee, IT project steering committee, portfolio management, IT budget control and reporting, CIO reporting to the CEO or Chief Operating Officer, IT leadership and project governance/management methodologies. Researchers, such as Sabherwal and Kirs (1994), Luftman et al. (1999), and Chan et al. (2006) conducted studies identifying the factors that contribute to the achievement of strategic alignment. The identified factors include
environmental uncertainty, organisational interaction, IT management sophistication, and senior executives’ support for IT.

2. **Value Delivery**

The IT Governance Institute (2003) refers to IT value delivery as the degree to which the IT is aligned with the business to meet organisational expectations. IT value delivery focuses on how IT usage can help an organisation to optimise reduction of expenses and to exploit and maximise the benefits of IT. Researchers often operationalise IT value delivery as competitive advantage, cost rationalisation, customer satisfaction, productivity, efficiency and effectiveness (IT Governance Institute, 2003). In manufacturing industries, Yao et al. (2010) found that the firm’s contextual characteristics (e.g., the level of vertical integration and industry type) conduced to higher IT business value by improving labour and administrative productivity. Another study conducted by Heier et al. (2007) revealed that IT governance could generate three types of business value. These are portfolio management optimisation, project visibility and control, and IT services efficiency. In a different study, Heier et al. (2009) showed that implementation factors (i.e., project planning and analysis, executive support, user involvement, user training, commitment, and organisational integration) played a vital role in facilitating the improvement of IT governance processes and business values.

3. **Risk management**

Risk management highlights the issues of safeguarding IT assets, disaster recovery and continuity of operations (IT Governance Institute, 2003). Risk management is important in helping an organisation to manage IT related risks and reduce the failure rate in relation to IT implementation and usage. Schmidt et al. (2001) observed that an organisation is exposed to various types of risk groups, such as environmental changes; poor relationship with the owner of the system; lack of trust and inadequate user involvement; inefficient management strategy; and inadequate understanding of the chosen technology. In order to manage the IT related risks, several models have been developed by institutions. For instance, the COSO enterprise risk management
model by the Committee of Sponsoring Organisation of the Treadway Commission; and Software Risk Evaluation (SRE) by the Software Engineering Institute (SEI).

4. Resource Management

IT resource management concentrates on the optimisation of IT investment and allocation of IT resources. For example, Ross et al. (2006) viewed an organisation’s IT resources as IT infrastructures, which comprised of (1) business process architecture; (2) data or information architecture; (3) application architecture; and (4) technology infrastructure. According to these authors, the IT resources are important for developing enterprise architecture in an organisation.

5. Performance measurement

Performance measurement refers to a mechanism used to ensure IT is properly governed and managed thoroughly. It provides a basis for supporting alignment by monitoring the strategic fit between IT and business strategies; risk management by monitoring whether risks associated with IT have been addressed, managed and mitigated correctly; resource management by assessing the effectiveness and efficiencies of IT resources; and value delivery by monitoring how strategic alignment, risk management, and IT resources produce business value for an organisation. As an example, Van Grembergen and De Haes (2005) proposed the use of an IT balanced scorecard (IT-BSC) as a performance measurement system for IT governance. The IT-BSC’s perspectives, which are the financial perspective, customer perspective, learning and growth perspective and internal business process perspective (see also Kaplan and Norton (2005)), have to be translated into goals and metrics to assess the current situation. It can also be used as a management and alignment instrument (Van Grembergen & De Haes, 2009b).

This study concurs with Wilkin and Chenhall’s (2010) observation that even though the five focus areas have been highlighted in the IS literature, the linkage between these areas is still tenuous. The current focus is still on the information silos (Wilkin & Chenhall, 2010), where governance itself was not identified as a key term in IS
research. Even so, the five focus areas of IT governance are important in this study and postulated here as having impact on implementing IT governance.

2.3 IT Governance Configuration

In order to understand who are entitled to make IT decisions and accountable for implementing such decisions, attention should be paid to the configuration of how the decisions are made. Literature cited thus far has focused on three types of IT governance configuration, namely centralised, decentralised and federal governance modes (Brown & Grant, 2005; Peterson, 2004a; Peterson et al., 2000; Sambamurthy & Zmud, 1999; Van Grembergen & De Haes, 2008a). The centralised configuration allows corporate IT/IS (information system) and senior executives (i.e., top management) to have a greater control over IS activities through their decision-making authority. These are in terms of developing and implementing IT solutions for business applications, shared services and architecture and a technological platform in all parts of the business (Peterson, 2004a). Under the centralised setting, a central IT organisation (i.e., unit) has the responsibility to provide IT services to all business units.

In the decentralised configuration, the IT decision-making authority is distributed to various business units. The business units have the ability to exercise control over their individual IT directions. Hence, multiple IT organisations exist to provide IT services to various business unit in the enterprise. However, conflicts arise, as an organisation has to choose the best approach to balance the benefit, cost and risks of centralisation and decentralisation. Centralisation leads to specialisation and increases the likelihood of incurring strategic risk due to bounded rationality and information overload. On the other hand, excessive flexibility under decentralisation leads to variable standards (Peterson, 2004b; Peterson et al., 2000). As a result, a federal governance configuration that combines the benefits of both centralised and decentralised governance mode is introduced. In the literature, federal governance configuration is also synonymous with distributed governance and hybrid governance. Following this hybrid configuration, the business will have a central IT organisation to provide group-wide IT services. At the same time, there are also several IT organisations in business units that provide specific IT services for the requirements in supporting their function. The federated governance configuration, however is challenging for companies. It
requires effective coordination approaches for helping an organisation to achieve its desired coordinated outcome (Williams & Karahanna, 2013). In their research, Williams and Karahanna (2013) identify four elements of coordinating structure and context of coordinating effort (i.e., operating mode, composition, coordinating climate and engagement logic). These four elements help to understand how coordination can be achieved within the structure of the federated governance configuration.

In contrast to the three foci of centralised, decentralised and federal governance configuration, Weill and Ross (2004) used political archetypes to explain how IT decisions are made in organisations. Their six types of IT governance archetype are summarised below:

1. Business monarchy: top management has the IT governance decision-making rights;
2. IT monarchy: decision-making authority is given to the IT specialist;
3. Feudal: each business unit makes independent decisions on IT;
4. Federal: the IT decision-making authority is shared by a combination of the corporate centre and the business units;
5. IT duopoly: decision-making authority is distributed to the IT group and one other group (for example, top management or business unit leaders); and
6. Anarchy: an isolated individual or a small group make IT decisions.

These authors concluded that different archetypes are adopted in organisations, depending on the type of IT decisions made. For instance, most of the enterprises they studied used (1) an IT monarchy archetype to make decisions for architecture and infrastructure; (2) an IT duopoly archetype for decisions related to IT principles; and (3) a federal archetype for deciding business application needs.

2.4 IT Governance Frameworks

While IT governance configuration and benefits of IT governance examine how IT decisions are made and the objectives of such decisions, IT governance frameworks emphasise the mechanisms of how IT governance can be implemented in the organisations. The frameworks have to embed a holistic approach that should be able to address both the current and emerging requirements of governing IT in the
organisations (Van Grembergen et al., 2004). Nevertheless, two major frameworks for understanding IT governance implementation are prominent in the literature.

Firstly, Weill and Ross’ (2004) framework focuses on three different types of IT governance mechanisms. These are decision-making structures, alignment processes and communication approaches. According to these authors, the decision-making structures focus on the organisational units and roles responsible for the IT decision-making process. The structures reflect the commitment of the management to be involved in the decision-making processes. The establishment of a senior management committee, IT leadership committee and IT council are examples of the decision-making structures. The alignments processes concentrate on the formal processes undertaken by the top management to ensure that the daily behaviours are consistent with IT policies, as well as to provide feedback mechanisms. Examples of alignment processes include IT investment approval, architectural exception, service level agreements, chargeback, project tracking and formal tracking of business value. Communication approaches on the other hand, emphasise the communication channel for delivering outcomes for IT decision-making processes. The more top management communicates formally about IT governance mechanisms and its processes, the more effective the IT governance. In this context, communication can be conducted through senior management announcements, a formal committee, a portal and the office of the CIO (Weill & Ross, 2004).

Secondly, Van Grembergen and De Haes’ (2009b) framework highlights a set of governance arrangements of structures, processes and relational mechanisms. The structures focus on the authority and responsibility in IT decision-making and the processes concentrate on the techniques and procedures to assist the governing processes. On the other hand, the relational mechanisms look into the ways in which an effective IT governance implementation can be achieved.

The similarities in Van Grembergen and De Haes’ and Weill and Ross’ frameworks in promoting proper mechanisms for IT governance implementation can be seen in terms of having structures and processes for guiding the decision-making process. However, the communication approaches described in Weill and Ross’ framework are limited only to promoting the governance decisions, processes and related desirable
behaviour in organisations. In contrast, in Van Grembergen and De Haes’ (2009b) framework, communication is included as part of the IT governance relational mechanisms. Relational mechanisms are derived from the social perspective of IT governance that focuses on promoting active participation and collaboration between the IT and business people. According to Van Grembergen and De Haes (2009b), relational mechanisms play important roles in facilitating the IT governance framework to support the IT governance structures and processes that are already in place. Therefore, given the more comprehensive perspective given to communication for active participation and collaboration, Van Grembergen and De Haes’ (2009b) framework is adopted in this thesis. The following subsection describes the components of Van Grembergen and De Haes’ (2009b) IT governance framework in detail.

2.4.1 IT Governance structures

**IT governance structures** provide a mechanism for how the decision-making process can be coordinated through clear guidelines on accountability and responsibility in an organisation. Peterson (2004b) and Peterson et al. (2000) explain that the coordination of **IT governance structures** is a mixed approach of formal and informal integration structures. The formal integration structure involves direct supervision, liaison roles, task forces and contacts between business and IT management. The formal structure is supported by the coordination and the building of a network relationship that is achieved through activities such as job rotation and training (i.e., informal integration structure).

Roles and responsibilities for an effective IT governance implementation are associated with the board of directors and executives, or top management (IT Governance Institute, 2003; Van Grembergen & De Haes, 2008b). Their role is to provide leadership and strategic direction to ensure the achievement of strategic alignment between IT and business strategy for business value delivery. Direct involvement of top management provides a positive impact on IT governance success (Ali & Green, 2012; Bowen et al., 2007; Ferguson et al., 2013).

Establishment of various committees, such as an IT steering committee, IT strategy committee, and architecture committee are examples of **IT governance structures**.
These committees can be placed at the board, executive or management levels, depending on the size, functional areas and the intensity of IT usage in an organisation. Hence, an organisation may have different types of committees (Karimi et al., 2000) and the names of such committees might also vary.

The IT Steering committee is a lateral IT-related organisational coordination entity (Prasad et al., 2010). It is often situated at the executive level (Van Grembergen et al., 2004) and it has representatives from sponsoring executives, business executives, the Chief Information Officer (CIO) and the Chief Financial Officer (CFO) (Bowen et al., 2007; IT Governance Institute, 2003; Prasad et al., 2010). The committee assists the management to align the IT strategy with the business strategy and also to focus on specific IT related activities and implementation in an organisation (Van Grembergen et al., 2004). The committee becomes a platform for its members, who have diverse interests and perspectives, to make decisions that optimise their IT activities (Huang et al., 2010).

Even though Chan (2002) argues that an IS steering committee is not always necessary, other studies suggest otherwise. For example, Prasad et al. (2010) found that an effective IT steering committee (driven by IT governance initiatives) helped an organisation to develop and sustain a firm’s IT-related management and infrastructure capabilities. Karimi et al. (2000) assert that the role of an IT steering committee is becoming more important as compared to back in the 1990s. In their study, the presence of an IT steering committee had a significant effect on overall IT management sophistication. Most recently, Ferguson et al. (2013) report that an IT steering committee can positively influence the overall level of IT governance effectiveness in an organisation.

2.4.2 IT Governance Processes

The IT governance processes focus on how the IT strategic decision-making processes and IT monitoring procedures can be employed in an organisation (Ribbers et al., 2002). The processes emphasise the techniques used to support IT decision-making, and also the assessment procedures related to the decisions that have been made (Van Grembergen & De Haes, 2008b; Van Grembergen et al., 2004). Peterson (2004a) observed that IT governance processes tend to be “mandatory, tangible, and often
implemented in a top-down manner” (p. 14). In most cases, the processes are driven by accountability that is achieved through the establishment of IT policies and procedures (Bowen et al., 2007). Weill and Ross (2004) highlighted IT governance processes as IT management techniques for securing management involvement and IT usage. The authors listed IT governance processes that included the IT approval process, the architecture exception process, service level agreements, charge back, project tracking and formal tracking of business value from IT. Hence, the development of an IS strategic plan, that contains an IS/IT strategy, prioritisation of IT investment and resources allocation, is considered part of IT governance processes. Strategic information systems planning (SISP) is an example of a tool that is used to support IT governance processes. SISP focuses on defining strategic intent and preparing a plan for achieving IT mission and vision to support IT/business alignment. Grover and Segars (2005) explained SISP as “a proactive search for competitive and value-adding opportunities, as well as the development of broad policies and procedures for integrating, coordinating, controlling and implementing the IT resources” (p. 762). An IT balanced scorecard (BSC) is also used by organisations as a tool to guide the achievement of IT/business alignment in an organisation (IT Governance Institute, 2003). The IT BSC is based on Kaplan and Norton’s (1992; 2005) BSC which focuses on the four different perspectives of the financial, customer, internal business and innovation and learning. The IT BSC is enhanced by using two types of measurements. Firstly, the outcome measures (how alignment can be achieved) and secondly, the performance drivers (the effectiveness of the strategy used) (IT Governance Institute, 2003; Van Grembergen & De Haes, 2008b).

There are several frameworks that are commonly used in IT governance practice. Firstly, Control Objectives for Information and Related Technologies (COBIT) is created by the ISACA to ensure IT activities and resources can be managed and be aligned with the business requirements. The latest version of COBIT 5 sets out good practice of IT governance aiming at deriving business value from IT. This framework introduced five principles (meeting stakeholder needs; covering the enterprise end-to-end; applying a single integrated framework; enabling a holistic approach; separating governance from management) and seven enablers (processes; organisational structures; culture, ethics and behaviour; people, skills and competencies; services infrastructure applications;
information; and principles, policies and frameworks) for helping enterprises to optimise the value of IT and maintaining quality information to support business decisions (ISACA, 2012).

Secondly, a Val IT framework has been developed by the IT Governance Institute as a guideline to optimising value from the investments. The Val IT framework is aligned with COBIT 5, but the focus is on helping organisations to measure, monitor and optimise business value from IT investment, especially in terms of business and financial objectives (IT Governance Institute, 2008). The framework provides enterprises with the structure they require to measure, monitor and optimise the realisation of business value from IT investments for achieving better return on investment (ROI). Val IT concentrates on three domains of value governance (i.e., to ensure that value management practices are embedded in the enterprise), portfolio management (i.e., to ensure that an organisation secures optimal value across its portfolio of IT investments) and investment management (i.e., to ensure individual IT investments contribute to optimal value delivery).

Thirdly, an ITIL (Information Technology Infrastructure Library) framework recommends best practices for IT service support and service delivery processes. Originated as a collection of books to cover a specific practice within IT service management, the ITIL focuses on the continual measurement and improvement of the quality of IT services delivered from the perspectives of both business and customer. This framework highlights that all service solutions and its delivery should be driven by business needs (i.e., IT is aligned with business). The latest update of the ITIL was made in 2011 and covers five core publications of:

1. Service Strategy - to understand organisational objectives and customer needs;
2. Service Design - to ensure that new or changed services are designed to meet the changing requirements of the business;
3. Service Transition - to ensure that new, modified or retired services meet the expectations of the business as documented in the service strategy and service design stages of the service lifecycle;
4. Service Operation - to deliver agreed levels of service to users and customers, and to manage the applications, technology and infrastructure that support delivery of the services; and

5. Continual Service Improvement - to ensure value for customers is maintained through continual evaluation and improvement (The Stationery Office, 2011).

Fourthly, TOGAF (The Open Group Architecture Framework) is a framework that provides detailed methods and a set of supporting tools for developing an enterprise architecture. Developed by the Open Group, the latest version of TOGAF 9.1 focuses on an Architecture Development Method (i.e., the core of TOGAF) that provides a step-by-step approach to developing an enterprise architecture. This framework aims at helping an organisation to design, evaluate, and achieve the right architecture and reduces the costs of planning, designing, and implementing architectures based on open systems solutions. Hence, TOGAF offers a best practice solution for adding value (e.g., right balance between IT efficiency and business innovation), and enables the organisation to build workable and economic solutions (i.e., to address their business issues and needs).

Lastly, ISO/IEC 38500:2008 is an international standard for corporate governance of IT governance. The standard was jointly published by the International Organisation for Standardisation (ISO) and International Electrotechnical Commission (IEC) with the aim of guiding the directors (e.g., board members, senior executive) on the effective, efficient, and acceptable use of IT within their organisations. This standard clearly stated the difference between IT management and governance, to help organisations to design and implement the processes to support their IT governance. The establishment of ISO/IEC 38500:2008 was to encourage organisations to use an appropriate standard to underpin their IT governance. This standard sets out six principles for IT governance (i.e., responsibility, strategy, acquisition, performance, conformance, and human behaviour). The core processes for each of the principles are based on an IT governance framework of evaluate, direct and monitor. Specifically, the framework is meant to ensure organisations are able to “(a) evaluate the current and future use of IT; (b) direct preparation and implementation of plans and policies to ensure that use of IT meets business objectives; (c) monitor conformance to policies, and performance against the plans” (ISO/IEC 38500:2008, p. 7).
The above examples are some of the existing plethora of best practice frameworks/tools for IT governance. The selection of the frameworks/tools however, depends upon the individual organisation as this is voluntary, rather than compulsory.

2.4.3 IT Governance Relational Mechanisms

The *IT governance structures* and *processes* alone cannot lead to the success of IT governance implementation. A holistic approach to IT governance implementation success requires an organisation to have two-way communication and active participation and collaboration among and between corporate executives, IT managers and business managers. This is referred to as *IT governance relational mechanisms* (Peterson, 2004b; Peterson et al., 2000; Van Grembergen & De Haes, 2008b; Van Grembergen et al., 2004). Van Grembergen et al. (2004) and Van Grembergen and De Haes (2008b) suggest that *relational mechanisms* include business/IT participation, strategic dialogue, shared learning and proper communication among and between the IT governance players. According to these authors, the *IT governance* relational mechanisms completes the IT governance framework, where its combination with IT governance structures and processes are critical for attaining and sustaining business-IT alignment.

Peterson (2004a, 2004b) classified the relational mechanisms into two integration strategies, namely, *relational integration structures* and *relational integration processes*. An active stakeholder participation and collaboration in the relational integration structures will balance the involvement of business and IT management in the process of IT governance decision-making. On the other hand, the relational integration processes focus on the strategic dialogue and shared learning between the principle business and IT stakeholders. Both relational integration structures and processes work in concert to facilitate the coordination of IT governance activities and its decision making process.

Fielding (2006) describes four types of communication that exist in an organisation. These are upward communication (i.e., subordinate/manager communication, from the lowest position to the highest rank in an organisation); downward (i.e., communication that takes place in the form of organisational formal chain of command, from the upper to the bottom level); lateral (i.e., communication that
occurs between employees of same hierarchical rank, that is also known as sideway or horizontal communication); and grapevine (i.e., informal communication that can be positive, if the communicated information is based on truth; or negative (rumours)). In terms of communication flow, Hannigan (1998) explained that in one way communication, information is transferred from one party to another. One way communication is often associated with downward communication, even though it can also be upwards and horizontal. Two way communication, on the other hand, allows for exchange of information, where feedback can be obtained to eliminate vagueness and ensure clarity of information.

In the IS literature much of the emphasis is given to downward communication. For instance, Reich and Benbasat (2000) highlight communication as vital to establish a relationship between the business and IT executives within an organisational unit. Such relationship could be established through direct communication (e.g., ad hoc meeting), liaison role, temporary task forces, permanent committee (e.g., IT steering committee), integrating and managerial linking roles. Ali and Green (2007) conducted a study to understand the roles of IT governance mechanisms and their impact on the overall effectiveness of IT governance. The authors found that the corporate communication systems (e.g., formal communication about the existence of IT governance mechanisms) could greatly enhance the overall effectiveness of IT governance. Nfuka and Rusu (2011), Huang et al. (2010) and Bowen et al. (2007) highlighted the importance of communicating information about IT governance related policies, procedures and guidelines for IT governance success. Communication media to share such information could be made through email, paper documents, meetings, word of mouth and Intranet (Huang et al., 2010).

De Haes and Grembergen (2008) suggest that IT leadership should be included as one of the important components for IT governance relational mechanisms. In a study to understand how IT can play a role to enable the achievement of competitive advantage, Luftman et al. (1993) postulate the role of executive leadership in articulating and communicating the business and IT strategy as critical for a successful IT implementation. In terms of leadership style, Wang et al. (2005) found that charisma could establish team cohesiveness and overall performance during ERP implementation. In another study conducted by Gumusluoglu and Ilsev (2009), the
results revealed that transformational leadership had effects on creativity at both the individual and organisational (innovation) levels. Müller and Turner (2010) examined the leadership competency profiles of successful project managers in different types of projects. The authors concluded that a more transactional style is needed in relatively simple projects and in complex projects, more transformational leadership is required.

2.5 IT Infrastructure

IT governance arrangements of structures, processes, and relational mechanisms are set in place so that firms can effectively manage and sustain their IT investment (De Haes & Grembergen, 2008). It should be viewed as an organisation’s commitment to allocate appropriate IT investment for current and future business development. Ross and Beath (2002) explain that IT investment in the organisations is made for four reasons. Firstly, transformation focuses on the effort taken by organisations to migrate to a new business platform. Secondly, a renewal initiative takes place when the existing technology becomes outdated. Thirdly, investment that is made for process improvement is aiming at improving the capability of the existing IT infrastructure. Lastly, the organisations might be investing in new technologies or ideas as an experiment to enhance existing business processes. If the experiment is successful, it will be a trigger for a major organisational change that requires investment in a new IT infrastructure. IT investment is crucial in order for an organisation to enable business initiatives and IT infrastructure. For example, Mithas et al. (2012) found that IT investment has an effect on firm profitability through revenue growth. In a same study, they also revealed that the impact of IT investments on sales and profitability is higher than that of other discretionary investments such as advertising expenditures. While Xue et al. (2008) and Weill and Ross (2004) acknowledged that IT investment could significantly impact on organisational success, a recent study conducted by Lee et al. (2014) found that IT investment is significantly associated with firm profitability (i.e., measured by return on assets and return on equity). Their findings also suggest that an organisation should invest in IT and its complement (e.g., a software system without sufficient hardware support would underperform) as a means to increase firm’s profitability.
Ross and Beath’s (2002) explanation implies that organisations rely heavily on their IT infrastructure to support a wide range of organisational tasks for smooth business operations. IT infrastructure is important for business because it supports the organisation’s overall information architecture (Law & Ngai, 2007) by providing the shared foundation for building and use of business application (Broadbent & Weill, 1997; Weill, 1992). IT infrastructure contributes to the ability of firms to assimilate and use IT competitively (Armstrong & Sambamurthy, 1999; Duncan, 1995) in order to achieve a sustained competitive advantage (Byrd & Turner, 2000). Nevertheless, IT infrastructure deployments are expensive and complex because they involve a substantial consideration of how the investment could provide positive impact for an organisation. Consequently, the process in which IT investment decisions is made for the acquisition and implementation of IT infrastructure, needs to be carefully governed. A decision to invest in IT infrastructure is a long term commitment that needs to be linked to the business strategies (Broadbent & Weill, 1997). Therefore, a balanced approach for determining the best IT investment is crucial. Over-investing (e.g., implementing unnecessary and incompatible infrastructure) results in wasted resources, and under-investment could cause limited integration between business processes (Weill et al., 2002). Sound implementation of IT governance assists organisations to protect their investment in IT through the efficient and effective use of IT resources (Callahan, Bastos, & Keyes, 2004). In addition, the development stages of IT investment decisions are also influenced by multiple contingencies (e.g., internal and external factors) and are essential elements of IT governance (Xue et al., 2008).

In the literature, IT infrastructure is generally described as part of the IT resources that need to be assembled to generate capabilities for competitive advantage. It is viewed as a shared set of capital resources that provides the foundation on which specific IT applications are built (Ray et al., 2005) to enable present and future business applications development (Ravinchandran & Lertwongsatien, 2005). IT infrastructure includes platform technologies (hardware and operating systems), network and telecommunications technologies, databases, a variety of shared services, such as electronic data interchange; and integrated business management software, like Enterprise Resource Planning (ERP). Several authors also include the human aspect depicting IT knowledge, skills and capabilities as components of IT infrastructure.
(Broadbent, Weill, & St Clair, 1999; Byrd & Turner, 2000; Chatterjee et al., 2002; Fink & Neumann, 2009; Sirkemaa, 2002; Weill, 1992; Weill et al., 2002; Weill & Vitale, 2002).

From a different point of view, Ciborra (1996, 2000) claimed that in reality, IT infrastructure always drifts from its original purpose. He recommends that the assessment of infrastructure must extend beyond the common ways of (research) investigating it. To help further understand the notion of IT infrastructure, Star and Ruhleder’s (1996) relational approach is referred to. The relational approach is used to determining information infrastructure as central to definitions, which go beyond a concentration on the material and objective aspects of infrastructure. Star and Ruhleder (1996) articulate eight salient dimensions to form an infrastructure. The dimensions emphasise the relationships between the social and the technical components of infrastructure. These dimensions are:

i. Embeddedness - Infrastructure is "sunk" into, inside of, other structures, social arrangements and technologies;

ii. Transparency - Infrastructure is transparent to use, in the sense that it does not have to be reinvented each time or assembled for each task, but invisibly supports those tasks;

iii. Reach or scope - This may be either spatial or temporal - infrastructure has reach beyond a single event or one-site practice;

iv. Learned as part of membership - The taken-for-grantedness of artifacts and organisational arrangements is a sine qua non of membership in a community of practice. Strangers and outsiders encounter infrastructure as a target object to be learned about. New participants acquire a naturalised familiarity with its objects as they become members;

v. Links with conventions of practice - Infrastructure both shapes and is shaped by the conventions of a community of practice, e.g. the ways that cycles of day-night work are affected by and affect electrical power rates and needs;

vi. Embodiment of standards - Modified by scope and often by conflicting conventions, infrastructure takes on transparency by plugging into other infrastructures and tools in a standardised fashion;
vii. Built on an installed base - Modified by scope and often by conflicting conventions, infrastructure takes on transparency by plugging into other infrastructures and tools in a standardised fashion;
viii. Becomes visible upon breakdown - The normally invisible quality of working infrastructure becomes visible when it breaks (Star & Ruhleder, 1996, p. 113).

The main purpose of IT infrastructure development and implementation is to increase productivity and efficiency for business operations. Therefore, the concept of work infrastructure is subscribed to in order to explain how infrastructure supports a field of work and tasks in an organisation (Hanseth & Lundberg, 2001; Pipek & Wulf, 2009). The definition of IT infrastructure is from Pipek and Wulf (2009):

the entirety of devices, tools, technologies, standards, conventions, and protocols on which the individual worker or the collective rely to carry out the tasks and achieve the goals assigned to them (p. 455).

Their definition is subscribed to because it addresses infrastructure as heterogeneous in the sense that it is not limited to the physical technological infrastructure. It also acknowledges the role of people who depend on it. In this context, their definition reflects IT infrastructure as the assemblage of the social and the material (i.e., technological artefacts) that continuously emerge through the interactions of its elements.

It is important to highlight that in the management of IT infrastructure, attention is paid to the installed base dimension. The installed base can directly affect how infrastructure is designed and developed within an organisation. Hanseth (2000) explains the installed base of infrastructures as

always considered as existing already; they never developed from scratch. When designing a new infrastructure, it will always be integrated into or replace part of an existing one (p. 60).

In the same vein, Hanseth and Monteiro (1998b) and Hanseth (2000) explicate infrastructure as a socio-technical network that is developed to support a wide range of organisational tasks and shared by a larger community of users and group of people. The infrastructure is open in the sense that there is no limit between what is included in the infrastructure (or what is not) for the number of users involved and for the
function it is used. Hence, IT infrastructure is heterogeneous because it involves various elements of human and technology, such as computer hardware and software.

The above discussion reflects that IT infrastructure development is complex and dynamic because it (1) displays strong properties of technical standards and conventions that cannot be changed without thorough examination; (2) requires critical consideration of its installed base to avoid conflict in business operations; and (3) people depend on its features to do things in an organisation. For these reasons, this thesis departs from the discussion of IT infrastructure in the current stream of literature (e.g., the relationship between IT infrastructure and competitive advantage) to focus on its sociomaterial assemblage of implementation choices (see Ciborra and Hanseth (2000); Cordella (2010); Gäre and Melin (2013); Hanseth and Lundberg (2001)). The underlying foundation of infrastructure development is based on the notion that the technology and people who use it only exist in relation to each other (Orlikowski & Scott, 2008). Thus, IT infrastructure is viewed as an emergent phenomenon because the sociomaterial assemblage (i.e., people, technology, technical, machine) residing in them is continuously emerging through interactions.

2.6 IT Governance and IT Infrastructure

An attempt to understand the relationships between the IT infrastructure and management control (i.e., governance) has been made by Weill and Broadbent (1998). Their study focused on how business strategy can be linked with the IT investment payoff. These authors introduced two approaches of management by maxim and management by deals to guide the development of IT infrastructure for maximising business value. In the management by deals approach, a decision on IT investment is made in response to the immediate business needs. The management by deals approach however, has resulted in an uneven establishment of IT infrastructure because it depends on the free market of IT infrastructure formation (Ciborra, 2000). On the other hand, management by maxim highlights that management has to identify both business and technology maxims to make the best IT decisions for the business’ strategic context. An alignment between the business and technology maxims approach reflects the strategic position of the firm. Ciborra (2000) views the management by maxim as a new form of getting the right formula to link the business
with IT infrastructure. The linkage between these two is achieved by “identifying the abstract characteristics of the context and the technology” (Ciborra, 2000, p. 36).

Ciborra (2000) observes that in the management-infrastructure literature, an emphasis is given to the ability to maintain control over IT infrastructure, which he referred as to “centrality of control” (Ciborra, 2000, p. 39). Ciborra claims that in reality, the ability to control the infrastructure is limited and does not always work because infrastructure always drifts from its original purposes. Therefore, while Weill and Broadbent’s (1998) work lends good insight into exploring the relationships between management control and IT infrastructure, their findings however, have only a limited impact on the life worlds of business and organisation (Ciborra, 2000).

Limited understanding of the relationships that exist between the management control and IT infrastructure can be seen from the way these two domains are addressed in the IS literature. The domain of IT infrastructure is often viewed as a socio-technical network that emerges from the interplay of the technological and the social. It is an emergent phenomenon that is built upon an installed base of existing infrastructure consisting of both the social and the technological elements. This sociomaterial perspective has developed a steady stream of research investigation into the dynamic evolution of information infrastructure (Cordella, 2010; Monteiro, 2000).

Even though extensive research has been carried out in relation to IT governance, ranging from the determinants of effective IT governance (Bowen et al., 2007; Ferguson et al., 2013) to IT governance’s impact on business performance (Lunardi et al., 2013; Neff et al., 2013; Nfuka & Rusu, 2011; Pang, 2014), little attention has been paid to clearly understanding the relationships that exist between IT governance arrangements and IT infrastructure. Even though Van Grembergen et al. (2004) noted that IT governance arrangements are evolving due to various internal and external factors, such as environmental contingencies; the corresponding effects of the interactions between the structures, processes and relational mechanisms within the governance practices have not been highlighted. In addition, the sociomaterial entanglement that exist within the structures, processes and relational mechanisms and IT infrastructure has not been sufficiently addressed in the IS and IT governance literature. As a result, the literature on IT governance arrangements of structures,
processes, and relational mechanisms has been seen as static because of their limited capability to capture and explain how the governance practices shape the IT infrastructure (i.e., the material) and that the effect of the IT infrastructure implementation is shaped by IT governance practices. Hence, what is still lacking in both the IS and IT governance literature is discourse on how the technology shapes and is shaped by the governance practices.

The separation of technology (i.e., the material) and organisational issue especially in the management literature is not new. The following quotation taken from Orlikowski (2010) explains why materiality issue has not gained much attention from the literature:

...while technology is everywhere to be found in organisational life, it is largely absent from the recent management literature... A common explanation for this absence of materiality in the management literature is that technology is either invisible or irrelevant to researchers trained in social, political, economic and institutional analyses of organisations. For these researchers, ontological priority is given to human actors and social structures and, as a result, technological artefacts (and materiality more generally) tend to disappear into the background and become taken for granted. With such a perspective it is not surprising that scholars do not work on questions about artefacts, and research done on this view thus underestimates the role and significance of technological artefacts (p. 128)

To create the linkage between the IT governance arrangements and IT infrastructure, the relational ontology that presumes the social and the material are inherently inseparable (Orlikowski & Scott, 2008), is followed. Under this sociomaterial perspective, the IT governance arrangements and IT infrastructure are viewed as emergent related phenomena, rather than individually separate and distinct. Both IT governance arrangements and IT infrastructure embody the characteristics of sociomaterial assemblages that continuously emerge over time. This sociomaterial viewpoint of IT governance and IT infrastructure concurs with Law (2004), who explains an assemblage as a process

...of bundling, of assembling, or better of recursive self-assembling in which the elements put together are not fixed in shape, do not belong to a larger pre-given list but are constructed at least in part as they are entangled together (p. 42)
Under the notion of sociomateriality, there is no distinction between the social and the technological elements in IT governance arrangements and IT infrastructure. Both elements contain heterogeneous actors that continuously interact with each other in a network of relationships. These actors, whether they are human or nonhuman, have equivalent roles to shape, and be shaped by, their interaction process. Hence, their continuous interactions are a result of a symmetrical interplay of human and nonhuman actors and the entanglement of the social and the material. Therefore, the use of the sociomateriality perspective helps to explain the first research question:

How do IT governance arrangements and IT infrastructure emerge in an organisation?

From the perspective of sociomateriality, it is also posited that the relationships between the IT governance arrangements and IT infrastructure are evolving. Both human and nonhuman actors residing in them are continuously interacting in pursuit of their interests. The dynamics of this evolution is on how their diverse interests can be aligned, as highlighted in the second research question:

How do IT governance structures, processes, relational mechanisms and IT infrastructure become dynamically aligned to support IT governance implementation?

In order to address the second research question, it is important to highlight that alignment refers to the alignment of interests between various human and nonhuman actors in the IT governance arrangements and IT infrastructure. Previous research, such as Broadbent, Weill, and Neo (1999) address alignment as a process of linking business strategy with IT infrastructure formation processes. It is frequently referred to as a mechanistic outcome (Chan & Reich, 2007), that is predominantly positivist in its approach. In the IS literature, there are various models used to measure the alignment between the business strategy and IT (e.g., Henderson and Venkatraman (1989a, 1989b, 1992); Luftman (2003)). However, given that each model has its own conceptualisation and measurement of strategic alignment, they cannot easily be compared to one another. Hence, there is no universal way to measure strategic alignment level by the literature (Van Grembergen & De Haes, 2009c).

Rather than the traditional view of strategic alignment, in this thesis, Ciborra’s (1997) claim is used as a foundation to support the argument for the alignment of interests concept adopted in this thesis.
while strategic alignment may be close to a truism conceptually, in the everyday business it is far from being implemented. Strategy ends up in “tinkering” and the IT infrastructure tends to “drift”. If alignment was supposed to be the ideal “bridge” connecting the two key variables, it must be admitted that such a conceptual bridge faces the perils of the concrete bridge always re-designed and never built between continental Italy and Sicily, (actually, between Scylla and Charybdis) its main problem being the shores: shifting and torn by small and big earthquakes (pp. 68-69).

Based on the above argument, it can be contended that the positivist research into strategic alignment does not actually measure the naturally occurring phenomena, as they happen in reality, rather measuring only theoretical and artificial constructs (Ciborra, 1997). As a result, “the messiness of everyday reality gets virtually hidden” (Ciborra, 1997, p. 69) and no pure alignment is measured (Ciborra, 1997; Ciborra & Hanseth, 2000). In addition, the ‘geometric model’ of strategic alignment (i.e., the output from positivist approaches) is problematic due to difficulties in measuring the strength of the alignment (Ciborra, 1997). In the same vein, Sauer and Burn (1997) question the notion of strategic alignment that has a static design, in which it “presumes that the business organisation is in a tight fit and will remain that way” (p. 106). These authors warn that alignment is complex and difficult to manage. It exposes an organisation to three distinct pathologies (i.e., misalignment, stagnation and global complication) that could result in “seriously adverse outcomes” (p. 92).

Therefore, it is important to highlight that this thesis recasts the notion of alignment from being viewed as a matching (or strategic alignment) of IT strategy with business strategy, to one in which alignment is viewed as an ongoing process. The alignment focuses on the negotiation of interests of the IT infrastructure, and the interests of actors involved in IT governance structures, processes and relational mechanisms. Following this notion of alignment, this thesis aims to investigate the dynamic relationships between IT governance arrangements and the underlying IT infrastructure as a means of understanding how their relationships shape, or are shaped by, the process of alignment of interests. This thesis highlights IT governance implementation as an outcome of the interactions between the IT governance structures, processes, and relational mechanisms, and IT infrastructure. The interactions that take place between the underlying IT infrastructure and governance
arrangements are complex, due to the potential of IT infrastructure to drift away from its original purposes, which is beyond the control of the management. Hence, to establish a stable IT governance network of relationships, the potentially conflicting interests of all actors, need to be aligned. This argument serves as a basis to address the third research question:

What factors contribute to the alignment of interests during the process of implementing governance and infrastructure arrangements?

2.7 Summary

This chapter focuses on a review of the literature of the two domains of IT governance arrangements and IT infrastructure. One important insight arising from the discussion provided in this chapter is a paucity of literature dealing with the relationships between the IT governance arrangements (structures, processes, and relational mechanisms) and IT infrastructure. Informed by the value of sociomaterial perspective that presumes the social and the material are inherently inseparable, this thesis proposes to view both IT governance arrangements and IT infrastructure as emergent phenomena. The idea is to integrate IT infrastructure as part of the overall IT governance implementation in the organisations and to minimise the tension that is due to the actors’ conflicting interests. Hence, an alignment of interests is proposed as a means for producing a stable network of IT governance relationships. Here, the concept of alignment of interests is considered important for exploring the emergence of IT governance arrangements and IT infrastructure (i.e., the first research question), the process of how the arrangements and IT infrastructure could support IT governance implementation (i.e., the second research question) and the factors that contribute to the establishment of a stable IT governance network (i.e., the third research question).

The following chapter will discuss sociomateriality and the theoretical lens used to analyse the assemblage of the social and the material in the network relationships between the IT governance structures, processes, relational mechanisms and IT infrastructure in detail.
CHAPTER 3: THEORETICAL LENS – ACTOR NETWORK THEORY

3.0 Introduction

Chapter 2 reviewed the IS literature on IT governance (and its arrangements) and IT infrastructure demonstrating a need for treating these two domains as emergent phenomena. A sociomaterial perspective is now adopted to explore the dynamic sociomaterial assemblage that exists between IT governance arrangements and IT infrastructure. The selection of the sociomateriality perspective is important to address the three research questions (RQs) highlighted in both chapters 1 and 2:

RQ1 - how do IT governance arrangements and IT infrastructure emerge in an organisation?
RQ2 - how do IT governance structures, processes, relational mechanisms and IT infrastructure become dynamically aligned to support IT governance implementation?
RQ3 - what factors contribute to the alignment of interests during the process of implementing governance and infrastructure arrangements?

In order to address the above research questions, this chapter presents an exegesis of literature associated with the sociomateriality perspective. Focus is directed to actor network theory (ANT) that is used as a theoretical lens to study the entanglement of the social and the material in the IT governance arrangements (structures, processes and relational mechanisms) and IT infrastructure.

3.1 Sociomateriality and Actor Network Theory

Technology is a slippery term (Bijker et al., 1987) because it cannot be separated from its physical objects (i.e., the material) and the social process in relation to its development, implementation and application. As a result, the degree to which the social and the material shape each other, and the impact of one on the other, is difficult to ascertain. Three streams of research that are of relevance to understanding the relationships between the material and the social exist in the literature. Firstly, technological determinism views technology as an independent entity that has a definitive impact on society. The technology shapes the social in accordance with its own needs (Howcroft et al., 2004; Sorensen & Williams, 2002), which neglects the role
of the social in shaping its usage and development. Secondly, in contradiction to technological determinism, social constructivism posits that the technical has no role in shaping the social (Hanseth & Monteiro, 1997; Monteiro & Hanseth, 1996). This line of thinking illuminates that technology cannot be seen as a black box, but rather it should be opened so that the process and content of the technologies during the research, development and innovation process can be interpreted within social perspectives (Howcroft et al., 2004; Sorensen & Williams, 2002). Lastly, the sociomateriality perspective does not give any privilege to either the material (i.e., technology deterministic) or human (i.e., social constructivism). It postulates the constitutive entanglement of the material and the social. In terms of this perspective, technology has no longer been used to explain devices and artefacts (e.g., software and hardware) and their ability to do things in organisations (Leonardi, 2012), or to be treated in a specific case of technological event (e.g., adoption and implementation of new technology) arise (Orlikowski, 2007). Technology and its artefacts are viewed as part of the material world, either in its physical or digital state (e.g., software does not have physical entity) (Leonardi, 2012). The material is complex because of its ability to shape, and be shaped by, social practices.

Orlikowski and Scott (2008) articulate sociomateriality as “a relational ontology that dissolves analytical boundaries between technologies and humans” (p. 455). A sociomateriality perspective asserts that

...materiality is integral to organising, positing that the social and the material are constitutively entangled in everyday life. A position of constitutive entanglement does not privilege either humans or technology (in one-way interactions), nor does it link them through a form of mutual reciprocation (in two-way interactions). Instead, the social and the material are considered to be inextricably related — there is no social that is not also material, and no material that is not also social (Orlikowski, 2007, p. 1437).

Actor network theory (ANT) is one amongst a number of sociomateriality approaches that treats the social and the material symmetrically, reciprocally interdependent (Orlikowski & Scott, 2008) and inseparable. In order to understand the entanglement of the social and the material, focus is directed towards the interaction of

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1 It is important to highlight that the terms technology, artefacts and technical are used interchangeably with the material. In this context, the term material is used to represent a broad spectrum of objects (i.e., objects of all kinds) that exists in the technical world.
heterogeneous actors (human and nonhuman) that is continuously emerging to establish various forms of association.

In this thesis, ANT is used as a theoretical lens to examine the dynamic interplay of the social and the material that exist within the governance arrangements and the underlying IT infrastructure. ANT is useful to understand the interwoven relationship of the IT governance arrangements and IT infrastructure by treating them all as actors. In this context, the governance arrangements of IT are considered as processes for making appropriate IT decisions for producing practices related to the selection, implementation and usage of IT infrastructure. Such processes involve various participation and interaction from human and nonhuman actors that are continuously emerging to establish a network of relationships. ANT provides an insight into how such governance arrangements and infrastructure emerge, by exploring the ability of the material to shape, and be shaped by, the social practices. This shaping process however has been little researched in the IT governance literature. In addition, ANT does not specify which actors might be involved, the influencing factors and the impact that will emerge from the analysis. Hence, ANT provides the researcher with the flexibility to understand the dynamics of relations between actors in the IT governance network.

The notion of ANT is grounded in the concept of a heterogeneous network (Callon, 1986a, 1987; Law, 1992) that is made up of a collective of human and nonhuman actors (e.g., technical artefacts). ANT is not a theory to explain certain events (Law, 2009), but it tells a story about how the assemblage of relations can be understood and maintained. The actors are “entities that do things” (Latour, 1992, p. 241) and have their own interests (Callon, 1986b, 1987; Gunawong & Gao, 2010; Hanseth & Monteiro, 1997; Sarker et al., 2006; Stanforth, 2007; Walsham, 1997). The alignment of interests between all of the human and nonhuman actors establishes the actor network (or network). ANT treats both human and nonhuman actors symmetrically (i.e., the principle of generalised symmetry). The treatment can be achieved by using an analytical impartiality between all actors (i.e., the principle of agnosticism) and by removing all a priori distinctions between the material and the social (i.e., the principle of free association).
ANT is a valuable framework of reference for this research because it provides a platform to investigate the complex interactions between the heterogeneous human and nonhuman actors involved in IT governance implementation (i.e., structures, processes, relational mechanisms and IT infrastructure). It sheds light on how the human and nonhuman actors interact with each other to shape, and be shaped by, the process of governance. In addition, the analysis of stories that is analysed using ANT leads to a better understanding of the evolution of actors’ relationships that exist during the process of establishing a stable network of aligned interests.

3.2 Research Model from the Lens of Actor Network Theory

By using the lens of ANT, this thesis views the emergence of IT governance in organisations as an effect of the dynamic interactions between IT governance arrangements and IT infrastructure, both of which represent the entanglement of human (i.e., the social) and technology (i.e., the material) that continually shape, and are shaped, by each other. The dynamic relationships between the IT governance arrangements and IT infrastructure are illustrated in the research model below:

Figure 1: Research model

Figure 1 shows that in general, Van Grembergen and De Haes’ (2009b) framework of IT governance arrangements (structures, processes and relational mechanisms) is used in part, but a more comprehensive model that incorporates both the material (e.g., IT infrastructure) and the social perspectives is followed. In general, Van Grembergen and De Haes’ (2009b) model integrates IT governance relational mechanisms, which are derived from the social perspective, with the IT governance structures and processes. However, their framework does not clearly articulate the role of technology
in IT governance implementation. As a result, the framework does not provide a clear stance on whether IT governance is materially, or socially driven, or both. Nor does it consider the human and nonhuman actors’ roles in shaping the IT governance arrangements. It is argued that IT governance is not just a technical process that embeds the technology to support and enhance business operations, but also a social process that involves participation from various stakeholders in organisations. Departing slightly from ANT, this research model views IT governance as a texture of relations, or a network. Each actor, despite his/her/its means, roles, technical or non-technical characteristics, is equally important in shaping and influencing network formation. The research model adopts a holistic approach that links the interdependency between IT governance structures, processes and relational mechanisms with IT infrastructure. The research model incorporates the following elements of:

i. **Equal role of actors.** The model focuses on the equal role of IT governance actors without being concerned about whether the actors are human, nonhuman, technical or nontechnical. In this context, both human and nonhuman actors are treated in a similar vocabulary and all a priori distinctions in between them are eliminated.

ii. **Alignment of interests.** The actors have their personal interests and all interests need to be aligned in order for the network to become stable. The need for aligning the interests of the actors in order to establish a stable IT governance network is depicted by the double-headed arrows connecting each actor in the research model.

iii. **Complexity of relationship.** The model illustrates that actors can be viewed as an actor network, and an actor network can also be viewed as an actor. IT governance arrangements are an actor that has heterogeneous elements of structures, processes and relational mechanisms. At the same time, each of the IT governance structures, processes and relational mechanisms is also an actor. An IT infrastructure is an actor network. It consists of relationships between heterogeneous actors including humans (e.g., IT personnel) and nonhuman actors (e.g., physical IT infrastructure, such as application systems).
iv. The concept of punctualisation\(^3\). In relation to point (iii) above, the heterogeneous actor network can be treated as an individual actor to compensate for its complexity (Law, 1992). In the proposed research model, the heterogeneous networks of IT governance structures, processes, relational mechanisms and IT infrastructure are punctualised into black boxes to become an individual actor.

The research model is used as a guide to investigate the three research questions highlighted in Chapter 1. Two mutually supportive strategies of the sociology of translation (Callon, 1986b) and the local/global network approach (Law & Callon, 1992) are applied.

### 3.3 Sociology of Translation

The sociology of translation (translation process), which is also known as four moments of translation (Callon, 1986b), focuses on a creation of an actor network by analysing interactions and linkages in the relationship between human and nonhuman actors. It highlights the politics of how human and nonhuman actors negotiate with each other and how alliances and alignment of interests are achieved to construct a stable actor network. Callon (1986a) and Law (1992) contend that the sociology of translation is a new approach to studying the power as a network of effects “through the production and reproduction of a network of heterogeneous actant” (McLean & Hassard, 2004, p. 494). For this reason, the sociology of translation is used as an analytical framework to study the interplay between the social and the material in structuring power relationships for analysing how and why IT governance emerges in organisations (i.e., the first research question).

In this thesis, the translation process is adopted to explain how a network of heterogeneous actors (i.e., IT governance) is formed. The IT governance network emerges from the interactions of the actors within the IT governance structures, processes, relational mechanisms and IT infrastructure. These actors are complex as each has specific interests and goals, which do not always coincide with each other. In order to understand how such complex relationships are emerging and the degree to

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\(^3\) The concept of punctualisation is also synonymous with a black box and simplification. These terms are used interchangeably in this thesis.
which the tight interplay between the actors and their interests could be revealed, the four moments of translation are applied as follows:

i. Problematisation (how to become indispensible)
   In the problematisation stage, a focal actor, who is the key actor, drives the translation process by identifying the relevant actors and their interests, and establishes an obligatory passage point. The obligatory passage point refers to “a situation or process that is specified by the focal actor such that all the relevant actors can achieve a shared focus in successfully pursuing the interests attributed to them” (Sarker et al., 2006, p. 54). In the context of analysis, the obligatory passage point is in relation to the establishment of an IT governance network (e.g., introducing a new IT solution, or improving existing IT governance practices).

   At this stage, the efforts of the focal actor, in defining the interests of the punctualised IT governance structures, processes, relational mechanisms and IT infrastructure, are highlighted. A negotiation takes place in which the focal actor starts to convince the other actors to accept his/her solution in regards to IT governance implementation (i.e., the obligatory passage point). While punctualisation is the best way to reduce the complexity of the punctualised actors during the negotiation process, the elements (i.e., actors) inside each of the punctualised actors are required to be considered to prevent resistance to accepting the obligatory passage point from occurring. Resistance from these actors could result in unsuccessful negotiation for the establishment of the IT governance network.

ii. Interessement (how the allies are locked into place)
   In the interessement stage, the focal actor negotiates and persuades the identified actors to accept the obligatory passage point by using various strategies (i.e. the device of interessement) to win over the negotiation process. The focus of interessement is to impose and stabilise the identified actors (Callon, 1986b) into an alliance.

   The creation of artefacts, or a desired program of action to protect the interests of the actors, occurs at this stage. This process is also known as
inscription or intermediaries (Callon, 1986b, 1991). Four types of intermediaries, namely literacy (e.g., reports, patent), technical artefacts (e.g., hardware and software), human beings (e.g., skills and experiences) and money (e.g., benefits) can be used as devices of interessement. Inscription is sometimes also referred to as an immutable mobile (Law, 1992). This classification came about because it contains elements that have strong properties of irreversibility\(^4\) that could mobilise across time and space (Walsham & Sahay, 1999).

iii. Enrolment (how to define and coordinate the role)

An enrolment takes place when the focal actor successfully convinces the other actors to accept the obligatory passage point and their new roles proposed by the focal actor. As a result, a network of alliances with aligned interests is formed. Inscription also occurs during the enrolment process (Sarker et al., 2006) as a result of a successful negotiation. A job description is an example of how the interests of the actors are secured into a written document, indicating that the actors accept the new roles defined for them.

iv. Mobilisation (how actors can have legitimate speakers to avoid betrayal)

Mobilisation takes place when a spokesperson (or representative) is appointed to represent the enrolled actors in the network (Callon, 1986b; Madon et al., 2004). Accordingly, actors start to follow the spokesperson, which then leads to stability and durability of the actor network. Mobilisation is considered as important to prevent betrayal\(^5\) of actors from occurring.

3.3.1 Example of the Sociology of Translation in IS Literature

The ANT concepts and translation process have been used to investigate various issues, such as information infrastructure development (Hanseth & Monteiro, 1997,

\(^4\) Irreversibility is a situation in which it is impossible to go back to a point where alternative possibilities exist (Callon, 1991). If the interests of all actors have been successfully inscribed into a technological artefact or a pattern of use (i.e., inscription), it is often difficult to change it (Hanseth & Monteiro, 1998a). An actor network becomes stable and durable when it exhibits a strong property of irreversibility.

\(^5\) Once a network is formed, it does not mean that it will maintain forever. The entry of new actors, desertion of existing actors, or changes in alliances, could affect the stability of the network. Betrayal or dissidence may occur because actors are capable of changing their goal and modifying their alliance in the network.
1998b; Monteiro, 2000), electronic data processing – ERP (Elbanna, 2007; Scott & Wagner, 2003), strategy formulation (Gao, 2005), e-commerce (Tatnall & Burgess, 2002, 2004), underground music community (Beekhuyzen et al., 2011, 2012), education (Fenwick, 2010; Martins et al., 2009), health care (Cresswell et al., 2010; Larsson, 2011) and geographical information systems (GIS) (Harvey, 2001; Walsham & Sahay, 1999). In this regard, ANT is applied to explore the success and the failure of IS projects’ implementations and to understand the issues and challenges faced by the actors during the translation process. For instance, Sarker et al. (2006) found that business process change was not successful because of the failure to identify the human and nonhuman actors and their interests, unrealistic obligatory passage point and inability of the focal actor to translate the obligatory passage point into a program of actions.

3.4 Local/Global Network Approach

The local/global network analysis is an approach pioneered by Law and Callon (1988, 1992) to reveal the interconnections between the global and local networks, the negotiation tactics, the obligatory passage point and the required resources to deliver a successful (or failed) project. A global network is a set of relations ‘outside’ the project that provides space (e.g., support) and resources (e.g., money) to enable a project to take place, and the local network is a set of relations ‘inside’ the project that is necessary to actually implement the project (Law & Callon, 1992).

In order for a project to be a success or a failure, depends on three interrelated elements of:

1. the ability of the global network to provide appropriate resources for an expected return;
2. the ability of the local network to develop the project using resources provided by the global network; and
3. the capacity of the project to establish an obligatory passage point to link these two networks (Law & Callon, 1992).

The interaction of these three interrelated elements is plotted on a two-dimensional graph (the x-axis represents the degree of mobilisation of local actors and the y-axis shows the degree of attachment of global actors in the IT governance network) to
produce a translation trajectory. The trajectory is “contingent and iterative” (Law & Callon, 1992, p. 50) because of its ability to produce a pattern of crucial strategic moves taken by both the inside (local network) and outside (global network) domains. The local/global network approach articulates that a successful project has a positive trajectory in the top right quadrant, whereas, a failed project’s trajectory is located in the bottom left quadrant of the two-dimensional graph (see Figure 2 below).

Figure 2: Local/global network analysis mapping for IT governance trajectory

In this thesis, the local/global network approach is applied to examine how the interests of the IT governance structures, processes, relational mechanisms and IT infrastructure become dynamically aligned (i.e., the second research question). The translation process is the foundation of the local/global approach because it is used to further reveal the power of negotiation, strategies, intermediaries (i.e., devices of interessement) and barriers in the negotiation process to link the interests of both the global and local actor networks. This analysis helps to explore how actors shape their network and their ability to influence the actors with whom they interact (Law & Callon, 1992). The IT governance trajectory, that is produced from the local/global network approach, is utilised to demonstrate how the interactions of the local and global actors shape, and are shaped by, their alignment of interests. In addition, the local/global network approach traces a pattern of crucial strategic moves (i.e., the interconnections between the tactics used and the required resources to deliver a successful project) taken by both the local and global actors. Hence, the local/global network approach is essential to address the third research question on identifying the
factors (i.e., strategies and tactics) that contribute to the alignment of interests during
the process of implementing governance and infrastructure arrangements.

3.4.1 Example of the Local/Global Network Approach in IS Literature
In comparison to the four moments of translation, the local/global network analysis is
not widely applied in IS literature (Gasson, 2006; Heeks & Stanforth, 2007, 2014). Most
of the research adopting the local/global network approach focuses on exploring an
implementation of IT projects. The applications are in the development of an
electronic mail system (Lea et al., 1995), the design of business and IT systems for the
customer bid response process (Gasson, 2006), lean implementation in a UK hospital
trust (Papadopoulos & Merali, 2008, 2009) and the implementation of the CIGAS/TAS
(Computerised Integrated Government Accounts System/Treasury Accounting System)
project (Heeks & Stanforth, 2007, 2014). These studies found that the success (or
failure) of the projects’ implementation was depending on sufficient global network
support to provide resources, the local actors’ commitment to participate in the
projects, and the ability of the project to create negotiation space to link the interests
of the local and global actors. The trajectories produced from their analysis reveal the
local and global actors complex interactions over time and the impact of their
emerging interactions to the network development (e.g., success or failure).

3.5 Application of a Translation Process and a Local/Global Network Analysis
This thesis adopts the translation process and a global/local network analysis because
both approaches provide the ability to trace the dynamics of interactions among actors
to reflect the emergence of IT governance implementation in organisations. In this
context, both the network analysis approaches can identify the actions taken by all
actors and its impact on the IT governance network development over time. The
application of the translation process and local/global network approach in this thesis
is based on the following steps:

i. Identification of the local and global actors, their interests and the obligatory
   passage point
The identification of the local and global actors are made, depending on their
role either to provide resources or to implement the IT governance project
(Callon, 1986b; Heeks & Stanforth, 2007, 2014; Law & Callon, 1992; Lea et al.,
1995; Papadopoulos & Merali, 2008, 2009). In addition, the IT governance structures, processes, relational mechanisms and IT infrastructure can be interchangeably depicted as local or global actors (depending on the role played by them). The elements inside these punctualised actors need to be considered to ensure the dynamic interactions of all actors who are involved in the technical project are examined.

ii. Mapping of events related to IT governance implementation

The interactions of the global and local actors occur when the negotiation process takes place. The focal actor tries to convince the other actors to accept the obligatory passage point with the use of various devices of interessement (i.e., strategies). If the interessement stage is successful, both the local and the global actors are enrolled and subsequently mobilised into the IT governance actor network. The analysis is summarised in terms of the key events (milestones), enrolled and non-enrolled actors, the strategies used and its impact on the network formation. The interactions between the local and global actors are further presented in the form of an IT governance trajectory movement. A mapping of milestones is then prepared as in Table 2 below. The table is derived and modified from previous researchers, such as Heeks and Stanforth (2007, 2014) and Strong and Letch (2012).

Table 2: Mapping of milestones

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies used to support enrolment</th>
<th>Trajectory movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. [the key event]</td>
<td><strong>Global and local Networks</strong> [summary of translation process]</td>
<td><strong>Global and local Networks (Blocked)</strong>[6] [summary of translation process]</td>
<td>[explanation on the implication of enrolled / non-enrolled actors into the network]</td>
<td>[summary of strategies used (e.g., well defined obligatory passage point)]</td>
<td>[an explanation of the trajectory movement to represent the network implication (e.g., increase or decrease)]</td>
</tr>
</tbody>
</table>

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6 The inability of the global and local actor to be enrolled in the network
iii. Development of IT governance trajectory

It is important to note the comments made by Heeks and Stanforth (2014) that the local/global network analysis does not provide

a clear guidance on how to identify let alone measure and plot the various notions of local and global network strengths; for example, network ‘attachment’ and network ‘mobilisation’ are not explained. It is assumed although not stated that these are synonymous with the first two factors underpinning project trajectories, and it is not clear whether or how the third factor is incorporated into the chart... (p. 17).

In response to Heeks and Stanforth’s (2014) comments, this thesis argues that the plotting of an IT governance trajectory depends on the ability of the IT governance implementation project to establish itself as an obligatory passage point. In passing through the obligatory passage point, the global actors must be convinced (by the focal actor) to allocate appropriate resources to support the project and the local actors must be persuaded that the project is aligned with their individual interests so that they agree to implement the IT governance project. Hence, such guidelines, as highlighted by Heeks and Stanforth (2014), is a difficult endeavour. This argument is based on Latour’s (1996) explanation

Instead of constantly predicting how an actor should behave, and which association are allowed a priori, ANT makes no assumption at all, and in order to remain uncommitted needs to set its instrument by insisting on infinite pliability and absolute freedom. In itself ANT is not a theory of action no more than cartography is a theory on the shape of coasts lines and deep sea ridges; it just qualify what the observer should suppose in order for the coast lines to be recorded in their fine fractal patterns. Any shape is possible provided it is obsessively coded as longitude and latitude (p. 378).

Therefore, in this thesis, the information provided in Table 2 is used to sketch the patterns of the local and global actors’ alignment of interests into a two-dimensional graph (see Figure 2). The patterns of the local and global actors’ alignment of interests produce the IT governance trajectory. In this context,
ANT recognises that the diverse actors’ interests would affect, and be affected by, the implementation of IT governance.

The ANT terminologies that will be used in this thesis are summarised in Table 3 below.

**Table 3: ANT terminologies used in the research**

<table>
<thead>
<tr>
<th>Terminology</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primum moven</td>
<td>A primary cause or “mover” that initiates the network initiative development</td>
</tr>
<tr>
<td>Actors (human and nonhuman)</td>
<td>“entities that do things” (Latour, 1992, p. 241) and have their own interests (Callon, 1986b, 1987; Gunawong &amp; Gao, 2010; Hanseth &amp; Monteiro, 1997; Sarker et al., 2006; Stanforth, 2007; Walsham, 1997)</td>
</tr>
<tr>
<td>Focal actor</td>
<td>The key actor who drives the translation process</td>
</tr>
<tr>
<td>Obligatory passage point</td>
<td>A situation or process that is specified by the focal actor such that all the relevant actors can achieve a shared focus in successfully pursuing the interests attributed to them (Sarker et al., 2006)</td>
</tr>
<tr>
<td>Devices of interessement</td>
<td>The strategies used to win the negotiation process</td>
</tr>
<tr>
<td>Punctualisation/simplification</td>
<td>The process of treating a heterogeneous network as an individual actor. As an effect of punctualisation, the actor is called a punctualised actor or black box</td>
</tr>
<tr>
<td>Irreversibility</td>
<td>Irreversibility is a situation in which it is impossible to go back to a point where alternative possibilities exist (Callon, 1991)</td>
</tr>
<tr>
<td>Problematisation</td>
<td>The first moment of translation process, where the actors and their interests are identified, and the establishment of the obligatory passage point</td>
</tr>
<tr>
<td>Interessement</td>
<td>The second moment of translation that focuses on the negotiation process to lock the actors into passing through the obligatory passage point</td>
</tr>
<tr>
<td>Enrolment</td>
<td>The third moment of translation that occurs when the actors accept the interests defined for them</td>
</tr>
<tr>
<td>Mobilisation</td>
<td>The last moment of translation, where a spokesperson is appointed to represent the enrolled actors.</td>
</tr>
<tr>
<td>Inscription</td>
<td>A process of creation of artefacts that would ensure the protection of certain interests (Sarker et al., 2006, p. 56)</td>
</tr>
<tr>
<td>Betrayal</td>
<td>A situation where actors do not abide by their agreement to be part of the network</td>
</tr>
</tbody>
</table>

**3.6 Summary**

The literature review discussed in Chapter Two suggested the need to adopt a sociomateriality perspective in order to address the complex relationships that exist
between the IT governance arrangements and IT infrastructure. In this chapter, a research model that depicts the entanglement of the social and the material in the emerging relationships of the IT governance arrangements and IT infrastructure, from the sociomateriality perspective is presented. The application of ANT as a theoretical lens can be achieved by using the translation process and the local/global network approach. These two approaches are critical to (1) discuss the emergence of IT governance arrangements and IT infrastructure (i.e., the first research question) by exploring the interactions of both the human and nonhuman actors; (2) investigate the process of how the arrangements and IT infrastructure could support IT governance implementation (i.e., the second research question) by exploring how human and non-human actors persuade each other to align to particular interests; and (3) identify the factors that contribute to the establishment of a stable IT governance network (i.e., the third research question) by examining the strategies taken by actors during the process of interests alignment to enrol others into the IT governance network.

The following chapter is concerned with the research methodology used in this study. It informs the underlying philosophical orientation and the process by which the data were collected and analysed to attempt to address the three research questions.
4.0 Introduction

This chapter explains how a mixed methods design, that combined qualitative and quantitative methods, was used in order to address the three research questions posed in Chapter 1. The overarching mixed methods design and the techniques for collecting and analysing the data are also discussed.

4.1 Research Approach

In order to understand how and why IT governance emerges in organisations, an exploratory two-phase sequential design (Creswell & Plano Clark, 2011) with a dominant qualitative perspective (Johnson et al., 2007) was developed. This research approach was selected because it maximises the strengths of both qualitative and quantitative methods (Creswell & Plano Clark, 2011; Morgan, 1998). The selection was also made for enhancing the breadth and depth of an understanding and corroboration of the phenomenon being investigated (Johnson et al., 2007). A dominant qualitative perspective was adopted because greater emphasis was given to studying the context of the phenomenon of interest (i.e., IT governance implementation). Meanwhile, the quantitative approach was used in a secondary role, to attempt to validate the findings from the qualitative approach. Figure 3 below summarises the exploratory two-phase sequential design with the qualitative dominant that was used in this thesis:

![Figure 3: An exploratory sequential design](image)

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7“The type of mixed research in which one relies on a qualitative, constructivist-poststructuralist-critical view of the research process, while concurrently recognizing that the addition of quantitative data and approaches are likely to benefit most research projects” (Johnson et al., 2007, p. 124).
The exploratory two-phase sequential design, with the qualitative dominant, is diagrammatically illustrated in Figure 4 below:

4.2 Phase 1: Qualitative (Exploratory) Approach

In the first phase of the research for this thesis, constructivism was subscribed to as the ontological position. This constructivist ontology considers reality is socially constructed by the social actors (Bryman, 2012) who establish the real world (Lee,
Applying this ontology can help the researcher to study the reality of how IT governance arrangements emerge and are implemented in organisations. In relation to the nature of knowledge (Allison & Pomeroy, 2000; Ritchie & Lewis, 2003) and how it can be acquired (Gregor, 2006; Ritchie & Lewis, 2003), this thesis adopted an interpretive approach as its epistemological stand point. The aim was to understand the context in which the IT governance phenomena (i.e., the reality of IT governance structures, processes, relational mechanisms and IT infrastructure) are implemented in terms of what it means to the subjects who participated in this study. This is in line with Orlikowski and Baroudi’s (1991) view, who postulate the benefit of an interpretive approach to enhance the understanding of how members of a social group, through their participation in social processes, enact their particular realities and endow them with meaning, and to show how these meanings, beliefs and intentions of the members help to constitute their social action (p. 13).

Linking the above ontological and epistemological stances led to the selection of a dominant qualitative case study approach in the research methodology. In this thesis, a qualitative approach is used to interpret the IT governance phenomena from the participants’ points of view, and within their particular social and institutional contexts (e.g., social, cultural and political domains).

4.2.1 Research Method: Case Study

The case study is a highly versatile research method (Cavaye, 1996) that integrates a range of strategies, such as interpretive or positivist, in a single or multiple case study design (Cavaye, 1996; Orlikowski & Baroudi, 1991; Yin, 2009). Moreover, a qualitative case study approach is the most widely used, due to its ability to explore the interactions between IT-related innovation and organisational context (Darke et al., 1998). This method has been accepted and used by several researchers to address IT governance related issues. For example Callahan et al. (2004); De Haes and Grembergen (2008); Heier et al. (2007); Devos et al. (2012) and Verleun et al. (2001).

The case study method was selected for three reasons. Firstly, the aim of this study is to understand how IT governance emerges in an organisation, which is still a relative unknown. Hence, a case study method allows the research to be conducted within a context in which the phenomenon emerges and appears in organisations. This method
enables the extraction of deep knowledge of individual, group, social and political, and other complex phenomena in its natural setting (Yin, 2009).

Secondly, the qualitative case study design allows for an exploration of the organisational and the social contexts that influence IT governance implementation. Hence, the nature and complexity of the context in which the IT governance implementation takes place can be highlighted.

Lastly, this method enables the collection of a large amount of detail on the dynamics of relationships between the IT governance structures, processes, relational mechanisms and IT infrastructure. Therefore, an in-depth analysis of how the interactions between the IT governance players occur can be investigated and analysed.

4.2.2 Multiple Case Study Design

The multiple case study design is used because it enables the researcher to conduct a cross case analysis and is suggested by Benbasat et al. (1987); Darke et al. (1998); and Yin (2009). As a result, a comparison of the findings from the diverse settings of the multiple cases can be made to produce more general results in relation to how IT governance emerges and is implemented in organisations (Benbasat et al., 1987). In this context, a cross case analysis can be conducted to find the similarities (or differences) between each of the case studies. This technique is referred to as a literal replication (Yin, 2009). It can enrich the findings of this thesis for the development of a rich theoretical framework that contributes to more compelling and robust findings (Yin, 2009). Most importantly, a multiple case study design can potentially minimise the risks associated with a single case study, such as misjudging of a single event, and of exaggerating easily available data (Voss et al., 2002).

4.2.3 Research Strategy – Four Cases

Given that this thesis adopted the multiple case study design, four organisations were selected to participate in the study. The findings from the four cases can create a richer understanding of the emergence of IT governance and the complex relationship that exists between the IT governance structures, processes, relational mechanisms and IT infrastructure. Two different countries - Australia and Malaysia - were selected
for reasons of manageability and accessibility of data (Silverman, 2006). The four case studies were conducted in two different settings of for-profit and not-for-profit organisations to assist establishment of validity. Their selection was based on the following premises:

- The for-profit organisations need to fulfil corporate governance requirements. This is part of the listing process in the market exchange. As a result, they need to establish a regulatory organisational structure that clearly depicts the accountability and responsibility of the top management, of which IT is part.
- The not-for-profit organisations are generally reliant on government funding. Their budget allocation for IT could be seriously challenging because it is always associated with high cost investment. Hence, IT needs to be carefully governed to avoid discrepancy in managing government funding.
- Both organisations use IT as an integral part of their basic operations.

From the above discussion, it can be concluded that the benefits of implementing governance mechanisms and infrastructure arrangements in both the for-profit and not-for-profit organisations are relatively similar. This view concurs with Coen and Kelly (2007), who note that the basic fundamental principles of IT governance development for both for-profit and not-for-profit may be equally valid. However, cross case analysis can highlight any differences.

4.2.4 Data Collection

4.2.4.1 Document Analysis

This study conducted an analysis of textual documents to cross-check several information sources provided by the respondents. This analysis is important because it can help to make “replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use” (Krippendorff, 2004, p. 18). The findings allow the researcher to understand more about the historical foundation of the participating organisations, as well as to identify the people who are involved in the IT governance implementation. The textual documents analysed included annual reports, websites, news and other confidential documents (e.g., strategic direction documents, organisational charts, and minutes of meetings) provided by the participating organisations.
4.2.4.2 Qualitative Interviews

This thesis used interviews as its main data collection technique within the case studies because IT governance implementation and how it emerges cannot be readily or directly observed. Hence, an understanding of how IT governance emerges through the assessment of the meanings from the interviewees’ personal perspectives could be obtained. The interviewees’ opinions are crucial because they are the ones who interact with the world around them (Orlikowski & Baroudi, 1991) and have the ability to provide a detailed coverage of how IT governance emerges and is implemented in their organisations.

A semi-structured interview was selected rather than structured and unstructured techniques because it combines a pre-determined set of questions with the opportunity for the interviewer to explore additional questions that are based on the emerging responses of the interviewees (Babbie, 2004; King, 2004). In this context, the questions can be improvised from time to time during the course of the interview. This process is essential so that sufficient information in relation to how the governance and infrastructure arrangements are implemented can be obtained. In addition, semi-structured interviews provide the interviewees with the flexibility to describe their roles and how their relationships with IT governance structures, processes, relational mechanisms and IT infrastructure evolve over time.

The questions in the semi-structured interview (i.e., the instrument) were designed to facilitate the exploration of how and why IT governance is implemented in the participating organisations. The questions were conceptualised from the IT governance theoretical framework developed in Chapter 3. Specifically, the questions were about the roles of the interviewees in relation to IT governance and the settings in which IT governance structures, processes, relational mechanisms and IT infrastructure are implemented in their organisations. Even though a semi-structured interview was used as an instrument to collect the research data, a formal interview protocol was not developed. An interview guide (named as the Interview schedule in Appendix A) was prepared for use during the interview sessions. The use of an interview guide concurs with King (2004, p. 15) who notes that qualitative interviews should not be based on “a formal schedule of questions to be asked word-for-word in a set order”. Rather, an interviewer generally uses an interview guide that lists the potential topics to be
covered in the course of the interview (King, 2004). Following King’s (2004) suggestion, the researcher developed the questions from three sources. These were a literature review, the interviewer’s own personal knowledge and experience of the area and informal preliminary work (e.g., discussion with her supervisors and colleagues). After construction, the interview guide was re-revised by the researcher’s supervisors and submitted to the HREO office for ethics clearance. A pre-test was not conducted to formally validate the instrument. As mentioned the reason for this was because the interview guide could be modified during the course of the interviews.

4.2.4.3 Field Study Details

This study used different strategies to identify the appropriate interviewees. In the for-profit organisations, once agreement to participate was obtained, the contact person was briefed with a summary of the project. A discussion to determine the potential subjects who should be interviewed followed. This step was crucial because the participating organisations’ policies did not allow any information related to their staff, including contact details, to be revealed to the researcher. For the not-for-profit organisations, the researcher applied the concept of snowball sampling by asking the interviewees to recommend additional potential interviewees who were integral to the IT governance implementation. These two different strategies were considered important as the researcher tried to use the concept of “follow the actor” (Tatnall, 2003; Yoo, Lyytinen & Yang, 2005; Latour, 1987) by asking the contact person (in for-profit organisations) and interviewees (in not-for-profit organisations) to name other important actors who should be interviewed. This technique enabled the researcher to canvass the views of a range of actors important to the success of IT governance implementation in the participating organisations. In addition, this method was considered valuable for capturing the complex relationship between human and nonhuman actors in the actor network relationship. The actors are not just point objects (Tatnall, 2003) because they are not only an actor, but also a simplified network.

In the case studies, once the respondents were identified, they were subsequently invited to participate in the research. In the invitation email, brief information about the study was provided (in an attached participant information form - Appendix B),
together with a set of questions that would be used during the interview session (i.e., the interview schedule in Appendix A).

Due to the two different strategies used to identify the respondents in the for-profit and not-for-profit organisations, the number of the interviewees across the four participating cases varied. The selection of interviewees was finalised on a voluntary basis and upon their willingness and readiness to participate\(^8\). As a result, there were a lesser number of interviewees in both the Australian and Malaysian for-profit organisations when compared to the two not-for-profit organisations.

The interviews were conducted on the premises of the participating organisations. The researcher entered into a free relationship with the interviewees by allowing them to interpret the situation using their own language. In this context, information was created through interaction between the researcher herself and the interviewees by using seven interview questions (see Appendix A). The researcher also asked additional questions about the historical background of the IT governance implementation and their IT infrastructure. Techniques used during the interview included probing (King, 2004; Saunders et al., 2009) and follow-up new questions based on the answers given. The researcher’s understanding gained from the erstwhile document analysis became part of the process that enhanced the social interaction with the interviewees. During the interview sessions, each interviewee was allowed to explain their understanding of IT governance and IT infrastructure using their own language. The interviews sessions were all conducted in English, but some of the interviewees from University Y (Malaysia) preferred to provide their responses in Malay language. Overall, the interview sessions lasted 40-90 minutes and were digitally recorded. Transcripts of the interviews were subsequently created. In the case of University Y, where some of the responses were in Malay language, the responses were translated back into English during the transcribing process. Table 4 below summarises the demographic and biographic details of the interviews.

\(^8\) The researcher made every effort to mitigate this limitation by providing the contact person and potential interviewees with the Participant Information Form (see Appendix B). Upon agreement to participate, the interviewees were required to sign a Participant Consent Form (see Appendix C). Both documents followed the requirements of the University of Western Australia’s Human Research Ethics Office (HREO).
Table 4: Details about the interviewees in the four case studies

<table>
<thead>
<tr>
<th>Cases</th>
<th>Data Collection</th>
<th>Interviewee’s positions</th>
<th>Number of interviewee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group ABC: Malaysian for-profit organisation</td>
<td>April 2012, July 2012</td>
<td>Group CIO</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Head of Group IT</td>
<td>3</td>
</tr>
<tr>
<td>Company B: Australian for-profit organisation</td>
<td>October 2012, June 2013</td>
<td>General Manager of ITS</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IT Manager</td>
<td>3</td>
</tr>
<tr>
<td>University X: Australian not-for-profit organisation</td>
<td>November 2011, January 2012</td>
<td>Vice Chancellor</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Librarian and Director IT (LDIT)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Former LDIT</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IT Review (2004) panel</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IT Review (2010) panel</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faculty Manager</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IS staff</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faculty IT Manager</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Former University IT Manager</td>
<td>1</td>
</tr>
<tr>
<td>University Y: Malaysian not-for-profit organisation</td>
<td>March 2012, April 2012</td>
<td>Director of IT</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Treasurer</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dean (Undergraduate Studies)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dean (Postgraduate Studies)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Librarian</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Former Director of IT</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IT staff</td>
<td>5</td>
</tr>
</tbody>
</table>

Given that two different strategies were adopted for determining the participants for this study, the researcher acknowledges that the results need to be treated with some degree of caution (see Chapter 10 on limitations of the study). For example, most of the respondents in Group ABC and Company B were Senior Managers, but in University Y most were IT staff. In order to minimise potential bias in relation to the above issue, all interviews were compared with each other and cross checked with the data obtained from the document analysis for each of the participating organisations.

### 4.2.5 Data Analysis

As outlined in Chapter 3, actor network theory (ANT) was used as a theoretical lens to describe and connect the dynamic relationships between the IT governance arrangements (structures, processes, relational mechanisms) and IT infrastructure. Analysing IT governance phenomenon using the ANT lens provides a holistic understanding of the sociomaterial assemblages that exist within the IT governance arrangements and IT infrastructure. ANT sheds light on the socio-political phenomenon by adding explanatory power to explore the role of technology in a more explicit manner (Sarker et al., 2006). ANT is a combination of theory and methodology in
seeking the truth about the real world (Cordella & Shaikh, 2006; Walsham, 1995, 1997). In addition to the use of ANT as a theoretical lens, this study also employed ANT as a methodology by applying a ‘following the actor’ (Latour, 1987) technique. This method is based on the idea of network based interviews (Latour, 1987), or snowball sampling. Snowball sampling was used in the not-for-profit organisations by asking the interviewees to recommend additional potential respondents related to the IT governance implementation (see subsection 4.2.4.3 on Field Study Details).

Given that ANT has an inherently interpretive nature, this study incorporated the seven principles of the interpretive technique proposed by Klein and Myers (1999) as a means to improve the quality of the analysis. The aim was also to reveal “the complexity of human sense making as the situation emerges” (Klein & Myers, 1999, p. 69). The principles and explanation of how this study engaged with Klein and Myers’ (1999) interpretive approach are explained below:

• The fundamental principle of the hermeneutic circle
  This principle suggests that “all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form” (Klein & Myers, 1999, p. 72). Following this principle, the analysis of the information iterated between the macro context of the participating organisations, and the micro context which is based on the activities associated with the IT governance implementation from the individual actors’ perspectives. The act of implementing IT governance and the context in which its activities take place are analysed within the social, political and historical context of the IT governance implementation in the participating organisations. An understanding of the IT governance implementation from its macro context was important to articulate information on the context of how IT governance emerges and implemented.

• The principle of contextualisation
  This principle requires “critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged” (Klein & Myers, 1999, p. 72). The use of ANT as a theoretical lens enabled the researcher to trace the historical background of IT governance implementation and its relations with the latest improvement
made. Investigating the historical context of the IT governance implementation increased the understanding of how organisational culture had influenced the global and local actors’ actions to stabilise the governance network. In this context, the manoeuvres in the process of aligning the interests of IT governance actors could be explored to understand how the implementation of IT governance and infrastructure shapes, and is shaped by, the interactions of its actors.

- The principle of interaction between the researchers and the subjects
  This principle requires “critical reflection on how the research materials (or data) were socially constructed through the interaction between the researchers and participants” (Klein & Myers, 1999, p. 72). As the study progressed, different perspectives of how IT governance is implemented were sought from the interviewees. Their perspectives shed light on the complexity of relationships between the local and global actors in the IT governance network. The researcher’s understanding was also enhanced by ongoing review of literature related to the subject (IT governance and IT infrastructure).

- The principle of abstraction and generalisation
  This principle suggests the need for “relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action” (Klein & Myers, 1999, p. 72). The use of ANT as a theoretical lens to analyse and interpret the findings of the study was useful for examining the implementation of IT governance. Two types of analysis were used. Firstly, the network analysis emphasised the translation process to examine the socio-technical interplay that occurred during the implementation of IT governance. The analysis is based on Callon (1986b) who explained the sociology of translation between the domestication of the scallops and the fishermen of St Brieuc Bay. Secondly, the global/local actor network approach (Law & Callon, 1992) was used to guide the analysis of how alignment of interests between the local and global actors can be achieved.
• The principle of dialogical reasoning
This principle requires “sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings (the story which the data tell) with subsequent cycles of revision” (Klein & Myers, 1999, p. 72). Careful consideration was taken to ensure the researcher’s preconceptions on the way the participating organisations implement their IT governance was minimised. The use of ANT as the theoretical lens assisted the researcher to analyse data and provide explanations more objectively.

• The principle of multiple interpretations
This principle emphasises the need to have “sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study” (Klein & Myers, 1999, p. 72). Careful consideration was taken to ensure each of the participants was given equal opportunity to express their views on the IT governance implementation at their organisations. Following this principle, all conflicting expectations from the participants are included in the analysis.

• The principle of suspicion
This principle requires “sensitivity to possible ‘biases’ and systematic "distortions" in the narratives collected from the participants” (Klein & Myers, 1999, p. 72). All facts related to IT governance implementation, such as the structures of IT governance committees and IT organisational units highlighted by participants were double-checked with the organisations’ printed documents (e.g., annual reports, minutes of meetings).

Apart from using Klein and Myers’ (1999) principles to improve the interpretive quality of the research, the researcher followed suggestions made by Shenton (2004), Lincoln and Guba (1985); and Guba (1981) to ensure the trustworthiness (i.e., to check the reliability and validity) of the data:

• To increase the “credibility” (Creswell, 2012b; Shenton, 2004) of the research, firstly, the potential respondents were given an opportunity to refuse to participate or withdraw their consent at any time during the period of the
study (see Appendices B and C – Participant information form and consent form, respectively). Secondly, information was gathered through reading of annual reports and other available reports to gain familiarity with the culture of participating organisations.

- Different strategies were adopted to address the issue of “transferability” of the data. All interviews were audio-recorded and carefully transcribed. The number of organisations taking part in the study and where they are based, the number of participants involved in the fieldwork, the data collection methods, the number and length of the data collection sessions, and the time period over which the data was collected were discussed in Subsection 4.2.4.3 which provided details of the field study.

- In order to address the dependability issue, the research design and its implementation and the operational details of the data gathering were discussed in subsections 4.1 on the research approach and 4.2.4 on the data collection method, respectively.

- The aim of “conformability” was to ensure “as far as possible that the work’s findings are the result of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher” (Shenton, 2004, p. 72). Hence, the researcher corroborated evidence [i.e., triangulation (Creswell, 2012b)] from different sources (e.g., documents provided by the participating organisations and the ones that were available online) to increase the credibility of the data. Copies of emails with potential and selected participants and their consent to participate were securely retained as an audit trail for this study.

Based on the above discussion, the data analysis in Phase 1 can be divided into two stages as explained in the following subsections.

4.2.5.1 Stage 1: Understanding the Dynamics of the IT Governance Implementation

The translation process and a local/global network analysis were applied to explain the dynamics of the IT governance implementation. These two approaches were conducted to address the first and second research questions of how do IT governance arrangements and IT infrastructure emerge in an organisation and how do IT
governance structures, processes, relational mechanisms and IT infrastructure become dynamically aligned to support IT governance implementation, respectively. The translation process was guided by the IT governance research model developed in Chapter 3 (see Figure 1). Following the local/global network analysis, IT governance arrangements and IT infrastructure are interchangeably depicted as local or global actors depending on the role played by them. An IT governance trajectory was prepared as an output of the local/global network analysis. It is important to highlight that both approaches used ANT terminology (i.e., languages and concepts). The ANT terminologies that were used in this thesis are summarised in Table 3 (see Chapter 3). It is important to note that the use of the translation process in this thesis was to guide the understanding of how IT governance emerges (in terms of its arrangement of structures, processes, relational mechanisms and IT infrastructure) in organisations. Mahring et al. (2004) argue that the translation process is often more fluid and interrelated because of the actors’ ability to manoeuvre while their identities are being stabilised. Hence, the application of translation process during the analysis was more flexible to follow the actions taken by the respective actors.

In this thesis, the historical development of IT governance structures, processes, relational mechanisms and IT infrastructure is described in Chapter 5. Following the presentation of a narrative of the participating organisations’ IT governance historical background, the network analysis approaches using both the translation process and local/global framework are conducted (Chapter 6). The IT governance trajectory is then presented as an output of the network analysis.

4.2.5.2 Stage 2: Identification of the Factors that Contribute to Strengthening IT Governance Trajectories

A cross-case analysis was conducted (see Chapter 7) to further address how the interests between the global and local actor networks became dynamically aligned (the second research question). The focus was on extracting the strategies used by both the focal actors and other important global actors to achieve alignment of interests. These strategies became the centre of discussion and were discussed as techniques used to impose the alignment of interests for stabilising the IT governance networks of relationships. Guided by the three research questions highlighted in Chapter 1, this study used a thematic approach (Braun & Clarke, 2006) to perform the
cross-case analysis of the four case studies. Specifically, a hybrid process of inductive and deductive (or theoretical) analysis (e.g., Bendassolli (2013) and Fereday and Muir-Cochrane (2008)) was employed to identify the patterns. In this context during the coding process, the themes would be derived from the data and the researcher would not try to match them with pre-conceived themes (i.e., inductive or data driven). The themes were further compared and analysed using ANT as a theoretical lens (i.e., deductive or theory driven), which was constructed prior to the data collection (i.e., literature review in Chapter 3). The use of a hybrid process to analyse the interview data helped the researcher to ensure the themes emerged from the data and matched with ANT’s main tenets (e.g., problematisation, interessement). In this way, potential bias could be minimised during the data analysis stage. The thematic analysis procedures (Braun & Clarke, 2006) are summarised as follows:

- **Familiarisation with the data**
  After all of the interviews were transcribed, the transcripts were repeatedly read to obtain initial ideas on the potential themes.

- **Generation of initial code**
  Once the researcher was familiar with the data, the initial ideas on the potential themes were carefully listed. At this stage, the first ideas were manually coded.

- **Searching, reviewing and naming the themes**
  The codes that overlapped were double-checked. Repeated codes across the data were identified and combined to generate themes. At this stage, ANT was used as the theoretical lens to compare with the generated themes. The themes were reviewed and refined. Eight themes were finalised: well defined and clear obligatory passage point; appropriate devices of interessement; role of inscription in perpetuating interests, re-consideration of IT infrastructure installed base; understanding the organisational culture; negotiation power of actors; top management support; and leadership style of the IT leader.

- **Reporting findings**
  A table summarising the themes from the four case studies was compiled and reported on in Chapter 7.
In this context, all the four IT governance trajectories were compared and analysed to find patterns⁹ (similarities or differences in the strategies used) and the results are presented in Chapters 8 and 9. An extraction of the factors¹⁰ (i.e., similarities or differences of the strategies) that affect the alignment of interests between the local and global actor networks was then presented. These factors are identified as contributing to the strengthening of the IT governance trajectories and are recast as tactics used to create stable alliances of heterogeneous actors in the IT governance network. A tactical model to guide IT governance implementation was developed thereafter.

4.3 Phase 2: Quantitative (Exploratory) Approach

In Phase 2, the second philosophical assumption of the mixed method design - objectivism - was subscribed to. It is an ontological perspective rooted in realism that believes in the existence of the real world (Johnson, 1995; Jonassen, 1991), in which the social phenomena and their meanings are independent of social actors (Bryman, 2012). Hence, the researcher needs to discover the social reality that can objectively measure the factors that contribute to the alignment of interests during the process of implementing governance and infrastructure arrangements. In order to gauge the social reality, positivism is adopted as the epistemological position. Positivism helps the researcher to measure the IT governance phenomena using an empirical observation to increase the predictive understanding of the phenomena (Orlikowski & Baroudi, 1991). In this context, a quantitative approach was used to try to validate the findings obtained from Phase 1 (i.e., the IT governance tactical model) to attempt to quantify its degree of confidence (Abeyasekera, 2005).

4.3.1 Research Method

This study used the survey method to attempt to validate the IT governance tactical model using “empirical observation” (Cavaye, 1996, p. 233) to represent the truth about the IT governance phenomenon. This method is a useful technique for collecting original data, as direct observation of how the IT governance model could be applied, 

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⁹ No predicted pattern of specific strategies was defined prior to the data collection

¹⁰ The word “factors” does not represent the prediction of variables for hypotheses testing as in the positivist school of thought. “Factors” are used to represent the context in which negotiation and the activities took place during the process of interests alignment between IT governance players.
is difficult. The results of the survey were used as a complement to the findings of the four case studies. In this context, the use of a survey allows an exploration of the generalisability or transferability of conclusions from qualitative research (Morgan, 1998).

4.3.2 Instrument Development

The survey instrument (i.e., the questionnaire) was carefully designed to enable rigorous data collection. Being exploratory in nature, the researcher did not identify independent, dependent or moderating variables and the operationalisation of the items as variables for construct measurement (i.e., hypotheses testing). In Phase 1, a tactical model was developed from the findings of the case studies. However in Phase 2, a questionnaire was designed with the aim of validating the tactical model and to gather ideas and comments from the respondents for model improvement. The questionnaire is provided in Appendix D. In the questionnaire, demographic information was requested first and the respondents were then asked to rate the relevance of each items in the IT governance tactical model. The response categories in the scales were from very important to of no importance. The instrument added to the qualitative approach by including open-ended questions. Open-ended questions are considered to be beneficial because in exploratory research, the respondents need to be given the opportunity to write the answer in their own words (Cohen et al., 2007; Forza, 2002; Krosnick, 1999; Totten et al., 1999).

The respondents were also asked to evaluate the perceived impact of the tactical model if it were to be implemented in their organisations. The response categories for the scales were from great extent to no extent. The five impacts of (1) improve value realisation from IT investment; (2) improve strategic alignment; (3) improve risk management; (4) improve IT resource management; and (5) improve business performance, were adopted from the benefit of implementing IT governance proposed by the IT Governance Institute (2003, 2011).

4.3.3 Data Collection

Survey research data can be collected through various techniques, such as a self-administered survey (e.g., mail survey or online survey) (Aldridge & Levine, 2001; Babbie, 2004; Denscombe, 2007; Fink, 2010) and structured observations (Denscombe,
2007; Fink, 2010). An online survey was selected over a mail survey, in order to reduce the turnaround time between sending out and receiving the completed responses. In addition, the input obtained from the online survey can be stored electronically, so the participants can fill in the questionnaire at a time that is convenient to them (Evans & Mathur, 2005).

The online questionnaire was constructed by using an online tool to create and distribute surveys online, namely Qualtrics Research Suite (Qualtrics). Qualtrics was used because it had various features that assist the development of the online questionnaire, such as question types (pick, group and rank, rank order and drill down items) and a variety of Likert scales. During the distribution of the survey, Qualtrics provided an anonymous link, so that identifying information about the respondents could not be obtained. This was to ensure protection of the privacy of the respondents.

4.3.3.1 Sampling

Ideally, the sampling design in survey research needs to represent the population as a way to generalise the findings on the phenomena to the population (Barlett et al., 2001; Kelly et al., 2003; Pinsonneault & Kraemer, 1993). However, in this study a non-probability sampling design was instituted because the representatives from the selected associations (see below) had agreed to administer the questionnaire on the researcher’s behalf. This technique was considered to be the best way to collect data for this study because the representatives are bounded by the requirements of not disclosing their members’ information to the researcher.

The populations of interest were the not-for-profit and global association of Information Systems Audit and Control Association (ISACA-Australian Oceania Chapters) and Australian Institute of Internal Auditors (IIA). The ISACA is an advocate for professionals involved in promoting the practise of governing IT in organisations for achieving IT/business alignment, optimising IT investment, managing IT-related risks and opportunities and delivering business value. Meanwhile, the IIA is recognised for providing leadership and guidelines for internal auditors. The important role of the internal auditors and IT governance has been emerging, especially after the release of IIA’s revised International Professional Practices framework in 2009. This framework
highlights the need for the internal auditors to address and evaluate risk exposures relating to the organisation’s governance, operations, and information systems.

The unit of analysis was individual members of ISACA and the IIA. Given the nature of this survey (i.e., exploratory), no attempt is made to generalise the findings to the selected population. Therefore, a combination of convenience and judgemental sampling was applied to select the potential respondents. In this context, the sample is purposively selected because of their convenient accessibility to provide useful information for the study (Creswell, 2012a; Denscombe, 2007; Fink, 2010).

4.3.3.2 Survey Administration

Initial contacts through email were made to the representatives of ISACA Oceania Chapters (Australia) and the IIA. The emails briefly explained the objectives of the research and asked for support for the questionnaire distribution. The representatives agreed to distribute a link to the survey to their members in their online newsletters. Interested participants could click on the link and complete the questionnaire at their convenience. An offer of a summary of the main findings was made to respondents who completed their questionnaire.

4.3.3.3 Sample Description

Due to the strategy taken (as discussed above in subsection 4.3.3.2) that the link to the survey was distributed to the respondents in the ISACA and IIA newsletters, the total number of the population could not be determined. Hence, the response rate could not be calculated. Nevertheless, thirty three responses were received. This low response rate was due to the researcher’s limited access to the respondents’ email address. The summary of the sample description is provided in Table 5 below.

<table>
<thead>
<tr>
<th>Job Profile</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditor</td>
<td>63.6</td>
</tr>
<tr>
<td>IT Manager</td>
<td>9.0</td>
</tr>
<tr>
<td>Senior Executive / Manager</td>
<td>12.1</td>
</tr>
<tr>
<td>Business Partner</td>
<td>3.0</td>
</tr>
<tr>
<td>Others</td>
<td>12.2</td>
</tr>
</tbody>
</table>
4.3.4 Data Analysis

All of the responses were keyed into the IBM SPSS Statistics (version 22). The analysis followed the suggestion made by Pinsonneault and Kraemer (1993), that simple statistics, such as frequency and mean are suitable for exploratory or descriptive research. For the open-ended questions in the questionnaire, the emerging themes from the responses were coded into several categories and their frequencies were calculated. The results were used to attempt to validate and possibly improve the IT governance tactical model.

4.4 Summary

This chapter discussed the mixed method research design used in this thesis. In the first qualitative phase, a multiple case studies design was adopted to address the emergence of IT governance arrangements and IT infrastructure (i.e., the first research question); explain the process of how the arrangements and IT infrastructure could support IT governance implementation (i.e., the second research question) and identify the factors that contribute to the establishment of a stable IT governance network (i.e., the third research question). The data gathered from the first phase were used to develop a tactical model for IT governance implementation. The model was validated using an online survey in the second phase (i.e., quantitative approach). Table 6 summarises the mixed method research design used in the study:

<table>
<thead>
<tr>
<th>Overarching method approach</th>
<th>Mixed method: Exploratory two-phase sequential design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>Phase 2</td>
</tr>
<tr>
<td>Nature of research</td>
<td>Exploratory</td>
</tr>
<tr>
<td>Research methodology</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Ontology</td>
<td>Constructivism</td>
</tr>
<tr>
<td>Epistemology</td>
<td>Interpretivism</td>
</tr>
<tr>
<td>Research Method</td>
<td>Case study</td>
</tr>
<tr>
<td>Research Strategy</td>
<td>Multiple case studies</td>
</tr>
<tr>
<td>Data collection technique</td>
<td>Document analysis</td>
</tr>
<tr>
<td>Participants</td>
<td>Group ABC (Malaysia)</td>
</tr>
<tr>
<td></td>
<td>Company B (Australia)</td>
</tr>
<tr>
<td></td>
<td>University X (Australia)</td>
</tr>
<tr>
<td></td>
<td>ISACA - Australia</td>
</tr>
<tr>
<td></td>
<td>IIA – Australia</td>
</tr>
<tr>
<td>Overarching method approach</td>
<td>Mixed method: Exploratory two-phase sequential design</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>University Y (Malaysia)</td>
<td></td>
</tr>
<tr>
<td>Data analysis</td>
<td>Interpretive using ANT as a theoretical lens (a translation process and a local/global network analysis approaches)</td>
</tr>
</tbody>
</table>

The following Chapter 5 commences the presentation and discussion of the findings of the study. This is the historical background of the multiple cases conducted at the Malaysian and Australian organisations is presented.
CHAPTER 5: HISTORICAL BACKGROUND OF THE CASE STUDIES

5.0 Introduction

This chapter describes the historical background of how IT governance is implemented at Group ABC, Company B, University X and University Y. This chapter is used as a foundation to address the first research question on the emergence of IT governance arrangements and IT infrastructure in an organisation. It provides insight into how improvements were made to transform their governance practices. Conflicts that arise during the governance and infrastructure implementation process are also highlighted.

Following an overview of each case, a historical analysis of IT governance implementation is presented for each of the phases indicated on the relevant timeline (Figure 5a-d). The first case study is a Malaysian diversified multinational government-linked company that applied a federated IT governance approach. The second case study presented is a large Australian retail organisation (i.e., Company B) pursuing a strategy committed to delivering outstanding customer services at low prices. The third and fourth cases are University X (Australia) and University Y (Malaysia). University X was struggling to overcome its devolved IT governance practices, whereas University Y focussed on developing most of its application systems in-house. The analyses of these two universities also examine conflicts that emerged during the development of their IT governance arrangements and IT infrastructure implementation.
5.1 Historical Background of Group ABC

Founded in 1910, Group ABC is one of Malaysia’s largest conglomerates. Established as a result of a merger of three Malaysian government-linked companies (i.e., Group A, Group B and Group C) in 2007, Group ABC has core businesses in six divisions of plantations, property, industrial equipment, motors, energy and utilities, and healthcare. Overall, more than 100,000 employees conduct Group ABC’s business operations in twenty countries worldwide. Group ABC 100% owns each division but each operation is run separately. Each division has its own Board of Directors, CEO, and Audit and Tender Committee. The Board reports directly to the President and Group CEO, and it also has an administrative reporting line to the Group’s Main Board.
The analysis of the implementation of IT governance at Group ABC from 2004 to 2012 identified four significant phases as depicted in Figure 5a. The following subsections summarises the historical background of IT governance at Group ABC.

5.1.1 Phase 1 (2004-2006): Foundation of IT Governance

The merger of the three companies (A, B & C) in 2007 was dominated by Group A. Group A was a Malaysian government-linked conglomerate with plantations (palm oil and rubber) as its core business activity. Phase 1 of the analysis therefore focuses on the efforts made by the CIO of Group A to improve its IT governance arrangements and IT infrastructure. Before 2004, the IT governance arrangements at Group A consisted of three layers: the Electronic Data Processing (EDP) group; divisions; and subsidiaries. The IT functions in each layer were operated independently to support their daily operations. The changes and improvement to the existing IT governance arrangements and IT infrastructure were made by Group A’s management after the resignation of the EDP Manager. The major activities concerning the IT governance arrangements and IT infrastructure are summarised in Table 7 below:

Table 7: Summary of activities in Phase 1 of Group ABC

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Resignation of the EDP Manager</td>
<td>• Management decided to introduce a common shared IT service across the business divisions and subsidiaries and to implement SAP as their standard financial system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Company XYZ was established as their subsidiary with 100% ownership to manage the implementation of SAP through a shared service function</td>
<td></td>
</tr>
<tr>
<td>• Appointment of the first CIO for Group A</td>
<td>• IT governance focused on promoting strong collaboration between IT players at Group A using a federated approach</td>
<td></td>
</tr>
<tr>
<td>• EDP group was revived as</td>
<td>• Introduced new sub-units of Strategy, Architecture</td>
<td>...at that point in time, the EDP Manager resigned, so IT was transferred under the shared services... but, something was missing from the Group A... the infrastructure and architecture were not in place. There was no department looking into that... After the appointment of the first CIO, he brought two areas (units) under his portfolio... firstly, the group shared services and secondly, he revived the EDP to the group IT (Interviewee A1, Head of Group IT, 2012)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When we started the SAP at that time, it’s more of a replacement of our financial system... Then the new CIO</td>
</tr>
<tr>
<td>Activities</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>“Group IT” and Planning and Risk and Security Management</td>
<td>Group IT provided a centralised IT plan, architecture and common IT infrastructure. IT organisation at divisions was maintained to focus on its specific business needs.</td>
<td>came in, he revised the SAP strategy to be more ERP based... he and his new team started to rearrange the strategy of implementing the SAP (Interviewee A1, Head of Group IT, 2012)</td>
</tr>
<tr>
<td>• An IT strategic plan, architecture and policy was formalised</td>
<td>Revised the SAP strategy. Company XYZ was transferred under the responsibility of the CIO. Appointment of Infrastructure Service Manager and SAP Project Manager.</td>
<td>When we implemented the SAP/ERP, we didn’t do it ‘big bang’. We selected a pilot site because if the pilot site’s implementation was successful, it would be easier to get buy in from the other business units (Interviewee A3, Head of Group IT, 2012)</td>
</tr>
<tr>
<td>• Introduction of ERP a group-wide IT application across the company</td>
<td>Developed the SAP/ERP implementation blue print. Implementation of the blue print at a pilot site. Implementation of the SAP/ERP in the whole group in phases, in one division after another.</td>
<td></td>
</tr>
</tbody>
</table>

5.1.2 Phase 2 (2006-2007): Group Merger

While the SAP/ERP implementation was still in progress, Group A’s management announced that they were going to suspend their shares on the Malaysian Stock Market. This occurred in November 2006, when the Malaysian Government decided to merge Group A with Groups B and C. Group B was a leader in the palm oil plantation and property industry, whereas Group C was a global palm oil company and was active in the oil and fats, and property industries. The Malaysian Government owned a stake in these three groups through its state run asset manager. The merger aimed to create synergy between the three groups and make it the world’s largest palm oil plantation group as well as to take advantage of the burgeoning economic development within the Asia-Pacific region. The changes in the existing IT governance arrangements and IT infrastructure are summarised in Table 8 below:
Table 8: Summary of activities in Phase 2 of Group ABC

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A Special Purpose Vehicle (SPV) company to facilitate the merger was established</td>
<td>• Establishment of a Merger Integration Committee and several sub-committees to address the impact of the merger in the critical areas of business divisions, their human resources, financial and IT needs</td>
<td>We got the temporary name for the SPV... a lot of discussion... All companies sat together in a few layers of hierarchy... the highest at that time was the Merger Integration Committee (Interviewee A1, Head of Group IT, 2012)</td>
</tr>
<tr>
<td>• Establishment of an IT Steering Committee</td>
<td>• Preparation of strategy for the combined companies to be in line with the SPV transformation plan. • ERP was chosen as the best standardised system to be adopted by the merged company</td>
<td>IT had its own steering committee (during the merger). This committee decided what was the best system to be implemented as one standard system... so, at that time we decided ERP as the single system to be used to support our business landscape... (Interviewee A1, Head of Group IT, 2012)</td>
</tr>
<tr>
<td>• Merger completed</td>
<td>• The merged entities were re-branded as Group ABC</td>
<td></td>
</tr>
</tbody>
</table>

5.1.3 Phase 3 (2007-2010): Three Pillars of IT

The merger transformation process was designed as an ongoing exercise. The SPV and its committees decided that Group ABC would embark on a three-phase roadmap. The first roadmap focused on the establishment of a new platform for Group ABC to support the integration of the core businesses. In the second phase, the focus was on a transformation process for Group ABC to create business synergy for their core businesses. In the final phase, the existing business operation was expected to be fully integrated and new business opportunities were to be explored as a means of transforming Group ABC into a world best company. The activities following the merger and its impact on the existing IT governance arrangements and IT infrastructure are summarised in Table 9 below:
Table 9: Summary of activities in Phase 3 of Group ABC

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• New important positions were introduced</td>
<td>• The CIO from Group A was promoted to the Senior Vice President position as Group CIO</td>
<td>...when the new organisation (Group ABC) came on board, Group A’s CIO was appointed as Group CIO... sub-division IT headship was given to the ex-CIOs of Group B and C (Interviewee A1, Head of Group IT, 2012)</td>
</tr>
<tr>
<td>• The new Group CIO introduced the “three pillars of IT” framework to support a federated model of IT governance</td>
<td>• The first pillar: Group IT</td>
<td>The first two years after the merger, we were really struggling... people need to understand... At some junction, we realised some resistance occurred. We decided to place emphasis on communication (Interviewee A1, Head of Group IT, 2012)</td>
</tr>
<tr>
<td>• Development of new IT strategy</td>
<td>• To expand ERP implementation to all business divisions</td>
<td></td>
</tr>
<tr>
<td>• Introduced various techniques to support the “three pillars of IT”</td>
<td>• Communication was highlighted for a better IT-business relationship</td>
<td></td>
</tr>
<tr>
<td>• Consolidation of IT infrastructure through GSC-Infrastructure and GSC-Application (sub-units under the Global Service Centre)</td>
<td>• Introduction of new operating model for group shared services provided by Global Service Centre</td>
<td></td>
</tr>
</tbody>
</table>

See Appendix E for full explanation.
5.1.4 Phase 4 (2010-2012): Collaboration in Governance

Phase 4 focused on the efforts made by the Group CIO and his team to enhance the role of IT to become both an enabler and value creator to further drive productivity and efficiency in Group ABC’s operations. The activities in relation to the IT governance arrangements and IT infrastructure are summarised in Table 10 below:

Table 10: Summary of activities in Phase 4 of Group ABC

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The Group CIO strengthened the “three pillars of IT. The aim was to ensure a strong collaboration between the three pillars to enable them to work as a team</td>
<td>Establishment of nine new IT units under the Group IT</td>
<td>...so then after I joined... I put in place the structure, the model... I met the CEO and told them that this model suited with us... it is not a centralised or distributed model... but, it is a federated model that is built on strong collaboration between the three pillars... we work well as a team... may not be 100%... but I think ultimately we deliver our promise, which is to deliver business value, that is enough (Interviewee A4, Group CIO, 2012)</td>
</tr>
</tbody>
</table>
| • Committees to support the three pillars of IT | IT Steering Committee  
• To discuss group-wide IT projects for approval and to revisit any issues or problems related to existing group-wide IT projects | For the senior management people... I usually go and engage directly with them. So far, their support is good, although it can be better. We have never faced any major issues in making some crucial IT projects because they are all recognising the importance of IT. They complain about the cost... everybody is |
| • Introduction of IT mission for the IT to become “a strong | Development of formal IT strategies and objective to provide the structured | |

...collaboration platform (e.g., IT portal)
<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>service provider and to proactively support the business in identifying new opportunities for value creation”</td>
<td>processes for ways of achieving the IT mission</td>
<td>mindful about cost and try to minimise and cut it. We take this as a part and parcel of business. We are not viewing those things as they are not supportive (Interviewee A4, Group CIO, 2012)</td>
</tr>
<tr>
<td>•  Introduction of new IT-business partnership frameworks</td>
<td>•  A guideline for the three pillars in performing IT operations (see Appendix G)</td>
<td>We have about 100 thousand employees, so communication is very important... that is why we make full use of whatever channel that we have... from time to time we send out information via portal... we have a specific page on IT that includes IT tips and tricks... we also blast emails to the users to inform of certain announcements or new features we implemented in the system (Interviewee A3, Head of Group IT, 2012)</td>
</tr>
</tbody>
</table>
| •  Customisation of formal IT governance process to fit Group ABC’s business operations | •  Customisation was based on ITIL, Control Objectives for Information and Related Technology (COBIT) and The Open Group Architecture Framework (TOGAF)  
•  Measurement of IT governance processes using key performance indicators (KPIs), and an internal customer satisfaction survey | Usually CIO will be involved in the Brown Bag session. The session is designed to talk anything about IT... whether there is anything that we need to improve or we can do... what has happened... new stuff that comes in... IT related idea can come from a conversation related to business objectives, needs and issue... but in order to ensure that the session goes well, you need to start probing. I will have my own issue that I want to talk about... (Interviewee A2, Head of Group IT, 2012) |
| •  IT leadership style by the group CIO                                   | •  Using a more pragmatic and diplomatic approach to leading the three pillars  
•  Emphasis was given to promoting the importance of using collaborative processes to accomplish the IT mission |                                                                                                                                                                                                                                                                                                                                                                                   |
| •  Incorporation of various techniques to support the IT mission           | •  Two-way communication through the Brown Bag session  
•  Formal communication through email  
•  Informal communication between the Group CIO and the three pillars  
•  IT training  
•  Continuous support from top management |                                                                                                                                                                                                                                                                                                                                                                                   |
<p>| •  Implementation of a new technology for                                 | •  The new technology included desktop                                           |                                                                                                                                                                                                                                                                                                                                                                                   |</p>
<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>enabling and enhancing workforce innovation,</td>
<td>outsourcing, server virtualisation (e.g., private cloud), network rationalisation, messaging collaboration platform, video conferencing capabilities, paperless IT and IP telephony</td>
<td></td>
</tr>
<tr>
<td>productivity and operation efficiency</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2 Historical Background of Company B

Group XY is an Australian incorporated company comprising business operations which include supermarket and department stores; home improvement and office supplies; coal mining; insurance; and chemicals, energy and fertilisers. Each of the business operations (known as divisions/subsidiaries) is autonomous, operated independently and has its own teams to support business operations. Group XY holds 100% ownership of Company B, a leading retailer of home improvement products and a major supplier to builders, in both the commercial and the housing industry.

The analysis of the implementation of IT governance at Company B from 2001 to 2013 identified four significant phases as depicted in Figure 5b. The following subsections summarise the historical background of IT governance at Company B.

5.2.1 Phase 1 (2001-2005): Foundation of IT Governance

In 2001, Group XY successfully acquired Hardware Store Chains (HSC), a rival to Company B. As a consequence, HSC’s business operations were merged with Company B’s. Prior to the merger, all of the IT systems at Company B were centrally managed by the IT Service (ITS) team in Perth, Western Australia. The ITS team is responsible for the end-to-end technology requirements necessary to support the business-specific outcomes. The IT infrastructure (i.e., application systems) was developed in-house by the ITS team using COBOL. IT support was provided to the business through an internal IT call centre for general IT problems. While the majority of the ITS team was located in Perth, the ITS team had a small number of teams in other parts of Australia, such as Melbourne and Sydney, and in New Zealand.
The management of Company B (also known as the Leadership Committee) established an Integration Governance Committee to facilitate the integration of the HSC’s IT infrastructure with Company B. The Managing Director of Company B led the Integration Governance Committee, with membership including all key IT players and business representatives. The committee defined the integration strategy and decided to apply minimum intervention in bringing HSC business operations into Company B. The aim was to enable synergies from the acquisition as quickly as possible and ensure both business operations were running smoothly during the integration exercise. The integration process was regarded as an in-house integration program and a project manager was appointed to lead the IT integration. The activities in relation to the IT governance arrangements and IT infrastructure are summarised in Table 11 below:

**Table 11: Summary of activities in Phase 1 of Company B**

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
</table>
| • Appointment of a new Managing Director by Group XY | • Introduced new strategies for newly merged Company B: the widest range, the lowest prices and the best service  
• Establishment of Company B’s Leadership Model (See Appendix H) | ...in order to get synergy from the acquisition as soon as possible, we were going to do the absolute minimum to invade the HSC into our organisation. So, that’s from cultural, system and process perspectives. It was all about how can we quickly get all those operations of the HSC embedded as Company B’s operations (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012) |
| • Establishment of Integration team             | • Appointment of a project manager to lead the integration process  
• Created an application to interface the HSC’s point of sales (POS) system to Company B’s COBOL system  
• HSC’s POS system ran in parallel with Company B’s | Now, having doubled in size as a result of the acquisition, our corporate systems were becoming more and more inflexible... that was in terms of its ability to accommodate the changes... (Interviewee B5, IT Manager and former |
| • Conducting a comprehensive review of Company B’s information system | • The COBOL system became inflexible in handling high volume of transactions processing  
• The ITS team analysed how Company B conducted its business processes and reviewed | |

86
Activities | Description | Examples
--- | --- | ---
• Finalising the comprehensive review | • Develop a proposal for a business process and information system upgrade | Launchpad Project Manager, 2012)

5.2.2 Phase 2 (2005-2008): Upgrade of IT Infrastructure

In Phase 2, the Board of Directors of Group XY approved funding of $55 million to support the upgrade project proposal prepared at the end of the Phase 1. Named the Launchpad project, the aim of the project was to support the growth of the business by providing the foundation for its expansion and the maintenance of competitive advantage. The project was designed to be conducted in three stages. Stage 1 of the Launchpad project commenced in 2005. The business process upgrade aimed to improve the business process in terms of Company B’s inventory management. Meanwhile, the information system upgrade focused on the implementation of the Oracle e-Business Suite (Oracle ERP) to replace the COBOL system.

It is important to highlight that Company B did not have a formal IT steering committee to oversee its overall IT governance. All of the IT decisions, including those related to IT investment and IT infrastructure development, were determined by Company B’s Leadership Committee, led by the Managing Director. In order to support the strategies to provide “the widest range, the lowest prices and the best service”, Company B promoted flexibility in their governance approach. As a result, formal IT strategies and governance processes did not exist, as they could disrupt their ability to fulfil the business strategies. The activities that occurred in the IT governance arrangements and IT infrastructure are summarised in Table 12 below:

Table 12: Summary of activities in Phase 2 of Company B

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Establishment of the Governance Committee to oversee the Stage 1 of the Launchpad project</td>
<td>• Appointment of all general managers as the committee’s membership</td>
<td>... this governance committee was a subset of the whole management team... and that was because the Stage 1 of the Launchpad project had direct impact to everybody (Interviewee B5, IT)</td>
</tr>
<tr>
<td>• Implemented</td>
<td>• Two project managers, from Oracle and the ITS team were appointed to lead the Launchpad project</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Transforming Company B’s</td>
<td></td>
</tr>
<tr>
<td>Activities</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>business process upgrade</td>
<td>supply chain and inventory management to make them more efficient and effective</td>
<td>Manager and former Launchpad Project Manager, 2012)</td>
</tr>
<tr>
<td>• Conducted information system upgrade</td>
<td>• Implementation of Oracle ERP to replace the existing COBOL-based system in a staged phase (see Appendix I)</td>
<td>We need to look at how we could replace the existing Cobol system... we actually evaluated through all other options across four to five ERP vendors... In the end, we decided to go with Oracle e-business suite... (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012)</td>
</tr>
</tbody>
</table>


After Stage 1 of the Launchpad project was successfully completed, the IT Leadership team re-evaluated the content of its Stage 2. A new plan was prepared to extend the duration of Stage 2, but without additional cost. A longer period was critical for the ITS team to prepare sound control mechanisms in Company B’s IT infrastructure. Once the approval for the extension was granted, the ITS team concentrated on upgrading the overall network across the stores from its legacy COBOL system to Oracle ERP, together with the development of a new POS system. The summary of activities in relation to IT governance arrangements and IT infrastructure is provided in Table 13 below:

Table 13: Summary of activities in Phase 3 of Company B

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The Governance Committee was retained to oversee the implementation of Stage 2 of the Launchpad project</td>
<td>• Changes of its committee members to include only the key general managers whose areas were impacted by the Launchpad project</td>
<td>The key driver was the ability to take the e-business suite and extend it. It means that we could build our own user interfaces, add extra functionality... This e-business suite allowed us to hook those in without changing the core and the integrity of the code. We</td>
</tr>
<tr>
<td>• Upgrade of the overall network across the stores all</td>
<td>• Installation of a new data storage solution to support large transaction</td>
<td></td>
</tr>
<tr>
<td>Activities</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>over Australia, from COBOL to Oracle ERP</td>
<td>processing and long trading hours at stores and catering for multiple time zones across Australia</td>
<td>saw this as advantageous, given that we came from an era of totally in-house system development (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012)</td>
</tr>
<tr>
<td>• Approval to replace POS system was granted</td>
<td>• An in-house development and implementation of a new POS system by the ITS team</td>
<td>I think the IT team try to keep it as flexible as possible. This business hates red tape because it is a waste. We are a retailer and our brand builds on lowest prices every day. We do not do that by upping all the costs. So, you got to try and do everything to bare minimum because we have a price guarantee which we have to live by… (Interviewee B4, IT Manager, 2012)</td>
</tr>
<tr>
<td>• Strengthening ITS organisational structure</td>
<td>• General Manager of ITS had a direct reporting line to the Managing Director • All of the IT Heads of Units had a 100% reporting line to the General Manager of ITS</td>
<td>• The role of Leadership Committee to decide and prioritise IT project • Formalised IT strategy and governance processes were not visible, as a means to maintain flexibility in business operation (see Appendix J)</td>
</tr>
</tbody>
</table>
| • Strong culture embedded in the IT vision that affect the ITS operation | • The Business Engagement and Rollout Unit was established • Informally, the ITS team members developed good relationships with business people | 5.2.4 Phase 4 (2010-2012): Driving Business Requirements

Phase 4 focused on the continuous improvement made by the ITS team to support Company B’s business operations. The ITS Leadership team re-evaluated the IT infrastructure of Company B after the implementation of Stage 2 of the Launchpad projects was completed. The team was of the opinion that combined, Stages 1 and 2 had been a lengthy project (almost five years) and as a result, the management of Company B had to put aside their business requirements needs in order to allow the Launchpad project to take place. After the re-evaluation, the ITS team designed Stage 3 as a self-contained project that did not require urgent implementation. Therefore, the ITS team decided to re-adjust their priorities to support and deliver business
needs. This plan was approved by the Governance Committee and subsequently, Stage 3 of the Launchpad was deferred. Table 14 below summarises the activities in relation to IT governance arrangements and IT infrastructure in Phase 4. Detailed explanation of Phase 4 is provided in Appendix K.

Table 14: Summary of activities in Phase 4 of Company B

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The Leadership Committee prioritised the list of necessary business</td>
<td>• The IT Leadership team decided the best IT solution to deliver the prioritised business requirements</td>
<td>There is no formal governance structure within the ITS itself. It is just individual accountabilities for various aspects of the operation. But at the end of the day, I am responsible for all...there is a lot that I don’t understand in IT.... I don’t have to understand all because we have right and capable people. I can trust them to do what needs to be done (Interviewee B2, General Manager of IT, 2012)</td>
</tr>
<tr>
<td>requirements to the IT Leadership team</td>
<td>• A Project Manager was appointed to deliver the IT requirements projects</td>
<td></td>
</tr>
<tr>
<td>• The Governance Committee was renamed as the Major Project Committee</td>
<td>• The Governance Committee was renamed as the Major Project Committee</td>
<td></td>
</tr>
<tr>
<td>• Appointment of new General Manager of ITS</td>
<td>• Development of a leadership model to ensure the right people in the right roles with the right values</td>
<td></td>
</tr>
<tr>
<td>• IT governance processes, such as IT strategies did not exist</td>
<td>• Implementing strong internal communication</td>
<td>We adopt those methodologies and standards, but we don’t need to follow exactly what they said. We don’t believe in world best practice in anything. We believe in Company B best practice... what is the best for us. What is best for us is not what is world best practice (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012)</td>
</tr>
<tr>
<td>• Adoption of a risk assessment procedure</td>
<td>• Promote flexibility in delivering business requirements projects</td>
<td></td>
</tr>
<tr>
<td>• The ITS Leadership team decided to break down the plan for Stage 3 into</td>
<td>• Stage 3 was implemented together with the business requirements projects</td>
<td></td>
</tr>
<tr>
<td>small projects</td>
<td>• Migration from COBOL to Oracle ERP was conducted in phases to control the entire process by giving them the flexibility to choose the application that had an immediate impact on the business</td>
<td></td>
</tr>
</tbody>
</table>
5.2.5 Phase 5 (2012-2013): Continuous Improvement

Phase 5 revolved around the ongoing efforts of the General Manager of the ITS team to strengthen the governance arrangements and IT infrastructure at Company B. During this phase, the ITS team embarked on developing a more formal approach to IT governance. In their regular meetings, the IT Leadership team determined that the existing approach was not sustainable to support the business (Company B did not have a formal IT strategic planning process in place). As a result, the systems used in Company B had become more fragmented and therefore this could limit the ability of the ITS to quickly respond to any critical changes in business needs. A series of meetings was held, and the IT Leadership team decided that there was a need for a better integration strategy, in order for the ITS to be able to continuously support the business. The activities that occurred in Phase 5 are summarised in Table 15 below.

Table 15: Summary of activities in Phase 5 of Company B

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Development and formalisation of new IT strategy</td>
<td>• The aim was to support the ITS operations and guide IT infrastructure development (see Appendix L)</td>
<td>...KPMG reviewed our data conversion from one system to another, the outcome when the systems ran parallel for a couple of months... and they basically said... yup, you good to go.... we quite comfortable with this process because it was a one-off effort, rather than having an extra level governance on-going forever. It is a lot easier to have a little bit less governance and just put extra bit at the end (independent audit by KPMG) rather than have high level governance across a whole lot on an on-going basis (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012)</td>
</tr>
<tr>
<td>• Conduct of an independent review of IT project</td>
<td>• Appointment of KPMG to conduct the IT project review as a one-off effort in governing Company B’s high impact projects • The KPMG report was submitted to the Major Project Committee</td>
<td></td>
</tr>
<tr>
<td>• Upgrading Oracle ERP</td>
<td>• It was a pure IT project that had no benefit to the business. When the proposal was first presented two years previously, the Leadership Committee rejected the request • Obtained approval in 2013 because Oracle ERP (first implemented in Phase 2) achieved its maturity level and Oracle would no longer support the version</td>
<td></td>
</tr>
</tbody>
</table>
that Company B currently used
• A separate team was established to conduct the project in a staged phase

5.3 Historical Background of University X

University X is a well-established research-intensive university in Australia. University X has three important layers of Senate, Executive and Academics. Firstly, the Senate has legislative authority to manage the University’s operations. The Senate appoints the Vice Chancellor (VC) as the Chief Executive Officer and works with this officer in partnership to govern the university. Secondly, the VC delegates responsibilities for academic, financial, administrative, and other fields at the university to the Executive group. The Executive includes; the Senior Deputy VC, Deputy VC (Research), Executive Director (Academic Services) and Registrar, and finally, Executive Director Finance and Resources (EDFR). Lastly, there are the Academics who, through the Academic Board and the faculties, are responsible for the general administration of courses. The faculties are comprised of thirty-two cognate schools in various disciplines. The Deans head the faculties’ administration and academic staff. The Heads of School administer the individual schools within a faculty. The three layers of Senate, Executive and Academics reflect the significant delegation of power and authority at the university via a distributed responsibility principle (i.e., a devolved culture). The university also subscribes to a strong tradition of collegiality that promotes a consultative and open decision-making process (i.e., by allowing staff to provide input into decisions that could affect them) through the establishment of various committees at the faculties and university level. At the university level, there are four principal committees – Senate Committee, Academic Council Committee, VC Advisory Committee and Faculty Committee – with some principal committees overseeing several standing committees which support their operations. The committees’ operations are based on four general principles of collegiality, working smart, good conduct, and review.

From 2003 to 2012, four significant phases were identified in relation to IT governance implementation (Figure 5c). The following subsections describe the summary of the historical background of IT governance at University X.
5.3.1 Phase 1 (2003-2006): Foundation of IT Governance

Phase 1 focuses on the efforts taken by the university to establish a central IT services unit, as a means to overcome problems associated with its devolved IT environment. IT governance at University X had been highly devolved, following the way the University had been governed under its collegial tradition. University X had two layers of IT governance. In the first layer, there were two central IT administrative units. These were the Administrative Computing Services and University Communication Services. The Administrative Computing Services was responsible for computing services within the central administration units, while University Communication Services focused on the general IT infrastructure, network and communication services. The managers of both units reported directly to the Executive Director Finance and Resources (EDFR). The second layer was at the faculty level. The Deans of the faculties had wide responsibility for managing their own resources, including IT to support the niche needs of the users. The Dean appointed a Faculty Manager for administrative matters and an IT Manager for IT management purposes. The impact of the devolved IT system can be clearly seen in that both the central IT administration and faculties implemented different standards, data security and data management. The activities in relation to the IT governance arrangements and IT infrastructure are summarised in Table 16 below:

Table 16: Summary of activities in Phase 1 of University X

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Conduct of a review of the Administrative Computing Services/University Communication Services</td>
<td>- Suggestion was made for both central IT administration units to integrate their processes with the university’s needs</td>
<td>...there was a review of the Administrative Computing Services/University Communication Services... to have a more centralised and broader IT organisation... the next stage that time was the decision to create ITS with its own director. It was the newly appointed EDFR who appointed the Director of IT (Interviewee X10, Former LDIT, 2012)</td>
</tr>
<tr>
<td>- Changes in the IT governance committee</td>
<td>- Replacement of the IT Policy Committee with an Information Services Committee (IS Committee)</td>
<td></td>
</tr>
<tr>
<td>- The Technical Advisory Group conducted a detailed SWOT analysis of the</td>
<td>- Development and endorsement of a Strategic Plan for IT/IS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>...each business unit was</td>
</tr>
</tbody>
</table>
5.3.2 Phase 2 (2006-2008): New Centralised Governance Model

In January 2006, the Administrative Computing Services, University Communication Services and IT Policy Office were fully amalgamated into the ITS. The mission of the ITS was to be a business unit responsible for driving and setting strategic information, communication and technology objectives that support University X in meeting its goals. The summary of activities in relation to the IT governance arrangements and IT infrastructure is presented in Table 17 below:

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Amalgamation of the devolved IT units into the IT Services (ITS)</td>
<td>- New ITS structure was introduced</td>
<td>... they had highly significant resources and control in what and how they did things in the faculty, so any effort towards bringing everything back into a central structure was a management challenge (Interviewee X2, Former University IT Manager, 2012)</td>
</tr>
<tr>
<td>- Establishment of an IT Reference Group as an IT steering committee</td>
<td>- Amendment of the membership in the existing IS Committee and Technical Advisory Group</td>
<td></td>
</tr>
<tr>
<td>- Conducting an Information Management Review</td>
<td>- The objectives was to overcome the problems associated with the devolved governance and IT infrastructure arrangements</td>
<td></td>
</tr>
<tr>
<td>- Development and</td>
<td>- Identified the need to</td>
<td></td>
</tr>
<tr>
<td>Activities</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------</td>
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</tr>
</tbody>
</table>
| endorsement of an IT Strategic Direction | adopt a centralised IT services  
• Articulation of IT vision and mission that highlight the need for having a university-wide IT services | IT for the university and not having IT factions (Interviewee X5, IT Review Panel, 2012)  
... the committee membership and its standing committee consist of a range of stakeholders... the problem is the committee does not have the right people in there... they all have their own agenda... if we have someone from any specific faculties in the board... what the person can share is what he or she thinks from his or her faculty’s point of view... it may not be the same as others in different faculties (Interviewee X6, Faculty Manager, 2012) |
| • Renaming the IT Reference Group as the Information Management Board | • Identification of the Information Management Board’s responsibilities, frequencies of meetings and its standing committees  
• The standing committees of IS Committee was renamed the Information Services Programme Committee (IS Programme Committee), and the Technical Advisory Group the Technical Coordination Group | |
| • Development of the ITS mission and transformation plan | • A plan to establish a formal service agreements for the services delivered by the ITS  
• Sending interested staff to attend a series of ITIL courses  
• Introduced a centralisation project to centralise the devolved IT infrastructure (see Appendix N)  
• Business case was prepared, but the project failed to be implemented | |

5.3.2.1 Resistance towards the Centralisation Project

This section analyses the resistance encountered towards the centralisation project. In Phase 1, under the leadership of the EDFR, the university was successful in amalgamating the Administrative Computing Services, University Communication Services and IT Policy Office into the ITS. In Phase 2, the ITS Director focused on
expanding the centralisation project to the faculties. However, the centralisation project failed and the Director resigned. The major issues associated with this failure are outlined below.

5.3.2.1.1 Cultural Compatibility Issue

University X was bounded by the devolved responsibility and collegial tradition that had been established since its foundation. Hence, the centralisation effort was viewed by many as controversial because it did not seem to be compatible with the culture of the university.

Their (ITS) stated goal was basically to run IT for the university, which was all levels of IT. There was a lot of opposition. It was a different culture structure to start with (Interviewee X9, Faculty IT Manager, 2012).

Without proper consultation with the Faculties and IT Managers, the centralisation project was perceived to be a threat. From the faculties’ point of view, through the centralisation project they had to hand over their IT governance arrangements and IT infrastructure to the central IT. They would lose some power and have less control of IT resources. Handing over responsibilities to ITS meant they were required to comply with the central IT structure model and possibly face unwanted interference from the central unit. The centralisation project received a lack of buy-in because under the existing structure, the IT Managers and Faculty Managers could determine the best IT option for their faculties. In addition, they had invested a significant amount of money in developing their sometimes esoteric IT infrastructures that suited their unique requirements and interests.

5.3.2.1.2 Controversy in the Appointment of the ITS Director

A second issue related to the controversy associated with the appointment of the ITS Director. The ITS Director previously worked as a project manager in the Financial Services unit responsible for the financial system upgrade in 2003 and he was appointed as the ITS Director in 2005. Prior to his appointment, the Director had

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11 Faculties were the largest devolved business units in the university. Hence, this study focuses on the impact of the centralisation project on the faculties.

12 The Financial Services Unit was directly under control of the EDFR
worked as a consultant in a company that provided software to the Financial Services unit. The controversial element of the appointment was explained as follows.

He must have impressed certain people in the university because he was subsequently appointed as the Director of IT, which in the process caused some adverse comment at the time (Interviewee X10, Former LDIT, 2012).

5.3.2.1.3 Controversy in the Business Case of the Centralisation Project

The business case for the centralisation project was also controversial. The purpose of the centralisation project was to develop a new foundation to establish university-wide IT infrastructure. However, the project did not receive sufficient buy-in from the Technical Coordination Group and faculties. This was due to two reasons. Firstly, the centralisation project was seen as an ITS project, rather than part of a university-wide IT project. There had been a lack of consultation with the IT Managers from the individual IT services. As a result, the proposed project was considered to be technology-focused and neglected the needs of the core business of the university (i.e., teaching and learning). Secondly, the Technical Coordination Group claimed that the four sub-projects suggested under the centralisation effort were too broad. As a result, the suggested cost for implementation was too high and risky since the university had no experience of conducting a large scale IT project.

5.3.2.1.4 Problem in the Governance Process

The IT Strategic Direction listed twenty-five priorities needing attention over a period of three to five years. For monitoring and evaluation purposes, University X conducted reviews on its activities, including IT for every seven years. An example is the Administrative Computing Services/University Communication Services review that was conducted in 2003. University X also conducted an additional review, namely the Information Management Review. Nevertheless, the impact of the reviews was seen as not delivering on promised success to the university.

There were a lot of reviews conducted. Consultants were all over the place doing whatever they wanted to. But nothing actually came out. It was just a waste of time (Interviewee X9, Faculty IT Manager, 2012).

It is important to note at this stage that University X still did not have consistent IT policies (e.g., faculties had [or did not have] their own IT policy).
The wording in the policies generally means, if possible, do this... or if you feel like it, then do this (Interviewee X11, IT Manager, 2012).

Despite the Information Management Review report revealing that University X had a lack of coordinated strategy and associated policies by which to meet information needs, the Technical Advisory Group did not consider developing a new one. This was because they were of the opinion that;

The current policy worked adequately and a radical change to it was not necessary. The most recent updates had only involved changes to the wording (Technical Advisory Group, Meeting Minutes, 20 October 2005)

As a result, no discussions had been conducted\(^{13}\) to address the need for having a university-wide IT policy, even though an IT Policy Officer was appointed. Hence, the appointment of the IT Policy Officer did not have much impact on supporting the centralisation project.

5.3.2.1.5 Controversy in Governing IT and its Project

The culture of collegiality resulted in the VC establishing the Information Management Board. The findings from analysis of documents showed that the committee related to IT had been established since 2000 and further its name and a list of members had been changed several times (Appendix O). Nevertheless, its role was still limited to being an advisory committee to the VC. Hence, the VC had the power to make any decision related to IT. But the VC’s role, through either the Information Management Board or Executive for promoting the centralisation project, was not visible.

The top management did not come out and say something like, this is our new IT structure that we have now, help us to achieve our aim. But there was none, as if they did not see the centralisation as being an integral part of the university (Interviewee X2, Former University IT Manager, 2012).

Interestingly, funding allocation for the approved project was subjected to the approval of the Planning and Budget Committee (i.e., another committee chaired by the VC). In this context, any proposals approved by the Information Management

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\(^{13}\) Document analysis from a series of Minutes of the Technical Advisory Group meetings from 20 October 2005 (i.e., the appointment of the ITS Director) until 15 March 2007 (i.e., no discussion on any IT policy issues after this period).
Board would need to compete with other university initiatives in the Planning and Budget Committee’s meeting. Therefore, negotiation to win the funding was difficult, even though the VC himself was the chairperson of both the Information Management Board and the Planning and Budget Committee.

The structure in the Information Management Board was going backwards, we normally get authorisation personally from the VC beforehand. We bring it back to the meeting and the committee will endorse it. It was just a matter of rubber stamping. Committees that had the VC on them, it was very rare that they decided anything if the VC didn’t want it to be decided (Interviewee X10, Former LDIT, 2012).

When the ITS presented the business case for the centralisation project, too little attention had been given to communication. As a result, the aim of the centralisation project was perceived as unclear and that led to the faculties having a different perspective on what the ITS wanted to achieve. In addition, this communication problem was also due to the one-way communication approach.

The Director told us what he was going to do, and this is what's going to happen (Interviewee X9, Faculty IT Manager, 2012).

Their contribution (IT Managers) was not really listed or valued. The process was just window dressing, to have a consultation, but it was not quite a consultative process in any real sense (Interviewee X10, Former LDIT, 2012).

Due to the above mentioned communication problem, the leadership style of the ITS Director was considered problematic.

The Director took a much more tyrannical and dictatorial view of how IT should be managed (Interviewee X5, IT Review Panel, 2012).

A meeting was held, discussion was taken and email was sent out. The formal structure of communication was there, but the tone and the content of the structure was totally unsympathetic and arrogant (Interviewee X10, Former LDIT, 2012).

5.3.3 Phase 3 (2008-2010): Re-structuring IT Organisation

The centralisation project was ultimately unsuccessful, despite the university’s successful amalgamation of its devolved IT units into the ITS. After the resignation of the ITS Director, the VC decided to transfer the ITS to the leadership of the Librarian.
Accordingly, the Librarian was thereafter known as the Librarian and Director of IT (LDIT) and he reported directly to the VC. Table 18 below summarises the activities that occurred in relation to the governance and IT infrastructure arrangements.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishing Information Services Division (IS Division)</td>
<td>IS division was headed by the LDIT, with two separate subunits of Library and ITS (see Appendix P)</td>
<td>... no supporting policies to drive change ... they talked about the devolved model and yet the devolved model probably is one of the single most important reasons why we find change is difficult... (Interviewee X6, Faculty Manager, 2012)</td>
</tr>
<tr>
<td>New structure for the ITS</td>
<td>Appointment of Associate Director of IT to lead the ITS units Some of the Library IT staff was transferred to support the ITS team</td>
<td></td>
</tr>
<tr>
<td>New structure for Library</td>
<td>An appointment of Associate Librarian Library’s IT team was maintained to support its specific IT needs</td>
<td></td>
</tr>
<tr>
<td>Improvisation of the centralisation project</td>
<td>Decision to implement with only a selected IT project was made</td>
<td></td>
</tr>
<tr>
<td>IT governance processes was not visible</td>
<td>IT policy was not visible ITIL was not fully implemented (see Appendix P)</td>
<td></td>
</tr>
</tbody>
</table>

5.3.4 Phase 4 (2010-2012): Improvement in Governance Approach

The LDIT retired at the end of 2009, after 14 years of service as Librarian and two years as LDIT. As a result, the VC appointed a new LDIT to lead the IS Division. Following the appointment of the new LDIT, the following changes (activities) to the existing IT governance arrangements and IT infrastructure are summarised in Table 19 below. A detailed explanation of this phase is provided in Appendix Q.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct of a review of ITS</td>
<td>Identified the needs to overcome IT services inefficiencies and the role of IS Division as a central IT</td>
<td>...a notice for inviting a submission was sent out a couple of months before the review ... so the review</td>
</tr>
<tr>
<td>Activities</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| • Amalgamation of the ITS and Library into the Information Services (to replace IS Division) | • Establishment of five new units to support Information Services operations  
• Launching of a new Information Services’ website  
• Conducting a series of briefings to inform about the impact of the amalgamation  
• Training for up-skilling the staff  
• Conducting an assessment of the current IT governance processes to support ITIL implementation | committee received a number of written submissions... we also received a request from people who wanted to talk to the review panel... the review panel also identified key people around the campus who wish to talk to us about what they saw as an issue... the whole part of the review was not to impose any idea, but merely to talk to different groups and to read their submissions... the aim was to see what are the common issues and problems ... to draw up a picture of what current users thought about IT, in terms of where it is now and where it should go (Interviewee X3, IT Panel Review, 2012) |
| • Implementation of the Investment program   | • Investment program was approved by the VC with $45 million funding allocation  
• Prioritisation of nine major projects to be implemented  
• Using an appropriate term to represent the centralisation process  
• Pilot implementation of new network upgrade | ... the new LDIT, she really had the perfect storm to go and develop this Investment program... the project looked at what were the components of the IT infrastructure that needed to be developed... (Interviewee X6, Faculty IT Manager, 2012) |
| • Appointment of a new VC                   | • A Senior Leadership Group was established  
• The Information Management Working Party (IM Working Party) was formed as an advisory body to the Senior Leadership Group to replace the Information Management Board |                                                                                                                                                                                                 |

5.4 Historical Background Analysis for University Y

University Y is a Malaysian public university established in 1984 to specialise in management education. The university’s Board of Directors is responsible for policy matters and monitoring the performance of the university. The Ministry of Higher
Education, following the University and University Colleges Act of 1973, appoints the chairperson and members of the Board. The VC is appointed by the Ministry of Higher Education following a recommendation made by the VC Search Committee. The VC is responsible to the Board of Directors for the leadership and management of the university. The Management Committee (formerly known as the Executive Council) was established to advise and support the VC in the areas of academic and international issues; research, innovation and commercialisation; industrial linkage and community, student and alumni; human resource management and development, finance, asset management and development, law and matters related to the Library. The VC also chairs the Senate which is responsible for the academic affairs of the university. Courses at the university were initially offered by thirteen faculties. However, in 2008, the faculties were merged to form three colleges (College 1, College 2, College 3).

The implementation of IT governance at University Y, involved three significant phases from 2002 to 2012 (Figure 5d). The following subsections summarise the historical background of IT governance at University X.

### 5.4.1 Phase 1 (2002-2007): Foundation of IT Governance

An IT Centre was established in 1984 with the mission of providing a comprehensive, up-to-date and fully functional infrastructure to support teaching and learning, research activities and management of the university. The IT governance at University Y was centralised, and under this arrangement, the IT Centre became responsible for managing and providing the IT infrastructure to be used by the faculties/departments in supporting the university’s core businesses. The Malaysian government funded the development of the IT infrastructure at University Y through the Malaysia Plan. Table 20 below summarises the activities related to the IT governance arrangements and IT infrastructure. Details of activities are explained in Appendix R.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appointment of a new Director of IT</td>
<td>Five IT units were established to help centrally develop, support, maintain and upgrade all of the IT</td>
<td>I travelled to take the ITIL exam, just to prove that I am certified to manage the IT Centre</td>
</tr>
</tbody>
</table>
5.4.2 Phase 2 (2007-2010): Implementation of the New College System

Phase 2 focuses on the effort made by University Y to improve its academic system after a new college system was introduced. The impact of the improvement of the academic system on the IT governance arrangements and IT infrastructure is summarised in Table 21.

Table 21: Summary of activities in Phase 2 of University Y

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appointment of an academic as the Director of IT</td>
<td>A new Director was appointed</td>
<td>If IT staff are being promoted as Director, the silo will continue and they will have their own clan... if the Director’s expertise were in the network development, then only the network would be in excellent condition. (Interviewee Y6, Director of IT, 2012)</td>
</tr>
<tr>
<td>Information Technology Council (IT Council) was established to replace the Computer Steering Committee</td>
<td>The IT Council failed to arrange any meetings</td>
<td>All IT paperwork needed to be presented in the Executive Council meeting (See Appendix S)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishment of the Computer Steering Committee</td>
<td>The Computer Steering Committee meeting was not held. All of the IT paperwork needed to be presented in the Executive Council meeting</td>
<td>Everything must go through the Executive Council meetings... but in those meetings, there were lots of agenda to be discussed... sometimes, we could not present our paper work in two consecutive meetings... we had to wait even though it caused a delay in our important paperwork (Interviewee Y9, IT staff, 2012)</td>
</tr>
<tr>
<td>Development of internal IT policy</td>
<td>The policy however, was not endorsed by the Executive Council</td>
<td></td>
</tr>
<tr>
<td>Development of the first IT Strategic Plan</td>
<td>A blue print to define the IT vision, mission and strategic direction of the university</td>
<td></td>
</tr>
<tr>
<td>Decision to continuously use their legacy application system</td>
<td>The system would be upgraded upon a request from its owner</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development of new application system was based on the request of the university</td>
<td></td>
</tr>
<tr>
<td>New VC was appointed in 2005</td>
<td>No changes were made to IT governance arrangements and IT infrastructure</td>
<td></td>
</tr>
</tbody>
</table>
5.4.3 Phase 3 (2010-2012): New Transformation Plan

In Phase 3, the focus was on implementing a new transformation plan mainly to overcome problems associated with the new college system. At the same time, the plan aimed at helping the university in achieving its vision and mission. The summary of activities in Phase 3 is summarised in Table 22 below. Further details on the IT governance arrangements and IT infrastructure in Phase 3 are provided in Appendix V.

Table 22: Summary of activities in Phase 3 of University Y

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
</table>
| • Establishment of a new college system (see Appendix T) | • Decision to centralise all of the IT staff who were located in the faculties/departments. But, the decision was rejected by the faculties/departments | IT, 2012)...
| | • Introducing an IT service desk to support a centralised IT request | ...we wanted to integrate the legacy system...but then came the new college system... We could not decide, which one should be done first... but we decided to proceed with the new college system first (modification of existing application system)... (Interviewee Y7, Former Director of IT, 2012) |
| • IT governance processes | • The IT policy was endorsed by the Executive Council | |
| • Upgrading and integrating legacy IT infrastructure | • The project was postponed to allow IT staff to modify the existing IT application system in accordance with the new college system (see Appendix U) | |
| • Development of new IT application system | • The project was continued to address the request from the university | |

I became the director of the IT Centre in January in 2010... I want my IT people to be committed to the changes that I plan... so in that process, I need to do a lot of convincing... (Interviewee Y6,
<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>for calculating key performance indicators (KPIs) for departments and faculties</td>
<td></td>
<td>Director of IT, 2012)</td>
</tr>
<tr>
<td>• Renaming the Executive Council as the Management Committee</td>
<td></td>
<td>...we are now developing a system for monitoring the KPIs for the business unit... (Interviewee Y9, IT staff, 2012)</td>
</tr>
<tr>
<td>• Appointment of a new Director of IT</td>
<td>• Strengthening the IT Centre’s internal structure • Establishment of IT management team</td>
<td></td>
</tr>
<tr>
<td>• Appointment of the Deputy VC (Research and Innovation) as the University CIO</td>
<td>• The Director of IT represented the CIO in various meetings held by the government</td>
<td>...the VC will always ask... do you have the people, expertise, platform, hardware, and software to do this? If you have, then you do it (Interviewee Y6, Director of IT, 2012)</td>
</tr>
<tr>
<td>• Establishment of an IT Steering Committee to replace the IT Council</td>
<td>• Establishment of an IT Security Committee as its sub-unit • The Director of IT was appointed as the committee’s secretariat • Endorsement of the IT Strategic Plan and IT policy</td>
<td>None of the IT staff involved in the IDMS is working as a full time team member. They are also doing their current work. We are pulling them in to deliver the IDMS and now they are doing double or triple work (Interviewee Y6, Director of IT, 2012)</td>
</tr>
<tr>
<td>• Relocation of IT staff to the IT Centre</td>
<td>• Relocation was conducted in two stages • A zoning system was introduced to support IT services across the campus</td>
<td></td>
</tr>
<tr>
<td>• Managing the impact of the restructuring of college system</td>
<td>• Modification of all IT application system to reflect the changes in the college system • Updating the systems</td>
<td></td>
</tr>
<tr>
<td>• Development of a new Integrated Database Management System (IDMS)</td>
<td>• To integrate all the legacy IT application systems to enhance the decision-making process • The system was developed internally</td>
<td></td>
</tr>
</tbody>
</table>
5.4.4 Analysis of IT Governance Implementation across the Three Phases

This section analyses the challenges faced by University Y in terms of its IT governance implementation from Phase 1 to Phase 3. The challenges are explained in the following sub-sections.

5.4.4.1 In-house application system development

All of the legacy application systems were developed in-house because the university wanted to have full control of its own system. It became a part of the university’s culture because it promoted the utilisation of skills among IT staff. According to the respondents, in-house development could: (i) reduce the risk of a security breach (Interviewee Y5); (ii) protect against the potential instability of the vendor (such as the vendor going out of business) (Interviewee Y8); and (iii) avoid compatibility and integration issues (Interviewee Y6). For example, Interviewee Y6 stated that the university had heavily invested in the “homegrown” IT systems and if the university wanted to buy a new system, the IT Centre would have a problem integrating the existing system with the new one.

Customisation involves IT staff, so why we do we need to do double work? Our legacy system is so critical, and we can’t just replace it with another system that we do not know. This legacy system was proven and satisfied the users (Interviewee Y6, Director of IT, 2012).

Most of the application systems had been used since the 1990s. Even though the application systems were enhanced and improved from time to time, problems related to their functionalities kept on occurring.

The problem is we keep looking at our history. We continue to tell our previous success of 5-10 years ago. Our infrastructure, in terms of coordination, I cannot see them in place... for example, the Graduate Academic Record System had reached a stage where it could not be repaired. What the IT Centre did was... they repaired this and this, to solve this and this. It was just like fixing a bad pumpkin (Interviewee Y2, Dean, 2012).

5.4.4.2 Conflict between the IT Staff and Users

During the development of a new application system, the IT staff often felt that the users (i.e., departments/faculties) did not have a clear understanding of the important
features to be included in the system during the preliminary stage. This issue became a barrier to the IT staff completing the development process in a timely manner.

This is like the chicken and egg. This is not about infrastructure or architecture, No. The problem is people. Both users and IT people do not want to think outside the box. Therefore, user said, IT cannot deliver and IT people said user did not say what they want. The IT people did not do their homework. They just need to be a bit creative and need to think from the user perspective (Interviewee Y2, Dean, 2012).

Every application system had an owner, even though it was a university-wide application system that was used by all faculties/departments. The owner was responsible for ensuring the accuracy and confidentiality of the data entered in the systems. Under this arrangement, any modification to the system was dependent on the request of the owner.

The instruction comes from the owner to modify the system, not the user. If not black and white, we cannot do it... We wait for the owner to request for modification (Interviewee Y9, IT staff, 2012).

When the IT Centre developed the application systems internally... the drawback is they keep on using the same method in developing the system. They could not change that. Normally what happen is, when nobody request, they will not change the system, even though they know that an hour operation can be reduced to a minute (Interviewee Y8, Librarian, 2012).

5.4.4.3 Personnel Issues

The issue that the IT Centre was faced with was the IT staff who had long periods of service in the IT Centre. All IT staff were classified under the F14 category. They could only be promoted to the position under the same category. As a result, their job promotion prospects were limited.

The last time when we were in the 1990s, The IT staff at the IT Centre were very vibrant, they sold services, and they were very active because they were young at that time. But now they tend not to do that. When the person entered the IT Centre at the age of 20 or 21, they will be here until their retirement, unless they were seconded or move to other government agencies that also have a F category (Interviewee Y6, Director of IT, 2012).

14 Grade F is a classification under the Malaysian public service scheme for a staff member who focuses on providing IT services at government agencies.
Following the above issue, the inability of the existing IT staff to deliver new projects was also highlighted.

Previously, the management thought that as long as they have IT background (i.e., for hiring new IT staff), then it would do... that was why they appointed people who had multimedia and information systems’ background.... lack of skills because their qualification was problematic in the qualifications... IT staff need to have background from Computer Science... it is not that they don’t want to do the task, it just that they are not capable to do it... They are not able to develop a system that will be sustained... (Interviewee Y5, IT staff, 2012).

We are still using our internal resources (e.g., the IT Centre’s staff) that are limited, and sorry to say, most of them are not strong (Interviewee Y8, Librarian, 2012).

Another issue highlighted was attitude problems due to the inadequacy of the monitoring procedure.

At this level of complacency, there is no punishment to the IT staff. We gave them rewards even though they were not performed, no punishment even if the work was not completed on time (Interviewee Y5, IT staff, 2012).

The only punishment would be my service (Director) would not be continued...For the IT staff, I don’t see any kind of punishment because practically they’re stuck here in the F category... We do internal transfer because we have different units... I feel their resistance because they’re already expert in that field. So if you move them somewhere else, you need to retrain them... IT training is expensive and our fund is limited (Interviewee Y6, Director of IT, 2012)

5.4.4.4 Management Issues

Some of the difficulties related to management-related issues were highlighted.

Top management are not aware of IT policy. When actions need to be taken, sometimes they would prefer it not to be written, through a phone call. I could not do that because IT staff need instruction, black and white... If it is a verbal instruction, then it is very difficult. The policy stated that everything needs to be official (Interviewee Y6, Director of IT, 2012)

Naming the Deputy VC (Research and Innovation) as the CIO also did not produce a positive impact on the IT Centre’s operations.
You can name anyone to hold that post, but can he fulfil the task? (Interviewee Y2, Dean, 2012).

...We know the CIO are busy people... sometimes we (at IT Centre) have a hard time to arrange a meeting with him... it causes a delay in our work... (Interviewee Y1, IT staff, 2012)

Three Directors of the IT Centre had been appointed from 2001 until 2010. The impact is explained as:

Leadership comes from the director, but the position is not permanent... there is no continuity (Interviewee Y5, IT staff, 2012)

In addition, the VC had the power to overrule some of the decisions that had been made. For example, in the case of centralising all IT staff at the IT Centre, the Head of Departments could personally justify to the VC why they needed their own IT staff and managed to retain them.

5.5 IT Governance Arrangements and IT Infrastructure in the Four Cases

The IT governance at the participating organisations was not static. The underlying reasons for this dynamic nature of IT governance are related to each organisation’s history and their organisational culture together with the emergence of new technologies. The following subsections summarise the IT governance structures, processes, relational mechanisms and IT infrastructure in the four organisations.

5.5.1 IT Governance Structures

All four participating organisations established IT committees to assist their IT decision-making. The effectiveness of the IT committees however, varied. For instance, although there was evidence that University X had several committees concerned with IT (e.g., Technical Advisory Group and Technical Coordination Group), the committees were constrained from making many IT decisions, such as IT investment, because their role was only to advise the VC on the IT matters. Interviewee X10 elaborated:

... The advisory committee only advise the VC... couldn’t actually make decisions like other university committees, such as Teaching and Learning Committee (Interviewee X10, Former LDIT, 2012)
On the other hand, even though Company B did not have a specific IT governing committee, its Leadership Committee was effective. Chaired by Company B’s General Manager, the Leadership Committee was responsible for making all business decisions, including IT.

University Y struggled to formalise its governing structure due to the inability of the senior management to arrange a meeting. As a result, all of the paperwork for IT development was brought to Executive Council’s meetings for discussion and approval. This caused a delay in the IT decision-making process.

Within the federated approach at Group ABC, its IT governance was formally structured with the establishment of the IT Steering Committee, Leadership Committees (i.e., Group IT) and IT Council (i.e., Division IT). These committees were formalised under the three pillars of IT (TPIT) that served to guide and coordinate all IT matters at Group ABC.

5.5.2 IT Governance Processes

All of the participating organisations used a mix of IT governance processes that they considered could provide more benefit to their business. This was exemplified within the ITS team at Company B. The ITS team adopted methodologies and standards from various sources to develop their own processes. They believed their processes were better for them because it suited their culture that was driven by a cost and customer focus. It was important for them to eliminate non-value added processes to ensure that no additional costs were incurred that would later burden their customers. Hence, flexibility and teamwork were strongly promoted to ensure their IT governance processes were set in place. This was explained as follows:

We are very much here for the business, so we don’t let process and bureaucracy take over from delivering what the business needs us to deliver for them (Interviewee B2, General Manager of IT, 2012).

5.5.3 IT Governance Relational Mechanisms

In all cases, communication and leadership were found to be important elements of IT governance relational mechanisms. Each case used different communication techniques to support their governance structures and processes. In Group ABC, for
example, two-way communication was always promoted. Interviewee A4 commented on this as:

Recently they organised an event like a brown bag session, a platform basically for me to meet people and sort of communicating some of the key decisions or direction... meeting the users and listen to their direct feedback... you get some idea on how IT is used and what are the challenges, issues or new requirements or governance process... (Interviewee A4, Group CIO, 2012).

The IT leader who could not communicate well, faced resistance from the staff. This was evident at University X during the centralisation project. Due to the one-way communication approach adopted by the ITS Director, leadership was found to be lacking in providing a clear direction as to how IT centralisation could take place. As a result, the centralisation project implementation was stalled. Interviewee X5 raised this issue and noted that,

I think during that period, although there were number of central projects, the progress of those projects, the rationale and the need for collaborative work on those projects were not well communicated... The approach taken was far too draconian. The Director took a much more tyrannical and dictatorial view of how IT should be managed (Interviewee X5, IT Review Panel, 2012).

5.5.4 IT Infrastructure

The arrangements of IT infrastructure varied across the participating organisations. Group ABC adopted a federated approach where all group-wide IT infrastructure was provided by the central IT through the Group Shared Service. The Group Shared Service charged back the costs of the IT infrastructure implementation expenses (i.e., inter-company charges) to the business divisions. Both Company B and University Y had a centralised IT infrastructure, where the ITS and IT Centre, respectively focused on in-house application system development. Attempts to implement new IT infrastructure at these two organisations proved challenging. For example, at University Y, due to the issue of data compatibility that was not supported in a newly developed application system (i.e., Integrated Database Management System- IDMS), its implementation was cost prohibitive. The Director of IT explained,
... The platform we used to develop the IDMS requires the latest version of SharePoint... we currently have its old version... to upgrade to a new version, it cost us like a quarter of million, a huge amount of money and the university don’t have that kind of money to prioritise that on us (Interviewee Y6, Director of IT, 2012).

On the other hand, the arrangements of IT infrastructure at University X were in a transition phase. The IS was in the process of upgrading and consolidating its devolved network and data centre through the Investment Program.

5.6 Summary

This chapter described the historical background of IT governance implementation at Group ABC, Company B, and Universities X and Y that covered a ten to twelve year period of investigation. Overall, the governance arrangements (structures, processes, and relational mechanisms) and IT infrastructure across the four participating organisations varied (e.g., Group ABC used a federated mode of IT governance and Company B adopted a centralised governance approach). Various changes were introduced by management as strategies to improve their IT governance practices. The strategies included restructuring their IT internal structures and appointing a new IT leader.

In the next chapter, the findings reported here are used to explore the dynamic relationships that emerge between the IT governance arrangements and IT infrastructure are explored using the translation process and local/global network analysis approaches. The network analysis, which uses these two approaches, is important to address the first and second research questions posed in Chapter 1.
CHAPTER 6: ANALYSIS OF THE CASE STUDIES FROM AN ACTOR NETWORK THEORY PERSPECTIVE

6.0 Introduction

This chapter presents the analysis of IT governance implementation at the four cases using actor network theory (ANT) as a theoretical lens. The analysis strategy deployed in this thesis uses both the translation and local/global network analysis approaches. These two approaches provide insight into the relationships that emerge from continuous interactions of the heterogeneous actors residing in the governance and infrastructure arrangements (i.e., the first research question).

This chapter begins by presenting the critical milestones identified from the analysis of IT governance implementation using both the translation and local/global network analysis approaches\(^\text{15}\) at Group ABC. A summary of which actors are enrolled and not enrolled, the strategies used and the impact on the network formation, as well as the trajectory of alignment is delivered. Specific movement of the trajectories around milestones are included in the summary to show how the actors’ conflicting interests in the governance and infrastructure arrangements become dynamically aligned and how it impacts on the overall IT governance trajectory (i.e., the second research question). The research model (see Chapter 3) is used to further elaborate and illustrate this dynamic process. Using a similar approach, the results of analysis for Company B, and Universities X and Y then follow.

The analysis presented here uses the language of ANT and as such uses terminology such as obligatory passage point (OPP) and devices of interessement. The ANT terminologies used can be referred back to in Table 3 (see Chapter 3 on the theoretical lens for this thesis).

\(^{15}\) The analysis of how the data were analysed is provided in subsection 3.5 on the application of a translation process and a local/global network analysis.
6.1 Analysis of IT Governance Implementation at Group ABC

Based on the historical analysis of IT governance implementation at Group ABC (see Chapter 5 - Section 5.1), translation process and local/global network analysis approaches are conducted to analyse the dynamics interactions of the actors. Eight milestones to represent the actors’ critical interactions can be clearly identified. From the translation network analysis perspective, these milestone are summarised in terms of which actors are enrolled and not enrolled, the strategies used and their impact on the network formation. The interactions of the actors to achieve interests alignment are further presented in the form of the trajectory movement using the local/global network analysis. Table 23 summarises the dynamic interactions among the IT governance actors from both the translation and local/global network analysis approaches at Group ABC. This summary is used to develop a trajectory of IT governance implementation at Group ABC. The trajectory is illustrated in Figure 6 below.

![Figure 6: IT governance trajectory at Group ABC](image-url)
Table 23: IT governance implementation from the perspective of the local and global networks and the network implications at Group ABC

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies used to support enrolment</th>
<th>Trajectory Movement</th>
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</thead>
<tbody>
<tr>
<td>Phase 1 (2004-2006): Foundation of IT Governance</td>
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<tr>
<td><strong>Global Actors:</strong> Group A management; CIO</td>
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<tr>
<td><strong>Local Actors:</strong> Company XYZ; Group IT; Divisional and subsidiary IT teams; IT infrastructure</td>
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<tr>
<td><strong>A.</strong> Establishment of Company XYZ</td>
<td><em>Global Network:</em> The Group A management established Company XYZ to embark on SAP.</td>
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<td>• At this point, the SAP project was totally driven by the global network.</td>
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<td><strong>Local Network</strong></td>
<td>Company XYZ became the local network.</td>
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<td><strong>(Blocked)</strong></td>
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<tr>
<td><strong>Local Network</strong></td>
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<tr>
<td><strong>B.</strong> Appointment of the first CIO at Group A</td>
<td><em>Global Network:</em> The management appointed the CIO as their proxy to govern the network. The SAP was extended to become a part of Group A’s ERP. Group IT focused on IT planning across the company.</td>
<td></td>
<td>• The CIO established the OPP (i.e., to develop a federated IT governance arrangement and IT infrastructure in a collaborative process). Strategic IT planning, architecture and policy were IT governance processes that were used as</td>
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<tr>
<td><strong>Local Network</strong></td>
<td><em>Local Network (Blocked):</em> No changes were made to the existing IT governance arrangements and IT infrastructure at the division and subsidiaries.</td>
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**Point A to B:**
1. Well defined and clear OPP
2. Negotiation power of actor
3. Decision to establish Company XYZ and to embark on SAP

**Point B to C:**
1. Well defined and clear OPP
2. Appropriate devices of interessement
   - Appointment of the CIO
   - Establishment of Group IT and its two units and its leader
   - Adding Company XYZ under the CIO’s portfolio
   - Appointment of the Infrastructure Service Manager and SAP Project Manager
3. Leadership of the CIO
4. Role of inscription in perpetuating interests

The trajectory’s movement is slightly upwards. This indicates that the local network was successfully enrolled and it accepted the role defined by the global network. The global actor was ready to allocate appropriate resources to support the mobilisation of the local network.
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<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies used to support enrolment</th>
<th>Trajectory Movement</th>
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</table>
| C. Company XYZ became one of the CIO’s portfolios | Global Network | • IT team at divisions and subsidiaries became the local network. | devices of *interessement*. | • The SAP/ERP blueprint | 5. Understanding the organisational culture  
6. Re-consideration of the installed base of IT infrastructure  
• Implementation of the SAP/ERP blueprint at a selected pilot site using a staged approach |
| | Local Network | • Company XYZ was transferred to the CIO’s responsibility.  
• Company XYZ focused on the ERP implementation.  
• Local IT teams at the divisions and subsidiaries provided support after the ERP implementation. | | | |

### Phase 2 (2006-2007): Group Merger

**Global Actors**: Malaysian Government; Group A, B & C’s management teams; SPV; IT Steering Committee  
**Local Actors**: Group A, B & C’s IT organisations, IT Infrastructure

| D. Merger and establishment of Group ABC | Global Network | Local Network (Partly Blocked) | Political pressure from the government ensured the success of the merger.  
• Both local and global networks were merged with their *punctualised* IT | Point C to D: |  
1. Negotiation power of actor  
• Government interference  
• Political interference of interested parties  
2. Merger of IT infrastructure between the merged companies |  
The merger process resulted in the attachment of the |
<table>
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<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies used to support enrolment</th>
<th>Trajectory Movement</th>
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<td></td>
<td>established. <strong>Local Network</strong> • The IT governance arrangements and IT infrastructure from Groups A, B and C were merged as local actors.</td>
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<td>governance arrangements and IT infrastructure.</td>
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<td>local and global networks, dropped downwards. This indicates a disintegration of both the local and global actor to the IT governance actor network. The merger process however was successful.</td>
</tr>
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</table>

**Phase 3 (2007-2010): Three Pillars of IT**

**Global Actors:** Group CIO, Group IT, Group Head of Global Service Centre  
**Local Actors:** Division IT, Group Shared Service, IT Infrastructure

- E. CIO from Group A became the Group CIO for the merged company
- Global Network • Group A’s CIO was appointed as Group CIO. • The Group CIO and Group IT focused on restructuring the IT governance arrangements and IT infrastructure. **Local Network** • IT organisations from the merged entity were
- **Local Network (Partly Blocked)** • The IT infrastructure still not heavily enrolled.
- **Point D to E** 1. Well define and clear **OPP** 2. Appropriate devices of **interessement** • Establishment of the Merger Integration Committee and IT Steering Committee • Communication on the benefit of the merger • Appointment of the Group CIO • Appointment of the CIOs from Groups B and C as the Division

The reconstruction of the global and local networks was fairly rapid. The attachment of both actors was emerging. This indicates that the role
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<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies used to support enrolment</th>
<th>Trajectory Movement</th>
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</thead>
</table>
| F. Establishment of the Global Service Centre | **Global Network**  
- Group ABC decided to detach Company XYZ from Group IT.  
- Global Service Centre was established, and its divisions of Group Shared Service focused on consolidating IT infrastructure.  
- Group-wide IT infrastructure (i.e., ERP) was *enrolled* as a local network. | **Local Network (Partly Blocked)**  
- The divisions maintained specific IT infrastructures. | *negotiation* process (i.e., to accept the OPP). | IT Heads  
3. Role of *inscription* in perpetuating interests  
- Three-phase merger roadmap  
4. Implementing ERP as group wide IT infrastructure in a staged approach | and actions taken by the Group CIO were effective. |

**Point E to F:**  
1. Well defined and clear OPP  
2. Understanding the culture of the merged companies  
- Strengthen the teamwork spirit  
- Emphasis on collaborative process  
3. Leadership style of the Group CIO  
4. Appropriate devices of *interessement*  
- Communication (briefing session, two-way communication)  
- Establishment of the Global Service Centre and its leader  
- Consolidation of IT infrastructure through Group Shared Service  
5. Role of *inscription* in perpetuating
### Phase 4 (2010-2012) : Collaboration in Governance

**Global Actors:** Group CIO, IT Steering Committee, IT Leadership Committee; Group IT

**Local Actors:** IT Council; Division IT; Group Shared Service, IT Infrastructure

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<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
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<th>Trajectory Movement</th>
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<td>interests</td>
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<td>• Establishment of the TPIT</td>
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<td>• IT strategy</td>
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<td>• IT policy</td>
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<td></td>
<td>• Background and experience of the Group CIO</td>
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<td>6. Re-consideration of the installed base of the IT infrastructure from the merged companies</td>
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<tr>
<th>G. Alignment of IT governance structure with business divisions</th>
<th>Global Network</th>
<th>Local Network</th>
<th>Network Implications</th>
<th>Strategies used to support enrolment</th>
<th>Trajectory Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Global Network</strong></td>
<td>• An attempt to strengthen the IT governance structures through the establishment of the IT Steering Committee, IT Leadership Committee.</td>
<td>• The IT Council was established to support Division IT.</td>
<td>• Communication between the local and global actors was strong, and the OPP was accepted.</td>
<td>• Both the local and global networks were enrolled when they accepted the interests and roles assigned to them through the TPIT.</td>
<td><strong>Point F to G:</strong> 1. Well define and clear OPP 2. Understanding the organisational culture • Emphasis on collaborative process • Business division had their own IT governance arrangements 3. Top management support 4. Leadership style of the Group CIO 5. Appropriate devices of interessement • Clear decision-making structures, responsibilities</td>
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| H. Increase in the                                           | Global Network | Global Network (Partly Blocked) | • Group CIO established an IT-business | • The challenge | **Point F to G:** 1. Well define and clear OPP 2. Understanding the organisational culture • Emphasis on collaborative process • Business division had their own IT governance arrangements 3. Top management support 4. Leadership style of the Group CIO 5. Appropriate devices of interessement • Clear decision-making structures, responsibilities |

The movement of the trajectory was gradually increased. This indicates that the Group CIO had succeeded in reattaching the local network and mobilised them. The OPP was accepted and that
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<th><strong>Milestone</strong></th>
<th><strong>Enrolled Network Actors</strong></th>
<th><strong>Non-Enrolled Network Actors</strong></th>
<th><strong>Network Implications</strong></th>
<th><strong>Strategies used to support enrolment</strong></th>
<th><strong>Trajectory Movement</strong></th>
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</table>
| contribution of IT to value creation | partnership framework. *Local Network*  
   • The relationships between the local actors were strong. | was to standardise the IT infrastructure across Group ABC. *Local Network (Partly Blocked)*  
   • The ERP system was not in a standard form that fits all the divisions. | network.  
   • Communication was emphasised to reduce the tension between the local and global actors, and as a means to achieve network *durability*. | and accountabilities through the three pillars of IT  
   • Two way communication (i.e., brown bag sessions)  
   • Informal communication with Group CIO  
   • IT training  
   • Appointment of appropriate *spokesperson* to represent business units | resulted in a successful and stable relationship between both the local and global networks |
| **Point G to H:** | 1. Well defined and clear *OPP*  
   2. Role of *inscription* in perpetuating interests  
   • The TPIT  
   • The IT strategies and objectives  
   • Background and experience of the Group CIO  
   3. Appropriate devices of *interessement*  
   • Two way communication | | | | |
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<td>across the TPIT</td>
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<td>4. Leadership style of the Group CIO</td>
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<td>5. Understanding the organisational</td>
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<td>6. Implementation of new IT</td>
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<td>infrastructure</td>
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The critical interactions of the actors highlighted in Table 23 above can be further described using the research model. Figure 7a-d below illustrates the dynamic relationships of the IT governance implementation at Group ABC.

Figure 7: Network analysis of translation at Group ABC

6.1.1 Phase 1 (2004-2006): Foundation of IT Governance

Figure 7a illustrates the network analysis of the interactions of all actors in this Phase 1. At the beginning of this phase, the IT governance arrangements actor networks were separately maintained in three different units. Each unit was stand-alone and disparate, and ran non-standard applications and separate IT infrastructures. Integration between the three units was not visible at this stage. The changes in the governance and infrastructure arrangements commenced after management (the primum moven) set up an obligatory passage point (OPP) of implementing SAP as the standard financial system across business divisions and subsidiaries. Two strategies (intermediaries) were used: (1) the establishment of Company XYZ to manage and implement the SAP across Group A; and (2) the appointment of a new CIO.

As a proxy for the primum moven in governing the implementation of the SAP, the newly appointed CIO (i.e., the focal actor) revised the original OPP and reconsidered all actors who might be involved in the new IT governance network. The CIO decided to
redefine the OPP as a new federated model in a more collaborative process. Various devices of interessement were used by the focal actor to entice all actors into the new IT governance network. These included: (1) the establishment of Group IT with new units of Strategy, Architecture, and Planning, and Risk and Security Management; (2) transferring Company XYZ’s operations (i.e., to manage and implement SAP) to his leadership; and (3) a decision to extend SAP, not only to cover Group A’s financial system, but its function would also be expanded to become a part of their ERP environment. The appointment of the Information Service Manager and SAP Project Manager was a tactic used to support the enrolment of Company XYZ.

The enrolment of all actors was facilitated by the development of the IT strategic plan, architecture and policy (i.e., an inscription). The inscription was important because it inscribed the delegated roles, responsibilities and practices among all actors. Mobilisation of actors into the IT governance network occurred when the actors accepted that IT was governed in a federated approach and the ERP was used as a group wide IT infrastructure. The divisions and subsidiaries agreed to work collaboratively with Group IT in determining the best IT infrastructure for their specific niche. The tactics used included the ERP blueprint (developed centrally by Group IT), and its implementation at a selected pilot site, communication and leadership. Communication was emphasised to support and improve the understanding between IT and the business’ needs.

Even though the ERP is a group wide application, we did not say that every division will go for ERP… but we said, we give priority to ERP (Interviewee A3, Head of IT Group, 2012).

His leadership style helped the focal actor to provide a clear direction for the actors to accept the OPP and to create confidence in how their collective action would have a positive impact on the organisation.

6.1.2 Phase 2 (2006-2007): Group Merger

The network analysis for this phase is illustrated in Figure 7b above. Problematisation of translation commenced with the decision made by the government to merge Group A, B and C as one entity. This decision affected the stability of the IT governance networks in the three Groups.
The SPV management team was the focal actor that controlled and managed the merger process. The establishment of the Merger Integration Committee and IT Steering Committee were strategies to facilitate the merger exercise. The Merger Integration Committee used the three-phase merger roadmap as a device of interessement to enrol Groups A, B and C into a new Group ABC. The IT Steering Committee considered the interests of the punctualised actors of IT at Groups A, B, and C and decided to use several devices of interessement to support their enrolment. Firstly, the appointment of Group A’s CIO as the CIO for Group ABC. Secondly, the appointment of Group B and C’s CIOs as Division IT Head. Finally, the implementation of ERP as a group-wide IT infrastructure in Group ABC.

**6.1.3 Phase 3 (2007-2010): Three Pillars of IT**

The interactions of actors in Phase 3 are illustrated in Figure 7c. A new translation process commenced under the leadership of the new Group CIO (i.e., the focal actor). The three-phase merger roadmap was used as an inscription to guide the development of IT governance for Group ABC. The OPP of federated governance approach using a more collaborative process was set up and the “three pillars of IT” was introduced. Under these pillars, each of the actors was designated specific roles and how they related to one another was identified.

The IT planning, architecture and strategy processes and IT policies were used by the Group CIO as devices of interessement to support the enrolment of all actors into the three pillars of IT. Communication to the IT personnel (e.g., through briefing sessions and a team-building course) about the overall goals of the merger and its impact on them was a tactic used to minimise the impacts of the merger and promote cultural integration between the merged companies.

The first two years after the merger, we were really struggling... people need to understand... At some junction, we realised some resistance occurred. We decided to place emphasis on communication (Interviewee A1, Head of Group IT, 2012).

Apart from its role as a device of interessement, the IT policies were also used as an inscription that inscribed the interests of Group ABC’s management on their responsibility and obligations of all actors in the network.
The Group CIO used the term ‘consolidation’ as a strategy during the process of amalgamating the IT infrastructure from Groups A, B and C. Driven by the OPP and the strategy to use ERP as a group wide IT infrastructure, the Group CIO, together with Group IT, focused on finding commonalities between the merged companies. From an ANT perspective, this was an example of the punctualised IT infrastructure being opened up for the focal actor to reconsider the constituting elements. In this context, the installed base of the IT infrastructure from the merged companies was reconsidered prior to ERP implementation. A new operating model for Group Shared Service and staged phases of ERP implementation were the tactics used to support enrolment of the IT infrastructure.

6.1.4 Phase 4 (2010-2012): Collaboration in Governance

The interactions of actors in Phase 4 are illustrated in Figure 7d above. At this stage, the focal actor appointed spokespersons to represent the enrolled actors (i.e., Group CIO was the spokesperson for the Group IT; the Division IT Head for Division IT; and Group Shared Service for the common IT infrastructure). The IT governance processes, such as IT policy, were used as an inscription in outlining the agreement of all actors on their roles and responsibility related to IT governance.

The Group CIO maintained the durability of the mobilised actors using the IT-business partnership framework. The IT-business partnership framework was an inscription that dictated the patterns of how actors interact across the three pillars. The IT-business partnership framework was also an immutable mobile because it shaped the shared culture (i.e., to work collaboratively across the TPIT) that was relatively stable over space and time, and became powerful in terms of its ability to provide a balanced relationship between all actors.

This is a collaborative process because working with people is not only a command and order... being in the corporate head office like us, where Group IT is detached from the real operation, we realise that business divisions are where the money is made... give respect to those people who are very capable in doing their job. You are not always right, so you have to listen to them. It is not something that you define in a bible, and you expect everybody to follow it. In the environment like us, we are good at working together, collectively as a team, rather than I said this and you follow (Interviewee A4, Group CIO, 2012).
Communication was continuously used (e.g., Brown Bag session) to support the mobilisation of all actors in the network.

It becomes the platform for me to meet users and communicate some of the IT key decisions and IT direction... listen to their direct feedback. By talking to users, we obtain some idea on how IT is used and know the issues, and challenges around them. We need to put ourselves in their shoes. This is how we get the sense on how urgently we need to change in certain policies, promote flexibility and how fast we can react to all those things (Interviewee A4, Group CIO, 2012).

6.2 Analysis of IT Governance Implementation at Company B

For Company B, eight milestones to represent the actors’ interactions are identified based on the historical analysis of IT governance implementation (see Chapter 5 - Section 5.2). The enrolment and non-enrolment of actors in the network are summarised in Table 24 below and the IT governance trajectory is depicted in Figure 8.

![Figure 8: IT governance trajectory at Company B](image)
Table 24: IT governance implementation from the perspective of the local and global networks and the network implications at Company B

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies used to support enrolment</th>
<th>Trajectory Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase 1 (2001-2005): Foundation of IT Governance</strong></td>
<td><strong>Global Actors</strong>: Group XY, Integration Governance Committee, Leadership Committee, Project Manager, ITS Leadership Team, Managing Director of Company B</td>
<td><strong>Local Actors</strong>: Integration team, ITS team, HSC’s IT infrastructure, Company B’s IT infrastructure</td>
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<tr>
<td>A. Acquisition of the HSC by Group XY</td>
<td><strong>Global Network</strong> • An internal integration was conducted by Company B to merge with the HSC. • Integration Governance Committee became a global governing network for integration process.</td>
<td><strong>Local Network</strong> • Integration team became the local network together with the ITS and Company B’s IT infrastructure. • The focus was on enrolling the HSC’s punctualised IT infrastructure.</td>
<td><strong>Global Network (Partly Blocked)</strong> • The Integration Governance Committee was concerned about disruption in the HSC’s business operation Local Network (Blocked) • The HSC’s punctualised IT infrastructure was not compatible with Company B’s IT infrastructure.</td>
<td><strong>Network development was initiated by the global network of Leadership Committee (i.e., primum moven).</strong> • The OPP (i.e., integrating the HSC’s business operations to enable acquisition synergy as quickly as possible) was established and the local network was responsible to deliver the project. • Communication and leadership model were important.</td>
<td><strong>Point A to B:</strong> 1. Well defined and clear OPP 2. Negotiation power of actor • Decision to merge with the HSC 3. Top management support 4. Role of inscription in perpetuating interests • Integration strategy 5. Appropriate devices of interessement • Establishment of the Integration Governance Committee <strong>Point B to C:</strong> 1. Appropriate devices of interessement • Appointment of new Managing Director 2. Re-consideration of the installed base of the existing IT infrastructure</td>
</tr>
<tr>
<td>B. Integration of</td>
<td><strong>Global Network</strong> • Project Manager was</td>
<td><strong>Local Network (Partly Blocked)</strong></td>
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</table>

At first, the attachment of the global actor was elevating, due to the use of appropriate devices of interessement. The attachment of the local actor however slipped back due to the limited mobilisation of the IT infrastructure.
<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies used to support enrolment</th>
<th>Trajectory Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>the HSC’s <em>punctualised</em> IT infrastructure</td>
<td>appointed to lead the integration process.</td>
<td>• The HSC’s <em>punctualised</em> IT infrastructure was still running on its original platform.</td>
<td>Integration Governance Committee was important to ensure the integration process was achieved.</td>
<td>• Developing application interface 3. Role of <em>inscription</em> in perpetuating interests</td>
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<td></td>
<td>• Project Manager reported to the Integration Governance Committee</td>
<td>• In the negotiation process, the <em>focal</em> actor led the integration team to create an interface (i.e., tactic) to link the HSC’s <em>punctualised</em> IT infrastructure with Company B’s IT infrastructure.</td>
<td>• New business strategy by newly appointed Managing Director.</td>
<td>• New business strategy</td>
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<td></td>
<td><em>Local Network</em></td>
<td>• The HSC’s <em>punctualised</em> IT infrastructure was temporarily <em>enrolled</em>.</td>
<td>• Leadership Model</td>
<td>• Leadership Model</td>
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<tr>
<td></td>
<td>• ITS team became the local network and helped the integration team with the IT infrastructure’s enrolment.</td>
<td>• The HSC’s <em>punctualised</em> IT infrastructure was still running on its original platform.</td>
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<td></td>
<td>• The HSC’s <em>punctualised</em> IT infrastructure was still running on its original platform.</td>
<td>• The IT infrastructure network was weak, particularly in terms of its ability to process the increase in transactions.</td>
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<td></td>
<td><em>Global Network</em></td>
<td>• Recognition of problem associated with a limited enrolment of the HSC’s IT infrastructure.</td>
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<td></td>
<td>• The ITS Leadership team led by the General Manager of ITS started to look at the ability of the COBOL system to process the increase in transaction processing.</td>
<td>• The IT infrastructure network was weak, particularly in terms of its ability to process the increase in transactions.</td>
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<td></td>
<td>• New business strategy by newly appointed Managing Director.</td>
<td>• A pre-requisite assessment was used as a tactic to re-define the interests of IT infrastructure</td>
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<td></td>
<td>• A pre-requisite assessment was used as a tactic to re-define the interests of IT infrastructure</td>
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<tr>
<td>C. Conducting a pre-requisite assessment</td>
<td><em>Global Network</em></td>
<td>• The IT infrastructure network was weak, particularly in terms of its ability to process the increase in transactions.</td>
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<td></td>
<td>• The ITS Leadership team led by the General Manager of ITS started to look at the ability of the COBOL system to process the increase in transaction processing.</td>
<td>• A pre-requisite assessment was used as a tactic to re-define the interests of IT infrastructure</td>
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<td></td>
<td>• New business strategy by newly appointed Managing Director.</td>
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<td></td>
<td><em>Local Network (Partly Blocked)</em></td>
<td>• The IT infrastructure network was weak, particularly in terms of its ability to process the increase in transactions.</td>
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<tr>
<td></td>
<td>• Recognition of problem associated with a limited enrolment of the HSC’s IT infrastructure.</td>
<td>• A pre-requisite assessment was used as a tactic to re-define the interests of IT infrastructure</td>
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<td>Milestone</td>
<td>Enrolled Network Actors</td>
<td>Non-Enrolled Network Actors</td>
<td>Network Implications</td>
<td>Strategies used to support enrolment</td>
<td>Trajectory Movement</td>
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<tr>
<td>Local Network</td>
<td>• The increase in transactions led to the need to strengthen the COBOL system as a local network.</td>
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<td>and to collaborate with new business strategies defined by the new Managing Director.</td>
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**Phase 2 (2005-2008): Upgrade of IT Infrastructure**

**Global Actors**: Leadership Committee, Governance Committee, Project Manager (Stage 1 of the Launchpad project)

**Local Actors**: Launchpad project team, ITS team, Company B’s IT infrastructure, HSC’s IT infrastructure

<table>
<thead>
<tr>
<th>D. Implementation of Stage 1 of the Launchpad project</th>
<th>Global Network</th>
<th>Global Network (Partly Blocked)</th>
<th>Point C to D:</th>
</tr>
</thead>
</table>
| • Project Manager of Stage 1 of the Launchpad was appointed as a *focal* actor. | • No clear IT strategy to govern the IT arrangements and IT infrastructure. | 1. Well defined and clear *OPP*  
2. Appropriate devices of *interessement*  
• Pilot trial for business process upgrade  
• Pre-requisite assessment  
• Phase 1 of the Launchpad project  
• Appointment of two project managers  
• Project managers report directly to the Managing Director in the Governance Committee | |
| • Governance Committee was *enrolled* as a spokesperson for the *primum mover*.  
Local Network | • COBOL system was still running as a major system used in Company B. It was a legacy system that could not be | • A new *OPP* of business process and information system upgrade was established.  
• An attempt to fully *enrol* the HSC’s IT infrastructure into Company B.  
• The tension between the COBOL system and Oracle ERP was minimised through the staged approach in the upgrading process. | |
| • The Launchpad team was *enrolled* as a local network.  
• The installed base of IT infrastructure was reconsidered.  
• New IT infrastructure was *enrolled*. | | 3. Role of *inscription* in perpetuating interests  
• Leadership Model defining the | |

Both the global and local actors accepted the *OPP*. A positive movement from point C to D was established, indicating that the attachment of both local and global actors to the IT governance network was emerging.
<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies used to support enrolment</th>
<th>Trajectory Movement</th>
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<td></td>
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<td>immediately removed.</td>
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<td>culture of Company B</td>
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<td>4. Top management support</td>
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<td>5. Re-consideration of the installed base of the IT infrastructure</td>
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<td>• Staged approach in upgrading the IT infrastructure</td>
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**Global Actors**: ITS Leadership team, Leadership Committee, General Manager of ITS, Board, Governance Committee

**Local Actors**: Launchpad team, ITS team, IT infrastructure

**Global Network**
- Evaluation of Stage 2 of the Launchpad was made and its extension was approved.
  - Local Network
    - The Launchpad and ITS teams were enrolled as local actors.
    - The local network of IT infrastructure was internally developed.

**Local Network (Partly Blocked)**
- COBOL system was not fully enrolled into the IT governance network. It was still used as a main system to support business operations.
- Limited IT governance processes to maintain flexibility in delivering IT projects.
- The complexity in the IT infrastructure was stabilised through a careful upgrading process.
- The IT infrastructure enrolment was totally shaped by the ITS and Launchpad teams through in-house development.
- Culture played an important role in inscribing the actors’ actions.

**Point D to E:**
1. Well defined and clear OPP
2. Role of inscription in perpetuating interests
   - Re-evaluation report
   - New plan for Stage 2
3. Re-consideration of the punctualised IT infrastructure
   - Upgrading the overall network in a careful manner
4. Top management support
5. Understanding the organisational culture
   - In-house development of new POS system
6. Appropriate devices of interessement
   - Phase 2 of the Launchpad

The movement of the trajectory was elevated, indicating that the attachment of both the local and global actors was effective.
<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
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<td>project</td>
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<td>• Appointment of a project manager for Stage 2</td>
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<td>• The project manager reports directly to the Managing Director in the Governance Committee</td>
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<td>• Engagement with business people</td>
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<td>• Communication – direct report to the Managing Director</td>
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</table>

**Phase 4 (2010-2012): Driving Business Requirements**

**Global Actors**: Governance Committee, Major Project Committee, ITS Leadership team, General Manager of ITS

**Local Actors**: ITS team, IT infrastructure

F. Conducting Stage 3 of the Launchpad as a small project

**Global Network**
- Revision of Phases 1 and 2 of the Launchpad. As a result, Stage 3 of the Launchpad was deferred.

**Local Network**
- Local network of ITS decided to continue Stage 3 as a small project.
- IT infrastructure was stabilised through the staged migration process.

**Global Network (Partly Blocked)**
- Recognition of a problem with the existing priorities of the ITS team.
- Lack of IT strategy resulted in a review of IT infrastructure development by the focal actor.
- The tension between the global and local actor was minimised through the staged migration of the COBOL system to Oracle ERP.

**Point E to F:**
1. Negotiation power of actor
2. Role of inscription in perpetuating interests

**Point F to G:**
1. Well defined and clear OPP
2. Role of inscription in perpetuating interests

A downward movement in the trajectory was traced when the global actor decided to defer Stage 3 of the Launchpad project. The degree of attachment of the
<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
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<th>Strategies used to support enrolment</th>
<th>Trajectory Movement</th>
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<tbody>
<tr>
<td>G. Delivering business requirements projects</td>
<td><strong>Global Network</strong>&lt;br&gt;• The IT Leadership team was enrolled as the focal actor.&lt;br&gt;• Leadership Committee initiated several business requirements projects.&lt;br&gt;• Major Project Committee acted as the spokesperson to monitor the delivery of business requirements projects.</td>
<td><strong>Local Network (Blocked)</strong>&lt;br&gt;• All IT projects were delivered but without a proper strategy from an IT perspective.</td>
<td>• The global network of the Leadership Committee was heavily involved in determining and prioritising the business requirements projects.&lt;br&gt;• Communication between the global and local actors was strong. It helped the local network of ITS to deliver the projects.&lt;br&gt;• Culture of the ITS inscribed the way they worked to support the business strategy.&lt;br&gt;• The relationships between the global and local actors were emerging.</td>
<td>• Prioritisation of business requirement project&lt;br&gt;• ITS vision&lt;br&gt;• Leadership Model&lt;br&gt;• Business strategy</td>
<td>local actor was consistently increasing due to the use of appropriate devices of interessement. The focal actor’s effort to increase global network attachment was successful when the ITS team delivered the business requirement projects.</td>
</tr>
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</table>

3. Appropriate devices of interessement<br>• Communication – direct reporting to the Managing Director through Major Project Committee<br>• Converting Stage 3 as a small project<br>• Project manager reports directly to the Major Project Committee

4. Understanding the organisational culture

5. Re-consideration of the installed base of the IT infrastructure<br>• In house migration process in staged phases<br>• Delivering business requirements (IT projects) that were compatible with the existing IT infrastructure through in-house development
<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies used to support enrolment</th>
<th>Trajectory Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>H. Improving IT governance implementation</td>
<td><strong>Global Network</strong>&lt;br&gt;• New IT strategy was developed.&lt;br&gt;<strong>Local Network</strong>&lt;br&gt;• Oracle ERP was fully <em>enrolled</em> after the migration of COBOL system was completed.&lt;br&gt;• The relationships between the local actors were strong.</td>
<td><strong>Local Network (Partly Blocked)</strong>&lt;br&gt;• Recognition of the need to upgrade the Oracle ERP</td>
<td>• The tension between global and local actors was minimised through the new IT strategy development.&lt;br&gt;• The global and local networks were <em>enrolled</em> when they accepted the interests and roles assigned to them.</td>
<td>• Risk assessment procedure</td>
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<tr>
<td><strong>Phase 5 (2012-2013): Continuous Improvement</strong>&lt;br&gt;<strong>Global Actors:</strong> ITS Leadership Committee, Leadership Committee&lt;br&gt;<strong>Local Actors:</strong> ITS team, IT infrastructure</td>
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<td><strong>Point G to H:</strong>&lt;br&gt;1. Well define and clear OPP&lt;br&gt;2. Appropriate devices of <em>interessement</em>&lt;br&gt;• Series of meetings of the IT Leadership team&lt;br&gt;• Appointment of KPMG for IT project independent review&lt;br&gt;3. Understanding the organisational culture&lt;br&gt;4. Role of <em>inscription</em> in perpetuating interests&lt;br&gt;• ITS vision&lt;br&gt;• New IT strategy&lt;br&gt;• KPMG review report&lt;br&gt;5. Top management support&lt;br&gt;6. Re-consideration of the installed base of the IT infrastructure&lt;br&gt;• Upgrading to ERP Oracle in a staged process&lt;br&gt;• Delivering business requirement projects</td>
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The movement of the trajectory was gradually upwards, indicating a strong attachment of the local and global actors to the network.
Further analysis of how the dynamic interactions among actors become stable is provided in this section (see Figure 9a-c below).

6.2.1 Phase 1 (2001-2005): Foundation of IT Governance

A number of dynamic interactions that occurred between all actors at Company B in Phase 1 was identified (Figure 9a). The Leadership Committee was the primum moven who established an Integration Governance Committee to facilitate the integration of HSC and Company B. The primum moven set out to integrate the HSC’s business operations into Company B for enabling acquisition synergy as an OPP. A Project Manager was appointed and he became the focal actor leading this in-house integration project. The focal actor carefully considered the actors residing in the HSC’s punctualised IT infrastructure because it was not compatible with Company B. Two tactics were employed, firstly, to leave the HSC’s POS system in place to continue operations; and secondly to create an interface application system to link HSC’s POS system with Company B. The HSC’s IT infrastructure was enrolled and the commitment of HSC was inscribed through its parallel operation with Company B’s POS system.

... the HSC had a totally different system. We decided to leave the store systems as they were in both organisations (the HSC and Company B). But, we create an interface to the HSC’s store systems into our Cobol systems... these efforts were seen as having lower risk and impact... if we replace the store system across the whole HSC using our COBOL system, that was about the same size as Company B at that time, which is about 150 stores.... If we changed the HSC system, the disruption would have been huge... so we made it seamless from the HSC’s point of view (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).
The newly appointed General Manager used a Leadership Model as an *inscription* to define the role of actors in achieving the new business strategy.

...we offer a leadership model around having the right people in the right roles with the right values, as well as understanding the overall vision and what it takes to get there... it’s very much part of the culture of the organisation (Interviewee B2, General Manager of IT, 2012).

### 6.2.2 Phase 2 (2005-2008): Upgrade of IT Infrastructure

In Phase 2, the dynamic interactions continued between all actors in the governance arrangements and IT infrastructure are illustrated in Figure 9b above. As a continuation from the translation process at Phase 1, the interests of all actors were re-defined (*problematisation*). The pre-requisite assessment became an *inscription* for the Board in approving a Launchpad project for upgrading the business process and information system (i.e., *OPP*).

In order to do the Phase 1 of the Launchpad project, we had to do a prerequisites assessment, where we mapped all of our business processes.... That was something that had never been done before because our system was just being sort of grown organically as we increase in size... we spent a good 6 months out there, looking at how business was operating, documenting process flows as a prerequisite to manage the project... So, we knew what the functions were that we wanted in regards to the new system (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).

The role of *focal* actor shifted to the Project Manager for Stage 1 of the Launchpad project. It was found that the aim of the *focal* actor was not to make himself *indispensable*, which is in contrast to Callon’s (1986b) view; but rather his aim was for Stage 1 of the Launchpad project to be *indispensable*. The Governance Committee was *enrolled* as a *spokesperson* for the Leadership Committee. Its membership, which included all Company B’s general managers, was used as a tactic to entice them to accept the *OPP*. In addition, the *focal* actor used communication as a tactic to report the progress of Stage 1 of the Launchpad project to the Governance Committee.

The Governance Committee was a subset of the whole management team (Leadership Committee) because everybody had directly been impacted by the implementation of the Launchpad project (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).
The elements inside the *punctualised* IT infrastructure were re-considered. Two devices of *interessement* were used to enrol them into the IT governance network: (1) improving Company B’s business process, and (2) upgrading the information systems. The tactic employed to enhance the business process was achieved through the implementation of a new inventory management system. For the system upgrade, the strategy used was to develop and upgrade IT infrastructure in-house. In this context, the Oracle ERP was a new actor to be *enrolled* in the IT governance network to replace the COBOL system. The tactics to support this strategy were firstly, the appointment of two Project Managers to lead the upgrading project; one was from the ITS and another was Oracle’s representative. Secondly, after considering the installed base of the existing IT infrastructure, a staged approach of upgrading the COBOL system to Oracle ERP was implemented.

...we partnered with Oracle for the implementation. So, that was considered a joint project here we had Oracle and Company B project managers... they (Oracle) jointly managed this project and that was a slightly different structure to what we would normally had... but, this new structure still had to report to the Governance Committee (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).

### 6.2.3 Phase 3 (2008-2010): Implementation of New Technology

The dynamic interactions between all actors in the IT governance arrangements and IT infrastructure actor networks in Phase 2 are discussed based on Figure 9b above. A new translation process occurred when the ITS Leadership team decided to conduct a review to re-evaluate the proposed contents of Stage 2 of the Launchpad. The review report was used as an *inscription* by the Leadership Committee to convince the Board to approve an extension for the duration of Stage 2.

...after the first phase, we achieved what we wanted and then we said okay, what is our priority now? ... so we went back to the Group XY’s Board... we explained our original plan and why we required a longer period for Phase 2 ... We didn’t go back and ask for additional money. We just basically wanted the project to be restructured. We needed to spend more time because Phase 2 had huge impact on the business operations... it was really a risk mitigation exercise and we were not going to rush into this (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).
The Project Manager for Stage 2 was enrolled as the focal actor. He became a spokesperson to represent Stage 2 of the Launchpad in the Governance Committee. At this stage, the upgrade of the overall network at the stores from its legacy COBOL system to Oracle ERP and a new POS system development were used as devices of interessement. The Governance Committee played an active role in monitoring the progress of Stage 2 of the Launchpad (i.e., tactic). The IT governance arrangements actor network was maintained, hence it was directly enrolled into the IT governance network.

In Phase 2 (Launchpad project), I was the project manager, I reported directly to the Governance Committee. I obviously had a very close relationship with the General Manager of IT, who was also a member in the committee. But, I didn’t have to report to the General Manager of IT (interviewee B5, IT Manager and former Launchpad Project Manager, 2012).

The interests of new actors of Oracle ERP, a new POS system and existing COBOL system were reconsidered to be aligned with the OPP to make a successful translation. The tactics used to enrol these actors were through a careful network upgrade across stores and installation of new data storage. The ITS vision was used as an inscription to support enrolment of all actors. This enrolment effort was supported by using the tactics of the business engagement program and communication of ITS shared values.

6.2.4 Phase 4 (2010-2012): Driving Business Requirements

The interactions of all actors involved in Phase 4 are illustrated in Figure 9b above. The initiation of a new network began after the focal actor (i.e., IT Leadership team) reviewed both Stage 1 and 2 of the Launchpad project. The focal actor decided that they should concentrate on the new OPP of delivering business requirements projects requested by the primum moven (i.e., Leadership Committee). The Major Project Committee was enrolled into the network and became a spokesperson for the primum moven. The reports of the Stages 1 and 2’s review were used as a powerful inscription to defer the Stage 3 of the Launchpad project. Company B’s leadership model inscribed the way the business requirements project was determined. In this context, the primum moven initiated the business requirements project and they used the business strategy as a device of interessement to prioritise the projects. Communication was used as a tactic by the Leadership Committee to inform the ITS on the prioritised
business requests (i.e., inscription). The ITS vision and shared values were used to guide the enrolment of the ITS team. The focal actor transformed the elements inside the Stage 3 project into a small project as a tactic to enrol the Oracle ERP and COBOL systems into the IT governance network.

...when we reached the end of Phase 2, a decision was made... let’s stop... let’s stop... Phase 3 was a self-contained piece that we didn’t actually need to do right then... instead of doing Phase 3, we obtained this big list of additional development projects that was needed to be done as soon as possible... We actually broke up Phase 3 into smaller chunks and we did it as part of the overall new project development... rather than saying this is Phase 3 of the Launchpad, we said let’s do another big project... that’s the approach that we took... we’re almost at the point where we are able to say, we can turn off that Cobol system (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).

6.2.5 Phase 5 (2012-2013): Continuous Improvement

Dynamic interactions continued to occur between the actors in Phase 5. Their interactions are summarised and illustrated above in Figure 9c. The focal actor (i.e., IT Leadership team) decided to have a more formal approach to support the ITS operations and guide IT infrastructure development (i.e., OPP). Two devices of interessement were used. Firstly, through several meetings, the need to establish an integration strategy was communicated and subsequently, a new IT plan was developed. Secondly, KPMG was appointed to conduct an independent review of the business requirements project that had high impact on the business. The review report became an inscription, testifying that the project was in good shape and it was presented to the Major Project Committee and Leadership Committee. The review was important because Company B did not embody a specific IT governance framework to maintain its culture. The enrolment of IT infrastructure was evident with the successful migration from COBOL system to Oracle ERP.

...once we developed all of our systems and decided to go live with this huge chunk of functionality, we brought in a third party (KPMG) to do an independent review... they basically reviewed our processes, the testing regime that was used and the whole project deliverables... they independently made an assessment and presented the result to the Governance Committee. They basically reported... yes, we think you are in a good shape... so, we didn’t have a whole lot of the normal governance structure... We didn’t have a
strong full project management, such as Prince 2 or whatever in place... so, as a final check to make sure that we actually were in a good position that we thought we were in, we had an independent evaluation by KPMG (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).

6.3 Analysis of IT Governance Implementation at University X

Eleven milestones to represent the actors’ interactions can be clearly identified from the historical analysis of IT governance implementation at University X (see Chapter 5 - Section 5.3). These milestones are summarised in terms of which actors are enrolled and not enrolled, the strategies used and their impact on the network formation and how it affected the trajectory movement (see Table 25). This summary is used to develop an IT governance trajectory for University X as illustrated in Figure 10 below.

Figure 10: IT governance trajectory at University X
Table 25: IT governance implementation from the perspective of the local and global networks and the network implications at University X

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies to support enrolment</th>
<th>Trajectory Movement</th>
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</thead>
</table>
| A. Appointment of the EDFR | Global Network  
• The new Executive Director Finance and Resources (EDFR) became a global actor, targeted development of a new network.  
• A Strategic Plan for IT/IS was developed.  
Local Network  
• The Administrative Computing Services and University Communication Services were the separate local networks providing different IT services across the campus. | Global Network (Blocked)  
• The Strategic Plan for IT/IS enlisted too many priorities (fifty-seven) to be accomplished over a three-year period.  
Local Network (Blocked)  
• At this time, the faculties were not involved. They had their own IT governance arrangements and IT infrastructure that was led by the Deans. | • The EDFR initiated the new IT governance network development by defining the OPP.  
• The Strategic Plan for IT/IS prescribed the importance of having a centralised IT service.  
• The IT infrastructure was weak and redundant. | Point A to B:  
1. Well defined and clear OPP  
2. Negotiation power of actor  
• The EDFR exerted control over the Administrative Computing Services and University Communication Services  
• The Deans of the faculties had power to use their allocated funding for faculties’ IT development  
3. Top management support  
4. Appropriate devices of interesement  
• Review of the Administrative Computing Services/University Communication Services  
5. Role of inscription in perpetuating interests  
• Review report of the Administrative Computing | A B C  
The trajectory steadily increased, indicating that the local network accepted their new roles and was subsequently enrolled into the network. The attachment of the global network was also increased due to their support of the effort taken by the EDFR. |
| B. Appointment of the ITS Director | Global Network  
• The new ITS Director | Local Network (Blocked) | The ITS Director’s appointment was a | | |

*Global Actors: VC, EDFR, ITS Director, IS Committee, Technical Coordination Group  
Local Actors: Administrative Computing Services, University Communication Services, IT infrastructure*
<table>
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<tr>
<th><strong>Milestone</strong></th>
<th><strong>Enrolled Network Actors</strong></th>
<th><strong>Non-Enrolled Network Actors</strong></th>
<th><strong>Network Implications</strong></th>
<th><strong>Strategies to support enrolment</strong></th>
<th><strong>Trajectory Movement</strong></th>
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<tr>
<td>the ITS Director was appointed.</td>
<td>• The Administration Computing Services and University Communication Services maintained their IT governance arrangements and IT infrastructure</td>
<td>device of <em>interessement</em> used to establish the central IT unit.</td>
<td>Services/University Communication Services • Background and experience of the EDFR (positive experience with IT centralisation)</td>
<td>Point B to C: 1. Well defined and clear OPP 2. Appropriate devices of <em>interessement</em> • Appointment of the ITS Director • New management structure for the ITS • IT staff relocation to the ITS • Establishment of IT Reference Group</td>
<td></td>
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<tr>
<td>Global Network</td>
<td>• The ITS mission was developed. • IT Reference Group was set up as a new steering committee. • The ITS Director became the <em>spokesperson</em> for the ITS.</td>
<td>Local Network (Blocked) • The global actor overlooked the complexity within the <em>punctualised</em> IT infrastructure.</td>
<td>The <strong>OPP</strong> was accepted and the ITS was established. • The ITS mission became an <em>inscription</em> that inscribed the interests of actors. • The <em>punctualised</em> Administrative Computing Services and University Communication Services were no longer durable.</td>
<td>3. Role of <em>inscription</em> in perpetuating interests • Strategic Plan for IT/IS • SWOT analysis • ITS mission</td>
<td></td>
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<tr>
<td>C. Amalgamation of the Administrative Computing Services, University Communication Services and IT Policy Office and the establishment of IT Reference Group</td>
<td>Local Network • The Administrative Computing Services, University Communication Services and IT Policy Office were</td>
<td>• The establishment of the ITS did not affect the existing IT governance arrangements and IT infrastructure at the faculties. • The appointment of the IT Policy Officer, however,</td>
<td>The <strong>OPP</strong> was accepted and the ITS was established.</td>
<td>4. Lack of consideration for the existing IT infrastructure during the amalgamation</td>
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<td>Milestone</td>
<td>Enrolled Network Actors</td>
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|           | amalgamated and enrolled as a local network.  
• The new management team was introduced and re-located in a central location.  
• IT infrastructure was directly enrolled. | was weak due to its limited reporting function to the ITS Director | infrastructure was not visible at this stage. |                                |                   |

**Phase 2 (2006-2008) : New Centralised IT Governance Model**

**Global Actors:** VC, Information Management Board and its standing committees, ITS Director

**Local Actors:** ITS, faculties, IT infrastructure

**Global Network**
• An attempt to redefine the information requirements for the university took place.
• The Information Management Board was established.
• The IT Strategic Direction was endorsed.

**Local Network**
• The faculties’ IT Managers were appointed as the

**Global Network (Partly Blocked)**
• The membership of the Information Management Board and its standing committees was not carefully addressed.

**Local Network (Blocked)**
• The changes in the university-wide IT governance

**Global Network**
• The Information Management Review findings evinced an *inscription* that highlighted the problem faced by the university in relation to IT. The *focal* actor used it as a tactic to strengthen the *OPP*.
• IT infrastructure was weak, particularly on the issues of redundancy, lack of standardisation and

**Point C to D:**
1. Appropriate devices of *interessement*
   • Conducting Information Management Review
   • Establishment of Information Management Board
   • Appointment of the Faculties IT Manager as spokesperson in Technical Coordination Group
2. Role of *inscription* in perpetuating interests
   • Findings from Infrastructure Management Review

The attachment to the global network was high due to the establishment of a new global network of IT Reference Group.
<table>
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<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
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</table>
| E.        | Technical Coordination Group representatives. | structures did not directly affect the faculties’ existing IT governance arrangements. | accessibility.  
- Communication between the global and local networks was very weak. | • Communication between the global and local networks was very weak. | However, the local network mobilisation regressed as the centralisation project was not accepted. The global network attachment also declined because of several issues in the centralisation project and the resignation of the ITS Director. |
| F.        | Global Network  
- The ITS Director was planning to extend the centralisation project to the faculties. | Global Network  
(Blocked)  
- No clear vision about how the centralisation project could resolve the devolved IT environment | • The tensions between the local and global actor networks were high, due to the limited emphasis on the university’s culture and two-way communication.  
- The attachment of both the local and global networks started to disconnect.  
- The impact of inattentive puntualisation unravelled.  
- Non-enrolled local network’s interests blocked the negotiation process. | Point D to E:  
1. Weak OPP  
2. Lack of devices of intéressment  
- Appropriate language was not used  
- No university-wide IT policy  
- Lack of communication of the benefits of centralisation  
- Inappropriate communication approach  
3. Lack of understanding of the organisational culture  
- Lack of consideration of the IT governance arrangements in faculties/departments  
4. Lack of top management support  
5. IT infrastructure was not considered during the initiation of the centralisation project  
6. Limited role of inscription in perpetuating interests  
- The IT vision and mission was not strong  
- The business case for centralisation was not accepted | |
|           | **Local Network**  
- The business case received a lot of feedback from the Faculties.  
- Problems with the puntualised IT infrastructure began to emerge | **Local Network (Blocked)**  
- The faculties were concerned about their power to handle their own IT infrastructure. | |
|           | **Global Network (Blocked)**  
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|           | **Global Network**  
- The ITS Director was planning to extend the centralisation project to the faculties. | **Local Network**  
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- Problems with the puntualised IT infrastructure began to emerge | **Global Network (Blocked)**  
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- Problems with the puntualised IT infrastructure began to emerge | **Local Network**  
- The business case received a lot of feedback from the Faculties.  
- Problems with the puntualised IT infrastructure began to emerge | **Global Network (Blocked)**  
- The faculties were concerned about their power to handle their own IT infrastructure. | |
|           | **Global Network**  
- The ITS Director was planning to extend the centralisation project to the faculties. | **Local Network**  
- The business case received a lot of feedback from the Faculties.  
- Problems with the puntualised IT infrastructure began to emerge | **Global Network (Blocked)**  
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|           | **Local Network**  
- The business case received a lot of feedback from the Faculties.  
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|           | **Global Network**  
- The ITS Director was planning to extend the centralisation project to the faculties. | **Local Network**  
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|           | **Local Network**  
- The business case received a lot of feedback from the Faculties.  
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<tr>
<td>the ITS Director</td>
<td>convince the benefit of the centralisation project to the local and global actors. The ITS Director resigned.</td>
<td>The centralisation project approval was pending. <strong>Local Network (Blocked)</strong></td>
<td>interests and identity of the local network. As a result, he was not able to convince the local network to accept the OPP.</td>
<td><strong>Point E to F:</strong>&lt;br&gt;1. Weak OPP&lt;br&gt;2. Leadership style of the ITS Director&lt;br&gt;• Background of the ITS Director&lt;br&gt;• Autocratic leadership&lt;br&gt;• One-way communication&lt;br&gt;3. Lack of devices of <em>intressement</em>&lt;br&gt;• Two-way communication was not highly promoted&lt;br&gt;4. Lack of top management support&lt;br&gt;• Lack of funding&lt;br&gt;5. Lack of understanding of the organisational culture&lt;br&gt;6. Resignation of the ITS Director</td>
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<td>• The centralisation project was not aligned with the interests of the local network.</td>
<td>• Lack of <em>intermediaries</em> used to support enrolment.</td>
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<td>für die Nutzung der zentralisierten Projekten zu den lokalen und globalen Akteuren. Der ITS Direktor trat zurück. <strong>Local Network</strong>&lt;br&gt;• Die zentralisierte Projektzulassung war ausstehend. <strong>Local Network (Blockiert)</strong>&lt;br&gt;• Die zentralisierte Projektzulassung war nicht mit den Interessen des lokalen Netzwerks übereinstimmend.</td>
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**Phase 3 (2008-2010): Re-structuring IT Organisation**

**Global Actors:** VC, Information Management Board and its standing committees, LDIT

**Local Actors:** ITS, Library, faculties

<p>| G. Establishment of new Information Services Division | Global Network | Local Network (Partly Blocked) | The tensions between | |
|-------------------------------------------------------|----------------|-------------------------------|---------------------| |
| • The VC appointed the Librarian as the LDIT to lead the new IS Division. | • The faculties were not involved. | | |
| <strong>Local Network</strong>&lt;br&gt;• The ITS and Library was enrolled as a local network. | | | |
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<table>
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<tr>
<th><strong>Milestone</strong></th>
<th><strong>Enrolled Network Actors</strong></th>
<th><strong>Non-Enrolled Network Actors</strong></th>
<th><strong>Network Implications</strong></th>
<th><strong>Strategies to support enrolment</strong></th>
<th><strong>Trajectory Movement</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Positioning the Information Services Division as a central IT function</td>
<td>- LDIT was enrolled as a focal actor.  - All of the university-wide IT projects were re-prioritised.  - New structures were introduced.  - Both the ITS and library were enrolled as local networks.</td>
<td><strong>(Partly Blocked)</strong>  - No university-wide IT policies were developed.  - Local Network  (Blocked)  - The devolved IT governance arrangements and IT infrastructure at faculties were maintained.</td>
<td>the global and local networks were minimised under the LDIT’s leadership.  - The attachment between the global and local networks started to emerge.</td>
<td>reports directly to the VC</td>
<td>trajectory steadily increased indicating that the attachment of the local and global networks were re-emerging.</td>
</tr>
</tbody>
</table>

**Global Actors**: VC, IM Working Party, Senior Leadership Group, new LDIT  
**Local Actors**: Information Services, faculties, IT infrastructure  

**Phase 4 (2010-2012): Improvement in Governance Approach**

**Point G to H:**
1. Well defined and clear OPP  
2. Role of inscription in perpetuating interests  
   - Background and experience of the LDIT  
3. Leadership style of the LDIT  
4. Understanding the organisational culture  
5. Development of new IT infrastructure  
6. Appropriate devices of interessement  
   - Appointment of Associate Director from both ITS and Library under the IS Division  
   - Two-way communication – consultation with the faculties  
   - IT project prioritisation

**Point H to I:**
1. Well defined and clear OPP  
2. Negotiation power of actor
<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies to support enrolment</th>
<th>Trajectory Movement</th>
</tr>
</thead>
</table>
| establishment of Information Services | • An extensive review of the ITS was conducted.  
• The new LDIT started to focus on redefining and consolidating IT services. | arrangements and IT infrastructure were still devolved at the faculties. | • The deficiencies in IT service delivery were revealed and recommendations to overcome the devolved IT environment were made.  
• The tension within the global network was minimised through communication and training. | • Appointment of the new LDIT by the VC  
3. Leadership style of the LDIT  
4. Understanding the organisational culture  
5. Appropriate devices of *interessement*  
   • Conducting the ITS review  
   • Amalgamation of ITS and Library as one central unit  
   • Restructuring the IS and the establishment of five new units  
   • Briefing session to the IS staff  
   • Training for the IS staff’s up-skilling | H to I K  
The process of re-building the network under the leadership of the new LDIT was successful. The trajectory inclined, showing that the new global and local actors were *mobilised*. The OPP was accepted and that made for a successful, stable attachment of the global and local networks. |
| J. Establishment of Investment Program | • The new LDIT was enrolled as a focal actor.  
• The VC approved the Investment Program for implementation.  
*Local Network*  
• The IT infrastructure was evaluated.  
• The ITS and Library staff were consolidated. | • The deficiencies in IT service delivery were revealed and recommendations to overcome the devolved IT environment were made.  
• The tension within the global network was minimised through communication and training. | • Appointment of the new LDIT by the VC  
3. Leadership style of the LDIT  
4. Understanding the organisational culture  
5. Appropriate devices of *interessement*  
   • Conducting the ITS review  
   • Amalgamation of ITS and Library as one central unit  
   • Restructuring the IS and the establishment of five new units  
   • Briefing session to the IS staff  
   • Training for the IS staff’s up-skilling |  |

**Global Network**  
• The new LDIT was enrolled as a focal actor.  
• The VC approved the Investment Program for implementation.  

**Local Network**  
• The IT infrastructure was evaluated.  
• The ITS and Library staff were consolidated.  

**Local Network** (Partly Blocked)  
• The faculties were concerned about the Information Services solution to their IT governance arrangements and IT infrastructure.  
• The VC agreed to provide extra resources to speed up the Investment Program implementation.  
• The elements in the *punctualised* IT infrastructure were reconsidered.  
• The tension between the global and local networks was regraded.

**Point I to J:**  
1. Well defined and clear OPP  
2. Appropriate devices of *interessement*  
3. Successful integration of ITS and Library as one central unit  
4. Understanding the organisational culture  
5. Appropriate devices of *interessement*  
   • Conducting the ITS review  
   • Amalgamation of ITS and Library as one central unit  
   • Restructuring the IS and the establishment of five new units  
   • Briefing session to the IS staff  
   • Training for the IS staff’s up-skilling  
6. Role of *inscription* in perpetuating interests  
   • The ITS Review report  
   • Student IT Needs’ Study 2010  
   • Audit report  
   • New IS website |
<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies to support enrolment</th>
<th>Trajectory Movement</th>
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</thead>
<tbody>
<tr>
<td>K. Improving IT delivery</td>
<td>Global Network</td>
<td></td>
<td>• The attachment of both the global and local networks was high.</td>
<td>Library into Information Services • Two-way communication and active participation and collaboration with the faculties • Establishment of Investment Program Project team • Funding • Extensive consultation • Use of appropriate language (collaboration and partnership)</td>
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<td></td>
<td>• A new VC of the university was enrolled.</td>
<td></td>
<td>• The local network accepted the roles assigned to them. Hence, the global actors were now providing and maintaining the central IT infrastructure, while the faculties maintained their specific IT requirements.</td>
<td>3. Understanding the organisational culture 4. Role of inscription in perpetuating interests • Business case for Investment Program • Direct funding 5. Leadership style of the LDIT 6. Top management support • Funding allocation 7. Re-consideration of the installed base of the IT infrastructure • Instalment phases for the implementation of the project under the Investment Program • Upgrading the aging and devolved IT infrastructure</td>
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<td></td>
<td>• The Senior Leadership Group was established to oversee the overall IT governance implementation.</td>
<td></td>
<td>• The faculties were re-enrolled through extensive consultation by the new LDIT.</td>
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<tr>
<td></td>
<td>• The IM Working Party was formed.</td>
<td></td>
<td>• IT infrastructure was enrolled into the network.</td>
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<td></td>
<td>Local Network</td>
<td></td>
<td>• The Library and ITS were successfully mobilised as the local network.</td>
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<td></td>
<td>• Faculties accepted the OPP and enrolled as local actor.</td>
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<td>• Faculties were re-enrolled through extensive consultation by the new LDIT.</td>
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<td></td>
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<td></td>
<td>• IT infrastructure was enrolled into the network.</td>
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<tr>
<td>Milestone</td>
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<td>Pilot site for the network migration</td>
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</tbody>
</table>

**Point J to K:**
1. Negotiation power of actor
   - Appointment of the VC
2. Appropriate devices of *interessement*
   - Establishment of new governance structure, the IM Working Party and Senior Leadership Group
6.3.1 Phase 1 (2003-2006): Foundation of IT Governance

Phase 1 describes the dynamic interactions between the actors in the IT governance arrangements and IT infrastructure by referring to Figure 11a above. An attempt to overcome the problem associated with the devolved IT governance began when a new Executive Director of Finance and Resources (EDFR) was appointed. The EDFR became the focal actor who pushed the idea of having a central IT unit in the campus (i.e., the OPP). This decision was driven by the Administrative Computing Services (ACS)/University Communication Services (UCS) review report, Strategic Plan for IT/IS (i.e., inscription) and was based on her positive experience of centralised IT in previous organisations. The interests of the IS Committee and Technical Advisory Group were found to be aligned with the OPP. The EDFR, in order to win the negotiation process, used the appointment of an OPP as the new single IT team in the university when Administrative Computing Services, University Communication Services and IT Policy Office were amalgamated and enrolled into the IT governance network. At this stage, the faculties remained outside of the network.
The ITS Director then became the *focal* actor to *mobilise* the merged actors into the IT governance network. This change of the role of the *focal* actor from the EDFR to ITS Director concurs with Sarker et al., (2006, p. 54) who note that ‘owing to punctualisation and disintegration of actor networks, the focal actor may be different at different points of time during the translation process’. The IT Policy Development project and the establishment of the IT Reference Group were the tactics used to support the *enrolment* of the ITS.

Both Administrative Computing Services and University Communication Services were aligned networks that contained *punctualised* actors of IT governance structures, processes, relational mechanisms and IT infrastructure. The amalgamation resulted in the *punctualised* IT governance structures, processes, relational mechanisms and IT infrastructure being no longer *durable*. In this context, the elements for each of the *punctualised* actors needed to be clarified so that their heterogeneous elements could be reconsidered. However, the ITS Director overlooked the complexity within the *punctualised* IT infrastructure.

...the core infrastructure was really for the administration and students. Each faculty had their own infrastructure, and that again was a problem... so the central IT made its decision, and the faculty also made their decision... (Interviewee X2, Former University IT Manager, 2012).

The consequence of this oversight was encountered in Phase 2. Even so, the ITS became a durable network with a strong property of *irreversibility*. The ITS was *mobilised* with the establishment of a new management structure and the appointment of the ITS Director as its *spokesperson*. The Strategic Plan for IT/IS was used as a tactic to ensure the stability of the *mobilised* network. In terms of IT governance relational mechanisms, the Director led the ITS transformation plan in accordance with its mission. The successful *mobilisation and enrolment* of the ITS was due to the political interference of the EDFR. The EDFR supported the establishment of ITS because she had had previous positive experiences with organisations that implemented IT centralisation.
...the centralisation did not actually happen until the appointment of a new EDFR... the new EDFR wanted to implement that approach and really tried to push it through ... so she started doing that...” (Interviewee X2, Former University IT Manager, 2012).

Meanwhile the ITS Director had previously worked in a for-profit organisation. Hence, the Director advocated a commercial view of how IT centralisation would provide greater benefits to the university.

6.3.2 Phase 2 (2006-2008): New Centralised Governance Model

This subsection explains the dynamic interactions between the actors in the IT governance arrangements and IT infrastructure actor network in Phase 2 (Figure 11b). In line with the IT mission and vision articulated in the IT Strategic Direction, the focal actor of ITS Director redefined the OPP to adopt a centralised IT services model. The entry of a new actor (i.e., the faculties) was a critical factor for the OPP to be achieved. The focal actor used the business case of a centralisation project as a device of interessement to entice the interests of all actors. However, due to the resistance of the faculties to accept the OPP, the project was halted. It was found that during the problematisation stage, the focal actor did not clearly identify the interests of all actors and it was considered to be due to the impact of inattentive punctualisation. Therefore, failure to consider each element that resided in the punctualised actors resulted in resistance to accepting the OPP.

...people had different views on what centralisation meant... But I think that was never really clearly spelled out... people were allowed to have a really different view of what it actually meant” (Interviewee X10, Former LDIT, 2012).

Further analysis shows that the resistance revolved around a lack of IT governance relational mechanisms. Two-way communication was not emphasised and the leadership style of the focal actor was considered to be controversial. In this context, the actors felt that they were being asked to follow the stated direction of the focal actor (i.e., the OPP) and that their opinions (i.e., interests) were not considered during the negotiation process. The negotiation was hence unsuccessful, as the focal actor failed to be indispensable to the other actors. Subsequently he resigned, reflecting that the focal actor had betrayed the network formation effort.
that person faced strong difficulties to push the change, met a lot of resistance, and that resistance ended in his downfall... so he resigned (Interviewee X6, Faculty Manager, 2012).

6.3.3 Phase 3 (2008-2010): Re-structuring IT Organisation

Figure 11c above illustrates the dynamic interactions between the actors in the IT governance arrangements and IT infrastructure actor networks in Phase 3. The VC was the primum moven who decided to establish the IS Division. He promulgated the IS Division as a central IT unit in the university as a means to solve the IT issue at the campus (i.e., OPP). Appointing the Librarian as the LDIT (Librarian and Director of IT), with a direct reporting line to him, was the tactic used to enrol the ITS and Library.

...the library joined the IS division (ISD)... there was a change in the reporting structure... the LDIT reported to the VC and that was an important change (Interviewee X9, Faculty IT Manager, 2012).

The LDIT became the focal actor and the negotiations that took place within the IS Division (ISD) were accomplished with the appointment of a new Associate Director of IT and Associate Librarian (i.e., device of interessement). The tactic employed to support the enrolment included transferring some of the Library IT staff to the ITS. The ITS and Library were then mobilised as an IS Division.

I was the LDIT and I had the associate librarian and associate IT director reported to me... I was quite careful in making this decision because it was new territory for this university... having said that, most of the library IT staff had been transferred over to the ITS” (Interviewee X10, Former LDIT, 2012).

The mobilisation was successful because both actors could not reject the OPP due to the legitimate authority possessed by the VC (i.e., decision to transfer the ITS under the LDIT). The successful implementation of the email and calendaring service was used as a strategy to entice the faculties and their IT infrastructure to accept the OPP.

...the previous ITS Director told us what he was going to do, always one way... nothing had been achieved... but the new LDIT took away the pressure and made things much more pleasant... he did achieve a couple of things (Interviewee X9, Faculty IT Manager, 2012).

The faculties remained outside the network, but their representatives were actively involved in the Technical Advisory Group (i.e., tactic). In this context, the LDIT
emphasised communication as being a device of *interessement* to negotiate with the faculties. It was difficult to directly *enrol* the faculties in the IT governance network because they fell under the responsibility of the Deans.

### 6.1.3.4 Phase 4 (2010-2012): Improvement in Governance Approach

This subsection discusses the dynamic interactions between the actors in the IT governance arrangements and IT infrastructure actor networks in Phase 4. Figure 11d above illustrates the interactions of all the actors. The VC continued to strengthen the IS Division by appointing a new LDIT, who later became the *focal* actor, who could address the devolved IT issues at University X (i.e., OPP). The *focal* actor translated the OPP into two approaches. The first approach was integrating the Library and ITS to establish an Information Services (IS). The new LDIT used various reports as *inscriptions* (e.g., the ITS Review, Student IT Needs’ Study 2010, and audit report) to understand the culture of the university and its relationship with IT. The *inscriptions* were used as a device of *interessement* to *enrol* the Library and ITS into a central team. The tactic for *enrolment* was enacted by setting up a new Information Services structure.

In the ISD, both the Library and ITS were two separate units, where both reported directly to the former LDIT... when the new LDIT was appointed, she decided to actually do a corporate merger of the two units” (Interviewee X5, IT Review Panel, 2012).

The IT governance processes (i.e., training and ITIL) and relational mechanisms (i.e., the briefing session – communication) were used as tactics to strengthen relationships between the ITS and Library staff within the Information Services. The Information Services was *mobilised* with the appointment of the new LDIT as its *spokesperson*.

The second approach was to centralise the devolved IT infrastructure provided by all individual IT divisions at faculties and schools. The new LDIT used the successful integration of Information Services as a tactic for enticing the faculties to accept the OPP.

I think the two priorities are the merger of the ITS and library, which had not been integrated before... so that was to fully integrate them, which is what we did in the last 16 months and also the attempt to raise IT to be a strategic enabler for the university, which is around the Investment program... Well that’s the aim... (Interviewee X8, LDIT, 2012).
The Investment Program was then used as a device of *interessement* because its interest (i.e., to raise IT to be a strategic enabler in support of the university's strategic goal) was in line with the OPP.

but the trust of this Investment program is to build a foundation of infrastructure... you need to put those in better in the first place before you can then be in a position to truly start to raise the IT to be strategic enabler... which needs a lot of collaborative work (Interviewee X8, LDIT, 2012).

It was quite a lot of money, but I set it aside to support that program. I had to take some money away from the next year’s budget, but at the same time, I needed to balance how we spend money on IT and on the other parts of university activity (Interviewee X4, Former VC, 2012).

The tactics used included two-way communication through extensive consultation with the faculties, and active participation in the Investment Program’s team. In this context, the *focal* actor of LDIT explained that her desired centralisation project was not a centralisation of expertise, but rather a focus on a collaborative relationship with the faculties (i.e., using a common language as a tactic). Hence, a concept of partnership was introduced.

...we attended faculties’ board and various schools meetings... and generally using email to inform people on breadth of progress... and we just about started a series of faculties and school update briefings... (Interviewee X8, LDIT, 2012).

*Enrolment* occurred when the faculties accepted the Investment Program. The actors were *mobilised* when they began to work collaboratively together with the Information Services for the Investment Program implementation.

I think the term collaboration needed to be used at this point in time... it could break down the barriers... it helps people to understand (the Investment program), but hopefully we reach to the level where the whole notion of centralisation is accepted... (Interviewee X6, Faculty Manager, 2012).

The entrance of a new and powerful actor (i.e., the new VC) had resulted in changes to the IT governance structures. The IM Working Party and Senior Leadership Group were established as the new IT governing body to replace the Information Management Board and its standing committees. This event however, did not affect the *enrolment*
of the actors into their new IT governance network. Rather, it was due to the strong properties of irreversibility of the Investment Program as a device of interessement and the OPP enlisted by the previous VC.

6.4 Analysis of IT Governance Implementation at University Y

The historical analysis at University Y (see Chapter 5 - Section 5.4) identified ten milestones that represent the actors’ interactions in its governance implementation. These milestones are summarised in terms of which actors were enrolled and not enrolled, the strategies used and its impact on the network formation and its affect to the trajectory movement. The summary of findings from the translation and local/global network analyses are presented in Table 26. This summary is used to develop IT governance trajectory for University Y as illustrated in Figure 12 below.

![Figure 12: IT governance trajectory at University Y](image)
Table 26: IT governance implementation from the perspective of the local and global networks and the network implications at University Y

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies to support enrolment</th>
<th>Trajectory Movement</th>
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</thead>
<tbody>
<tr>
<td>A. Appointment of new Director of IT</td>
<td><strong>Global Network</strong>&lt;br&gt;- The new Director represented the management’s interests to manage the IT Centre.&lt;br&gt;- The IT Centre became the local network.&lt;br&gt;- Legacy application systems continued to be used and upgraded.</td>
<td><strong>Local Network (Partly Blocked)</strong>&lt;br&gt;- The power of the Director was limited only to control of the IT Centre at the local level.</td>
<td>• At this point, the roles of both global and local actors were equally important.&lt;br&gt; • The appointment of the new Director did not have a major impact on the IT governance network.&lt;br&gt; • The OPP was accepted. Hence, the local network of IT infrastructure was maintained and stabilised.</td>
<td><strong>Point A to B:</strong>&lt;br&gt;1. Well defined and clear OPP&lt;br&gt; • Strengthening the IT governance&lt;br&gt;2. Understanding the organisational structure&lt;br&gt;3. Limitation on devices of interessement&lt;br&gt; • The Computer Steering Committee was not active&lt;br&gt;4. Limited role of inscription in perpetuating interests&lt;br&gt; • The role of the Computer Steering Committee was not visible</td>
<td>The trajectory for the global actor was regressing, reflecting that the attachment of the global actor network was loose due to the problem in the IT governance structures. The attachment of the local actor, however, strengthened due to the culture that was maintained as the OPP.</td>
</tr>
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</table>

| B. Establishment of Computer Steering Committee | **Global Network**<br>- The Computer Steering Committee was established.<br>- The Director of IT was enrolled as secretariat for the Computer Steering | **Global Network (Blocked)**<br>- The Computer Steering Committee was not actively enrolled. | • The global actor’s attachment was not stable.<br> • The global network was very weak and could not be enrolled. | **Point B to C:**<br>1. Negotiation power of actor<br> • Limited role of the spokesperson in the Executive Council<br>2. Lack of devices of interessement<br> • Lack of monitoring from the MAMPU | |

Phase 1 (2002-2007): Foundation of IT Governance

**Global Actors:** Director of IT, Deputy VC (Research and Innovation), Computer Steering Committee, Executive Council, MAMPU

**Local Actors:** IT Centre, faculties/departments, IT infrastructure
<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
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<th>Trajectory Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Enrolment of Executive Council to replace the Computer Steering Committee</td>
<td>Global Network</td>
<td>Global Network (Partly Blocked)</td>
<td>• The role of the global actor was transferred to the Executive Council.</td>
<td>• Two-way communication was not used</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The Executive Council was established as a global network.</td>
<td>• Limited role of the Deputy VC (Research and Innovation) as a spokesperson for the IT Centre.</td>
<td>• The IT Strategic Plan was mostly informed by the needs of the local networks to enhance the IT infrastructure.</td>
<td>• Director’s leadership was limited to the IT Centre</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The IT Strategic Plan was developed.</td>
<td>Local Network (Blocked)</td>
<td>• The IT policy disconnected with the global and local networks.</td>
<td>3. Limited role of inscription in perpetuating interests</td>
<td></td>
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<tr>
<td></td>
<td>• IT Policy was enrolled as a local network.</td>
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<td>• IT Strategic plan for requesting budget allocation</td>
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<td>• IT policy was not communicated</td>
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<tr>
<td>D. Appointment of new Director of IT and establishment of IT Council</td>
<td>Global Network</td>
<td>Global Network (Blocked)</td>
<td>• The tension between the global network’s interests and local network was visible.</td>
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<tr>
<td></td>
<td>• The IT Council was established.</td>
<td>• The IT council was not in operation for three years.</td>
<td>• The IT Council detached from the network and could not be mobilised.</td>
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<td></td>
<td>• The Director of IT was appointed as a secretariat for the IT Council.</td>
<td>Local Network (Partly Blocked)</td>
<td>• The underlying problem within the local network affected its</td>
<td></td>
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<tr>
<td></td>
<td>Local Network</td>
<td>Legacy application systems faced several issues from</td>
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<td></td>
<td>• Existing IT infrastructure was re-enrolled.</td>
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</table>

**Phase 2 (2007-2010): Implementation of New College System**

**Global Actors:** Director of IT, IT Council, Executive Council, Malaysian Government, Deputy VC (Research & Innovation), VC

**Local Actors:** IT Centre, three colleges, IT staff at faculties/departments, IT infrastructure

- Lack of devices of *interessement*
- Appointment of new Director of IT
- Establishment of the IT Council

2. Limited role of inscription in perpetuating interests

• The IT Council was not in operation

Point C to D:

The attachment of the global actor
<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies to support enrolment</th>
<th>Trajectory Movement</th>
</tr>
</thead>
</table>
| E. Re-enrolment of the Executive Council | **Global Network**  
- The Executive Council was re-enrolled as a global actor.  
- Deputy VC (Research and Innovation) became the *spokesperson* for the IT Centre.  
- Endorsement of the IT policy.  
**Local Network**  
- The interests of the new IT infrastructure were identified. | **Global Network (Partly Blocked)**  
- Time-consuming enrolment.  
**Local Network (Partly Blocked)**  
- Both the IT Centre and users struggled to reach alignment of interests on the features of the new application system. | **Point D to E:**  
1. Well defined and clear OPP  
2. Understanding the organisational culture  
3. Negotiation power of actor  
   - Limited role of the *spokesperson* in the Executive Council  
   - Limited role of the Director of IT  
4. Role of *inscription* in perpetuating interests  
   - Direct funding  
5. Appropriate devices of *interessement*  
   - Funding allocation | decreased due to the failure of the IT Council to conduct meetings. The enrolment of the Executive Council resulted in the upward inclination in the trajectory. This indicated that the alignment of interests between the global and local actors began to re-emerge. The implementation of a new college structure strengthened the attachment of the global actors. The local actors’ attachment, however, was weak. |
| F. Restructuring a new college system | **Global Network**  
- The VC implemented a new college system.  
- The Director of IT became the global actor to implement the new change.  
**Local Network**  
- Local network now consisted of colleges and departments. | **Global Network (Partly Blocked)**  
- The VC approved the faculties’ requests to maintain their IT staff.  
**Local Network (Blocked)**  
- Faculties/department insisted on having | Tensions between the global and local actors were high due to the changes in the university’s structure.  
- The global actor of the Director of IT was responsible for shaping the local actor’s action in support of the new college system. |  |
### Phase 3 (2010-2012): New Transformation Plan

**Global Actors:** Director of IT, IT Steering Committee, VC, Deputy VC (Research and Innovation), MAMPU

**Local Actors:** IT Centre, colleges, departments, IT infrastructure

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies to support enrolment</th>
<th>Trajectory Movement</th>
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</thead>
<tbody>
<tr>
<td>G. Appointment of new Director of IT</td>
<td>Global Network</td>
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<tr>
<td></td>
<td>• New Director was</td>
<td>Global Network</td>
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<tr>
<td></td>
<td>appointed.</td>
<td>(Partly Blocked)</td>
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<td></td>
<td>• The Deputy VC (Research and Innovation) was named as the CIO for the university.</td>
<td>• The CIO was not well versed with IT, including IT planning and its development.</td>
<td>• The OPP was maintained.</td>
<td>• Problem with IT policy</td>
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<td></td>
<td>Local Network</td>
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<tr>
<td></td>
<td>• IT Centre, IT infrastructure and colleges/ departments were re-enrolled as local networks.</td>
<td>• The local network was highly localised, with relationships between the IT Centre and IT infrastructure becoming increasingly important.</td>
<td>• Problem with IT policy</td>
<td>• Understanding the organisational culture</td>
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<td>H. Appointment of new VC and the development</td>
<td>Global Network</td>
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<tr>
<td></td>
<td>• New VC was appointed.</td>
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<td></td>
<td>• A transformation plan was developed.</td>
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<td></td>
<td>• An IT Strategic Plan was</td>
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<td></td>
<td>• The local network had to be extended to include new actors.</td>
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<td></td>
<td>• A new IT strategic plan was developed. It was</td>
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**Point F to G:**

1. Well defined and clear OPP
2. Understanding the organisational culture
3. Negotiation power of actor
   • Appointment of a new VC
   • Implementation of new college structure
4. Appropriate devices of interessement
   • Appointment of new Director of IT
   • New organisational structure for the IT Centre
   • Establishment of the IT Steering Committee
   • Relocation of IT staff to the IT Centre

The appointment of the VC and Director impacted positively on the local/global actors’ relationships. The trajectory steadily increased indicating that the attachment of the local and global networks was re-
<table>
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<tr>
<th>Milestone</th>
<th>Enrolled Network Actors</th>
<th>Non-Enrolled Network Actors</th>
<th>Network Implications</th>
<th>Strategies to support enrolment</th>
<th>Trajectory Movement</th>
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</thead>
<tbody>
<tr>
<td>of a new IT Strategic Plan</td>
<td>set up to support the transformation plan. Local Network • New actors from colleges were enrolled as local networks. • The interests of the IT Centre and IT infrastructure were reconsidered.</td>
<td></td>
<td>informed by the local networks requirements and following the transformation plan. • The local networks of the IT Centre and IT infrastructure were mobilised, attempting to define the best solution to support the transformation plan.</td>
<td>5. Role of inscription in perpetuating interests • IT strategic plan • University Transformation plan</td>
<td>emerging. However, due to the conflict within the IT Centre, the degree of attachment for the local actors slightly decreased</td>
</tr>
<tr>
<td>1. Appointment of a new LDIT and establishment of Information Services</td>
<td>Global Network • The VC appointed a new LDIT. • An extensive review of the ITS was conducted. • The new LDIT started to focus on redefining and consolidating IT services. Local Network • IT infrastructure was evaluated. • The ITS and Library staff were consolidated.</td>
<td>Local Network (Blocked) • The IT governance arrangements and IT infrastructure were still devolved at the faculties.</td>
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<td>2. Understanding the organisational culture • Appropriate devices of <em>interessement</em> Establishment of the IT Steering Committee • Appointment of the Director of IT as spokesperson in the IT Steering Committee</td>
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<td>J.</td>
<td>Global Network</td>
<td></td>
<td>Establishment of the IT</td>
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<td>Milestone</td>
<td>Enrolled Network Actors</td>
<td>Non-Enrolled Network Actors</td>
<td>Network Implications</td>
<td>Strategies to support enrolment</td>
<td>Trajectory Movement</td>
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<td>Establishment of the IT Steering Committee</td>
<td>• IT Steering Committee was established and enrolled.</td>
<td></td>
<td>Steering Committee reflected the commitment of the management to support IT development at the university.</td>
<td>1. Lack of devices of <em>interessement</em></td>
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<td></td>
<td>• Director of IT was appointed as the spokesperson.</td>
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<td>• The tensions between the global and local actors were minimised.</td>
<td>• Relocation of IT staff to the IT Centre could not resolve internal conflict</td>
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<td></td>
<td>• The IT Strategic Plan was approved.</td>
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<td>2. Limited role of <em>inscription</em> in perpetuating interests</td>
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<tr>
<td>K. Relocation of IT staff to the IT Centre and development of a new IT</td>
<td><em>Global Network</em></td>
<td><em>Global Network</em> (Partly</td>
<td></td>
<td>• Controversy during system development</td>
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<td>infrastructure</td>
<td>• Relocation of IT staff to the IT Centre was approved.</td>
<td>Blocked)</td>
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<td>• Internal conflict among the IT staff</td>
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<td><em>Local Network</em></td>
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<td></td>
<td>• Re-enrolment of IT staff at the IT Centre.</td>
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<td></td>
<td>• New application systems were developed.</td>
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<td></td>
<td><em>Global Network</em></td>
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<td><em>Local Network</em></td>
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<td>(Partly Blocked)</td>
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<td></td>
<td>• Power held by the VC.</td>
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<td>• Data integration process between the existing and new IT infrastructure was complex.</td>
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<td></td>
<td>• IT Centre’s personnel issues.</td>
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<td></td>
<td>• The attachment between the global and local networks was emerging.</td>
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<td></td>
<td>• The local networks stabilised around limited functionalities.</td>
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<td></td>
<td>• The underlying problems within the local networks were visible.</td>
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The dynamics of IT governance implementation at University Y is further discussed using Figure 13a-b below:

![Figure 13: Network analysis of translation at University Y](image)

**6.4.1 Phase 1 (2002-2007): Foundation of IT Governance**

A number of dynamic interactions occurred between the actors in the IT governance arrangements and IT infrastructure\(^{16}\) at University Y in Phase 1 (Figure 13a). The beginning of the IT governance network can be traced to the appointment of a new Director of IT in 2002. He was the *focal* actor who aimed at strengthening the IT governance network (i.e., the *obligatory passage point*). All this while, University Y’s IT governance was less effective, whereby IT decisions could not be made in a timely manner (i.e., IT paperwork was presented in the Executive Council meeting). The *focal* actor used the IT Strategic Plan Guide from the MAMPU (i.e., *inscription*) to guide the preparation of the IT Strategic Plan. At this stage, all elements in the *punctualised* IT infrastructure were reconsidered by identifying the need for development of new application systems and upgrading the existing ones. Given the fact that University Y had a centralised IT culture, the *focal* actor did not face difficulties in enrolling the faculties/departments.

The first attempt to strengthen the IT governance network was through the establishment of the Computer Steering Committee, following the MAMPU’s requirement. However, the negotiation process between the IT Centre and Computer Steering Committee was problematic; hence, its *enrolment* could not be achieved. Without approval from the Computer Steering Committee, the IT Strategic Plan and

\(^{16}\) In context of discussion at University Y, IT infrastructure refers to their in-house application systems.
other important projects proposed by the IT Centre could not be enrolled. A second attempt to win the negotiation began with the enrolment of the Executive Council.

I met with the registrar, asked her opinion about having a steering committee... she said that the registrar knew nothing about it... in this university, we need support from the VC and management. It was difficult to call a meeting... So at that time, I did not do all that (arrange for a meeting for steering committee). What I did was I prepared all the paperwork to be presented to the Executive Council (Interviewee Y7, Former Director of IT, 2012).

This new actor approved and endorsed the IT Strategic Plan. The plan became an inscription in two ways. Firstly, the IT Strategic Plan was a blueprint of what the IT Centre wanted to achieve within seven years (2004 to 2010); and secondly, it served as documentation to be presented to the MAMPU, requesting budget allocation in the Malaysia Plan. The Director of IT became the spokesperson for the university in the presentation of the IT Strategic Plan budget, requesting budget allocation in the Malaysia Plan at the MAMPU.

The roles of communication and leadership, however, were limited because of the formal administrative structure that required the Director to report to the Deputy VC (Research and Innovation). The Director’s leadership only focused on leading the IT Centre internally. Due to the centralised IT governance network, the formal communication structure was hierarchical. Limitation in the enrolment of the Deputy VC (Research and Innovation) as the IT Centre’s spokesperson in the Executive Council meeting was visible in the next phase.

But the IT director was not a member of the Executive Council. He (the Director) reported to the Deputy VC. He represented us in the meeting... the university did not acknowledge the IT Director as a CIO... that is the problem... (Interviewee Y7, Former Director of IT, 2012).

6.4.2 Phase 2 (2007-2010): Implementation of the New College System

Dynamic interactions continued to occur between all actors in Phase 2 as illustrated in the above Figure 13b. The role of the focal actor was shifted to the new Director of IT, who also aimed to strengthen the IT governance at University Y (i.e., OPP). The appointment did not affect the stability of the punctualised IT Centre. This was due to
the power held by the Director, who was appointed by the university to lead and become a spokesperson for the IT Centre. When the Malaysian government approved the funding allocation, the Director of IT, together with his team, prepared paperwork for each of the specific IT projects listed in the IT Strategic Plan, requesting authorisation to use the funding. The IT Strategic Plan was used as a device of interessement for enticing the IT Council to accept the paperwork. However, the enrolment of the IT Council was problematic. As a result, the Executive Committee needed to be re-enrolled into the IT governance network. The enrolment of the IT Council was temporarily blocked due to the limited role played by the IT Centre’s spokesperson (i.e., Deputy VC [Research and Innovation]). The enrolment of the Executive Council was also time-consuming because the paperwork needed to be re-presented and discussed in another meeting slot.

Executive Council could not discuss the IT project in detail because the scope was too broad. Normally, when it was first discussed, the council member would ask for the project to be referred to an expert, seeking a second opinion... the Deputy VC (Research & Innovation) would need to discuss it back with the Director of IT... it resulted in paperwork that would be discussed in several council meetings... It's just a waste of time (Interviewee Y8, Librarian, 2012).

When the VC and Executive Council decided to implement a new college system, a new translation process occurred. The faculties/departments had no power to protect their own networks, but had to follow the new direction set by the VC. As a result, a new actor (i.e., new colleges) emerged and needed to be enrolled into the IT governance network.

The VC made a major blunder by introducing the college system. He thought he could solve the management problem by having the faculties grouped into colleges. He did not engage with all staff, hence the staff couldn’t see and appreciate why we need to have the colleges (Interviewee Y6, Director of IT, 2012).

The Director of IT, who was the focal actor re-defined the interests of new actors (i.e., three new colleges) and the IT infrastructure. The re-enrolment of both colleges and IT infrastructure was crucial because the new college system had a significant effect on the existing application systems and the way actors were interacting in the IT governance network. The focal actor used a tactic of re-centralising the IT staff from
the previous faculties/departments back to the IT Centre to support the impact of the re-structuring process. The tactic however, failed due to the lack of buy-in from the Heads of Departments/Faculties. As a result, the prioritisation of the IT Centre was re-adjusted (a tactic), allowing the existing IT staff to focus on the IT infrastructure’s modification of interests.

...each department has their own staff... no synchronisation between the departments. At that time, I suggested to centralise all of the IT staff at the IT Centre. ...it was normal, before we could implement the plan, everyone was angry... I could not implement it. I needed to write letters to all heads of departments to inform them. Some of the IT staff at the department did not do anything, other than preparing power point slides! But they keep on asking for new IT people, they said who are going to help them in preparing power points slides? (Interviewee Y7, Former Director of IT, 2012).

Even though IT policy was formally enrolled into the network, its role as an inscription was limited. It was successful in term of inscribing the role of IT Centre during the development project, but it was not communicated to the university community. It was found that the leadership and communication was not strong. The Director’s leadership was limited only to directing and coordinating the IT Centre’s activities. The Director did not have the power to represent the IT Centre at management level.

6.4.3 Phase 3 (2010-2012): New Transformation Plan

Dynamic interactions between all actors in the IT governance arrangements and IT infrastructure actor networks were continued in Phase 3 (Figure 13b above). The role of the focal actor once again was transferred to a new Director of IT. The obligatory passage point of strengthening the IT governance at University Y was maintained. The Director re-strengthened the structure of the IT Centre (i.e., tactic) to reduce the silo effect and improve their overall performance. A new leadership style was also introduced as a tactic to win over the negotiation with the IT staff.

With the appointment of a new VC, the college system was re-structured and a new actor entered the IT governance network. The interests of all actors in the IT governance network once again needed to be re-considered. Due to the power held by the VC, new actors in the new college system were successfully enrolled and mobilised. The punctualised IT infrastructure however, could not be directly enrolled due to its
complexity. Hence, the Director re-defined the interests of the IT infrastructure by using the transformation plan and new IT strategic plan as devices of *interessement*. In this context, the interests of the transformation plan were translated and used as an *inscription* to guide the preparation of the new IT strategic plan.

We have the information strategic plan (ISP), specifying our plan for five years... what we want to do in the first, second until the fifth year... We prioritise the projects... that’s why we need top management endorsement for the document so that what we actually suggest for the project implementation, we can argue that ISP already documented and endorsed... so, now we need the money to implement it (Interviewee Y6, Director of IT, 2012).

A device of *interessement* of relocating IT staff to the IT Centre was used to support the *enrolment* of IT infrastructure. To ensure *enrolment*, a tactic of establishing a zone system was used to entice the faculties/departments to hand over their IT staff to the IT Centre. Another tactic employed included the two stages of reporting structure: dual reporting (50% to the Heads of Departments and 50% to the Director of IT), and was followed by the formation of a 100% direct line of reporting to the Director of IT.

Previously, we had about twenty IT staff who were allocated to twenty faculties/departments. Another forty faculties/departments were left with no service and they were crying... they demanded service but we could not provide... Paperwork was prepared and presented to the IT Steering Committee to solve this problem... it could be achieved by pulling them back to the IT Centre and we introduced a zoning system. Each zone will have 4 or 5 different departments and a team of two to three IT staff is assigned to support that zone. By doing this, the forty faculties/departments said thank you, but the other twenty, said it was not fair... (Interviewee Y6, Director of IT, 2012).

An addition of a new actor of the IT Steering Committee further stabilised the IT governance actor network because of its crucial role in expediting the IT decision-making process. The *enrolment* of the IT infrastructure and the IT Centre was achieved with the appointment of the Director as its *spokesperson* in the IT Steering Committee as a secretariat.

At the top level, we have an IT Steering Committee, where its members include the VC, executive members of the university and the Deans from the school of IT... also myself as the secretariat to the IT steering committee... (Interviewee Y6, Director of IT, 2012).
6.5 Summary

This chapter has used the language of actor network theory (ANT) to explain how IT governance arrangements and IT infrastructure emerged in the four organisations and how the various actors’ interests became dynamically aligned. The analysis reveals the detailed nature of the dynamics of the socio-technical interplay that was involved during the translation process for the establishment of a stable IT governance network (i.e., the emergence of IT governance arrangements and IT infrastructure – the first research question). The IT governance trajectory helped to further explain the second research question on how the alignment of interests between the IT governance arrangements and IT infrastructure actor networks shaped the governance network (e.g., through well defined and clear obligatory passage point). The use of ANT was crucial as it helped to (1) identify relevant actors and their diversity of interests; (2) analyse how the diverse interests could be aligned; (3) reveal the tensions that occur during the process of aligning the actors’ diverse interests, such as resistance and betrayal; (4) explore the emerging relationships between the governance arrangements and IT infrastructure; and (5) highlight the role of nonhuman actors (i.e., the technology) in the network development. The discussion and a cross case analysis are presented in the next chapter.
CHAPTER 7: DISCUSSION AND CROSS CASE ANALYSIS

7.0 Introduction

The analysis of the four cases presented in Chapter 6 used translation processes and a local/global network analysis approach. This analysis produced four IT governance trajectories. The trajectories have covered the necessary context of how and why IT governance emerge (i.e., the first research question) and how the diverse interests’ of all actors become dynamically aligned (i.e., the second research question). This chapter firstly reviews and discusses the key findings related to the IT governance trajectories. Following this discussion, a cross case analysis of the four trajectories is conducted to further address the third research question (i.e., the factors that contribute to the establishment of a stable IT governance network).

This chapter presents the discussion and cross case analysis using ANT language, such as obligatory passage point, devices of interessement and inscription. A definition of ANT terminologies was provided in Chapter 3 on the theoretical lens for this thesis (see Table 3).

7.1 IT Governance Trajectories in the Four Cases

Figure 14 below illustrates the IT governance implementation at Group ABC, Company B, University X and University Y. These trajectories show that the relationships between IT governance arrangements (structures, processes and relational mechanisms) and IT infrastructure are not static, but dynamic. The dynamic relationships are due to the continuous interactions of the actors for achieving alignment of interests.
7.1.1 Group ABC

Figure 14a shows the IT governance trajectory for Group ABC located in the top-right quadrant, almost in a linear form. This was largely due to having a clear and strong *obligatory passage point (OPP)* that contributed to the enrolment of both local and global networks. In the IT governance implementation at Group ABC, how the technological shaped the social was evident with the decision to implement ERP as a group-wide IT infrastructure. This decision shaped the interests of all actors to work in a collaborative manner to support ERP implementation in each of its business divisions.

7.1.2 Company B

The positive IT governance trajectory at Company B in Figure 14b represents the story of how this organisation delivered: (1) Oracle ERP to replace the COBOL system, and (2) business requirements projects. While the global actors continuously provided their support through the Governance Committee, the local network was responsible for successfully implementing the project. The role of culture in shaping the actions taken by both local and global actors was also revealed.
7.1.3 University X

The IT governance trajectory at University X fluctuated, with several regressive trajectory movements apparent (i.e., network disintegration). From Figure 14c, it can be seen that the detachment of the local and global networks commenced with downward movement from point D to F. The analysis suggests that the detachment of the local and global actors is due to the following reasons:

1. Failure to align the interests of actors
   From the focal actor’s (ITS Director) point of view; the obligatory passage point was clear. The obligatory passage point was endorsed in the IT Strategic Direction, as well as the selection of words used in the IT’s vision and mission statement, such as “integrated” and “whole-of-university approach”. However, during the problematisation stage, the details of the obligatory passage point regarding the degree to which IT services and application should be provided centrally or by the devolved units, and its benefits, were not clearly communicated to the other actors.

2. Limitation of the devices of interessement
   Overall, the devices of interessement that were used to support the centralisation project were not effective. For example, the ITS and its Director did not use appropriate language to lock in the interests of other actors. Within the devolved structure, the word centralisation conveyed a negative connotation because of its perceived association with losing the power to make any important decisions, as well as perceived job losses. The devolved structure embeds a strong property of irreversibility that would render such reversal very difficult. But, strong IT policies that could be adhered to by all actors (i.e., a device of interessement) did not exist.

3. The impact of inattentive punctualisation
   The focal actor neglected the interests of the punctualised actors of faculties and IT infrastructure by treating them as black boxes during the negotiation process. These punctualised actors were relatively stable actor networks, but began to display their complexities when the focal actor wished to lock them into the
obligatory passage point without considering their interests. The impact of inattentive punctualisation was visible when the faculties became reluctant to accept the obligatory passage point. This resistance was due to the faculties having established their own IT infrastructures involving people, technologies and devices to support their daily operations. Most of these were developed and funded locally to fulfil their staff’s needs.

The focal actor also took the IT governance relational mechanisms for granted. The lack of recognition of the project’s cultural impact had made the negotiation process difficult. The adoption of a one-way communication approach by the focal actor led to conflict in managing the diverse interests of the actors. This conflict resulted in difficulties in creating a belief in, and commitment towards achieving the same obligatory passage point.

(4) Limitation of the role of focal actor and the power of the primum moven

The leadership style of the focal actor was perceived to be autocratic since he did not use two-way communication in the negotiation process. The Director was not able to develop his sphere of influence over other actors and the new vision that he wanted to bring to the university was not accepted. In addition, the analysis revealed the strong power held by the VC (i.e., the primum moven) in making final decisions on IT. The VC had the legitimate power from his hierarchy and without his full support in allocating appropriate funding, the project was unable to succeed.

From Point F to G, the trajectory for University X began to become more aligned. The incline was due to the following reasons. Firstly, the direct involvement of the VC (i.e., recognition of IS Division as a central unit and the appointment of the Librarian as LDIT) in IT matters. Secondly, a more pragmatic approach was taken by the newly appointed focal actor (i.e., LDIT) that took into consideration the empowered culture of the university. Thirdly, a well defined and clear obligatory passage point and lastly, the use of appropriate devices of intersessement.
7.1.4 University Y

The IT governance trajectory at University Y (Figure 14d) fluctuated. An explanation of the non-linear trajectories is provided below:

(1) The IT Centre faced several internal issues in relation to its operations, but it was always enrolled in the IT governance network. This continuous enrolment was due to its function being recognised by the university to centrally provide IT services and infrastructure on the campus.

(2) The Director of IT’s role as a focal actor was constrained by the fact that he did not have the power to negotiate with the global actor. The Director was the spokesperson for the punctualised IT Centre and IT infrastructure, but at the top management level (e.g., Executive Council’s meetings), the role of the spokesperson was transferred to the Deputy VC (Research and Innovation).

(3) IT governance relational mechanisms were not fully emphasised as devices of interessement during the translation process. The IT leadership was diminished due to the contradictory roles of both the CIO and Director of IT. At the university level, the Deputy VC (Research and Innovation) was named as the CIO. Nevertheless, the CIO was only a position in name to fulfil the requirements provided by the MAMPU.

(4) It was found that the IT Centre maintained its legacy application systems since the 1990s, with various enhancements and upgrades. However, the legacy application systems had become expensive to maintain as they had reached their maturity and had already incorporated various changes that had been made over many years. For this reason, it was found that the IT staff were struggling to align their interests with the existing IT infrastructure during the new application system development stage.

7.1.5 Summary of IT Governance Trajectories

Specifically, the translation and local/global network analysis conducted in Chapter 6 of the four cases suggested that IT governance implementation success depends on the following:
(1) The alignment of interests between the IT governance arrangements (structures, processes and relational mechanisms) and IT infrastructure actor networks;

(2) A creation of an effective local network that can operate together with the global actor, where each actor plays an important role in ensuring the stability of the network;

(3) The global actor cannot shape the network independently without considering the interests of the local actors;

(4) The enrolment and mobilisation of all the actors into an agreed network is contingent upon the power held by the focal actor to shape the network. The focal actor had the power to formally control and shape the network through a legitimate line of authority that was prescribed under the IT governance structures;

(5) The use of powerful devices of interessement can create sufficient space for the local actors to be able to directly negotiate their interests with the global actor. The analysis shows the devices of interessement can create a favourable balance of power state during the negotiation phase. The selection of appropriate devices of interessement together with various tactics can successfully entice and enrol actors in the new network. Therefore, the interessement devices are powerful in stabilising the agreements and relationships among actors during the implementation of the IT governance actor network;

(6) The appointment of the spokesperson to represent the mobilised actors is successful to avoid betrayal in the future;

(7) The ability of both global and local actors to negotiate their interests in achieving an interests alignment through a well defined and clear obligatory passage point;

(8) The ability to consider the elements inside the punctualised IT infrastructure, including its installed base to prevent misalignment of interests in the future is vital. This step has been found to successfully minimise resistance from all actors residing in the IT infrastructure to accepting the obligatory passage point.
(9) The development of *obligatory passage point* should consider and be compatible with the organisational culture.

### 7.2 Cross Case IT Governance Trajectories Analysis

From the ANT perspective, the trajectories provide an illustration of how continuous negotiation takes place, in which actors can successfully translate their interests to ensure a smooth IT governance implementation. Despite the four organisations’ unique ways of implementing and maintaining their IT governance, commonalities in the actions taken to support and strengthen their IT governance implementation were visible. Therefore, the emphasis of this section is on extracting the strategies (i.e., factors\(^\text{17}\)) that are found in the four cases to contribute to the strengthening of the governance trajectory.

### 7.3 Factors Contributing to Strengthening the IT Governance Trajectories

As noted in Chapter 3, there are two actor networks that could influence the success or failure of IT governance implementation projects. The global actors have the power and resources to control the implementation of the IT projects, whereas the local actors actually implement the projects. The relationships between these two actor networks are controlled by the ability of the *obligatory passage point* to establish a situation for both local and global actors to perform their intended functions. Through the lens of ANT, the four trajectories in Figure 14 were analysed in order to extract the commonalities that contributed to the interests’ alignment of the local and global actor networks (i.e., strengthening the IT governance trajectory). The cross case analysis focused on comparing and analysing the four trajectories to find the patterns and connections between the trajectories (Figure 14a [milestones A – H], Figure 14b [milestones A – H], Figure 14c [milestones A – K], and Figure 14d [milestones A – J]), allowing the factors to emerge from the data. The names of the factors derived from this cross case comparison is based on the actions (strategies) taken by the local and global actor networks during the interests’ alignment process. Table 27 below summarises the findings from the cross case analysis of the four IT governance trajectories.

\(^{17}\) The word “factor” does not represent the prediction of variables for hypotheses testing as in the positivist school of thought. “Factors” are used to represent the context in which negotiation and specific activities took place between the global and local actor networks. It reflects the factors contributing to the strengthening of the IT governance trajectories.
trajectories, which reveals eight factors that contribute to the strengthening of the IT governance trajectories.

Table 27: Factors contributing to the strengthening of the IT governance trajectories

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√ represents YES, clearly seen in Figure 14 & “× represents NO, not seen in Figure 14
The identified factors presented in Table 27 above reflect how interactions, between the local and global actors for achieving alignment of interests, are strengthened. The following sections discuss the individual factors that contribute to strengthening IT governance trajectories in more detail.

### 7.3.1 Well Defined and Clear Obligatory Passage Point

The *obligatory passage point* (OPP) is an essential part of the translation process during the *problematisation* stage (Gunawong & Gao, 2010; Sarker et al., 2006). A well defined and clear *obligatory passage point* is required for convincing all actors that their passage through the *obligatory passage point* is the best option for them to achieve their own goals (i.e., a clear alternative; either to change direction and follow their own path or to accept the solution provided by the *focal* actor). From the analysis of the trajectories, a well defined and clear *obligatory passage point* was found to be an effective tactic for aligning the interests of both local and global actors. The process of aligning the interests between the global and local actors is complex and dynamic, where both actor-networks are heterogeneous with embedded interests of their own. Through a well defined and clear *obligatory passage point*, the global actors can guide the local actors’ behaviour in relation to IT governance implementation. In addition, it provides the global actor with the ability to control the project and its relationship with local actors during the project’s implementation. For instance, the analysis of Group ABC’s IT governance trajectory (Figure 14a) shows that a strong and clear *obligatory passage point* set up by the Group CIO led to a successful IT governance implementation. Interviewee A1 explained as follows:

> The Group CIO has a clear vision and objective of what he wants to achieve. When I joined the Group IT in 2006, I could see his roadmap, with the skeleton on how we should operate... Roadmap is the big map on what we want to do. We have hit-back sessions, and the output is mapped to the roadmap... things has been revisited every year (Interviewee A1, Head of Group IT, 2012)

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18 All four case examples have been discussed in full previously, so apposite case instances are used in the cross case analysis
7.3.2 Appropriate Devices of Interessement

Interessement involves the group of actions taken by the focal actor to convince all the heterogeneous actors that their interests are consistent with the focal actor’s interests (i.e., the obligatory passage point). From the four cases, devices of interessement were identified as factors in as many instances as the role of the obligatory passage point (see Table 27). This reflects that a strong and clear obligatory passage point needs to be supported by appropriate use of devices of interessement. The analysis of the four trajectories reveals various types of devices of interessement. The analysis identified the common devices of interessement used during the translation process and it is presented in Table 28 below:

Table 28: The devices of interessement used in the four cases

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### 7.3.2.1 Communication

Developing and maintaining a two-way communication channel was found to be the most common technique used during the negotiation process between the local and global actors and for maintaining the IT governance network. During the negotiation process, for all actors to successfully pass through the *obligatory passage point*, this was highly dependent upon the communication approach taken by the global *focal* actor. For example, in the first path taken by the University X’s ITS Director, communication was not emphasised. As a result, actors rejected the *obligatory passage point* and their predefined roles, resulting in a failure of the centralisation project to proceed. On the other hand, in the second path, the Librarian and Director of IT (LDIT) conducted consultation sessions in order to gain input from all actors through their representatives. She also focused on using a common language (e.g. “partnership”), to convince the faculties and other business units that they needed to work in a collaborative manner with the IS for a better IT services delivery. This approach was more successful and all actors were then enrolled into the new IT governance network. Interviewee X7 explained that using the concept of partnership put the IS team into a better position to take an IT leadership role at University X. He added that,

> We have to acknowledge that we are still in a devolved IT situation... we don’t use the term centralisation because it could have different meaning... centralisation is not a good term because people associate centralisation with job reduction... we do our best to work in partnership...we are collaborating with people and there are no threats (Interviewee X7, IS staff, 2012).
7.3.2.2 Appointment of a Spokesperson

The analysis from the case studies reveal that during the process of aligning the interests between the local and global actor networks, the *focal* actor often negotiated with a spokesperson who was appointed to represent the actors (e.g., the IT Centre and the ITS team are the spokespersons for University Y and Company B’s IT infrastructure, respectively). This concurs with Sarker et al. (2006) who note that actors do not always participate in the negotiation process by themselves, but through speakers negotiating the interests on their behalf. It is a tactic used to expedite the negotiation process because rather than convincing all actors who were part of the IT governance network, convincing the spokesperson was found to be appropriate as he/she could “speak in the name of the others” (Callon, 1986b, p. 214). Convincing the spokesperson who speaks on behalf of the actors, is more practical and uncomplicated as compared to negotiating with all individual actors. Once the spokesperson agrees with the *obligatory passage point*, the heterogeneous actors will normally follow the interests that have been inscribed for them. For instance in Company B, the appointment of a project manager to lead the Launchpad project, and as a spokesperson representing the IT infrastructure and Launchpad team in the Major Project Committee, were used as tactics to support the mobilisation of both local and global actors. The following comment was recorded,

... In the second phase (i.e., Phase 2 of the Launchpad project)... we didn’t want to sort of waste people’s time especially for those who didn’t have a stake in what was happening... so they did not join the Governance Committee, but they were still in the Leadership Committee... I was the project manager and I reported directly to the governance committee (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).

7.3.2.3 Appointment of IT Leader

The appointment of IT leader as devices of *interessement* was used by the *primum moven* (i.e., the global actor – management) to lead the IT unit in the early stages of the translation process. The IT leaders (i.e., Group CIO for Group ABC; General Manager of ITS for Company B, LDIT for University X; and Director of IT for University Y) were appointed and given a mandate to become the key collaborators to concentrate on their respective IT development efforts and link with the business
objectives. For example, Interviewee X10 explained his appointment as the LDIT at University X as follows:

When the ITS Director was appointed, I remained as the librarian... only when he left, the VC asked me to take the role of the LDIT... the decision to combine the library and ITS was an entirely personal decision of the VC at that time (Interviewee X10, Former LDIT, 2012).

7.3.2.4 New (Restructured) IT Organisational Structure

It was found that during the new leaders’ transition into their new positions that they all introduced a new structure in the IT units as a device of *interessement*. This tactic is seen as crucial because newly appointed IT leaders aimed to ensure that the key IT positions were filled by people who understood his/her vision. For instance, the Group A’s CIO after his appointment (in Phase 1 – Foundation of IT governance), revived the Electronic Data Processing group by renaming it Group IT and established two new units of Strategy, Architecture and Planning; and Risk and Security Management.

7.3.2.5 Establishment of IT Governance Committee

The management of the participating organisations established the IT governance committee as a device of *interessement* to ensure clear roles and responsibility in IT decision making. In this context, it represents the ability to influence IT decision making through executive participation by bridging the gap between business and IT to achieve business/IT strategic alignment. In University Y, the two attempts at establishing an IT steering committee as a device of *interessement* failed (i.e., Computer Steering Committee and IT Council, respectively). This failure was due to the lack of commitment from the top management to meet regularly to discuss IT matters. In contrast, Group ABC’s IT Steering Committee and IT Leadership Committee are examples of successful devices of *interessement* that led to the enrolment of various actors in the IT governance network. Both committees were active and met quarterly to discuss IT matters at Group ABC.

7.3.2.6 IT Review

Conducting an IT review as a device of *interessement* was used in two participating organisations, namely Company B and University X. From the analysis, the review was
designed to examine and report on the participating organisations’ present use of IT and provide recommendations for improvement. As an example, in University X, the ITS Review was used as a strategy to identify the problem faced by the ITS. The recommendations were used as a basis for preparing the business case for the Investment Program. During the ITS review, a respondent highlighted the following:

The interesting part of the review was it didn’t take long before you see a pattern was emerging... different people who ordinarily wouldn’t have any things to do with each other comes with similar view... so the broad issues quickly emerged... lack of IT standardisation across the campus because different groups had really followed their own pathway... not chaotic... but it really was not there... (Interviewee X3, IT Panel Review, 2012).

**7.3.2.7 Training/IT-Business Engagement**

Training was important as part of the IT staff development process because it allows for the development and maintenance of their technical skills and competencies. Using training as a device of *interessement* can be seen in Group ABC where they promoted IT skill enhancement among their IT staff. In this context, the degree of alignment of interests was increased through negotiations for actors to attend proper training programs. This aimed at lessening resistance to new changes or programs.

In terms of IT-business engagement, the focus is on building relationships between IT and business people (or stakeholders) to ensure IT can achieve both local (e.g., IT unit) and organisation-wide vision. The use of IT-business engagement was found to be an effective device of *interessement* because it helped the organisation to minimise the gap between the IT and business people: IT should be perceived as an integral part of the business process that could enable the business to perform better. The engagement process at Company B was explained as follows:

... We have a business engagement function as a primary mechanism for collaboration with the business. The group is responsible for talking regularly in a formal way with the major stakeholders in the business to understand the IT requirement and prioritise requirements that feed back into our development cycle... informally, everyone is responsible for developing business relationships to understand the business process... so it’s a collaborative process in terms of team spirit (Interviewee B2, General Manager of IT, 2012).
7.3.2.8 Funding

Funding was used as a device of *interessement* used by both University X and Y. As not-for-profit organisations, lack of funding resulted in a constraint to invest in the IT infrastructure development. For example, University X’s efforts to overcome its problems associated with the devolved IT infrastructure through a centralisation project was unsuccessful. One of the reasons was the lack of funding from the top management of the university to support the project.

... Being able to fund... we think the project (i.e., centralisation project) was expensive... we bring in a consultant... but there was not a lot of success... if you were not getting things done, you were not likely to be able to convince people to put money into it... (Interviewee X4, Former VC, 2012).

In the second attempt at a centralisation project that was conducted through the Investment Program, funding allocation was used as a device of *interessement* to interest the faculties to accept the project. Interviewee X6 explained the reason why faculties rejected the centralisation project,

The faculties don’t want to give up their money to the central IT... they (i.e., the IS) don’t have the resources to invest in an IT system which makes the faculties worry... if any of the central IT system break down... who should provide the support?... so give the money to the faculties and they can do it by their own... part of the reason of why the level of investment is quite stagnant... (Interviewee X6, Faculty Manager, 2012).

When the global actor of the VC agreed to allocate $45 million funding for the Investment Program (i.e., device of *interessement*), the faculties accepted the project as the *obligatory passage point*, and began working in partnership with the IS for implementation.

7.3.3 Role of *Inscription* in Perpetuating Interests

The role of *inscription* in perpetuating interests is important to “bind” the interests of all actors during the translation process into a durable (i.e., stable) artefact. It also reflects the outcome of the translation process that had the ability to influence how actors take actions. In the context of this analysis, the ability of *inscription* to protect the interests of all actors could lead to strengthening the IT governance trajectory. For
instance, the three pillars of IT introduced by the Group ABC’s CIO inscribed the way Group IT, Group Shared Services and Division IT interacted and performed their tasks.

Four types of inscription were identified in accordance with Callon’s (1991) classification. These inscriptions had been used by the participating organisations to perpetuate the interests of the actors. These are literacy; technical artefacts; human beings; and money. Table 29 presents the mapping of types of inscriptions used by the participating organisations.

Table 29: Mapping of types of inscription used in the translation process

<table>
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<tr>
<th>Types of inscription</th>
<th>Group ABC</th>
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<tr>
<td><strong>Literacy</strong></td>
<td><em>Three phase merger road map</em> <em>IT strategy</em> <em>IT policy</em> <em>IT objectives</em></td>
<td><em>New business strategy</em> <em>Re-evaluation report</em> <em>Review report of Stage 1 and 2 of the Launchpad project</em> <em>Leadership model</em> <em>ITS vision</em> <em>New IT strategy</em> <em>KPMG review report</em> <em>Prioritisation of business requirement project</em></td>
<td><em>Review report of the Administrative Computing Services/University Communication Services</em> <em>Strategic plan for IT/IS</em> <em>SWOT analysis</em> <em>ITS mission</em> <em>Findings from Infrastructure Management Review</em> <em>Audit report</em> <em>Student IT Needs’ Study 2010</em> <em>The ITS review report</em> <em>Business case for Investment program</em></td>
<td><em>IT strategic plan</em> <em>University transformation plan</em></td>
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<td><strong>Technical artefacts</strong></td>
<td><em>SAP blue print</em> <em>ERP implementation</em></td>
<td><em>Integration strategy – developing an interface</em> <em>Launchpad project (upgrading COBOL to Oracle ERP)</em></td>
<td><em>New IS website</em> <em>Projects under the Investment Program</em></td>
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<td><strong>Human beings</strong></td>
<td><em>Establishment of the TPIT – e.g., Group CIO, Head of Group IT</em> <em>IT-business partnership framework</em></td>
<td><em>Leadership Model – e.g., General Manager of ITS, project managers</em></td>
<td><em>LDIT, associate director of IT/library</em></td>
<td><em>Director of IT</em> <em>Staff relocation</em></td>
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<td><strong>Money</strong></td>
<td><em>Benefit of ERP</em></td>
<td><em>Advantages of using</em></td>
<td><em>Benefit of the</em></td>
<td><em>Funding</em></td>
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19 “Money in all its different forms acted as an instrument of exchange that demands essential returns in the form of information” (Callon, 1991, p. 138)
The types of *inscription* used are as follows. Firstly, *literacy inscription* include IT strategic planning, IT policy statements and review reports. For example:

Yes, the policy helps to control... There are things do & don’t because human beings are not angels anyway. The policy is clear, internal control must be there in order to curve all these unnecessary things (Interviewee Y3, Dean, 2012).

Secondly, *technical artefacts* can be seen during the integration process between the HSC and Company B. Interviewee B5 explained the following:

The HSC had a totally different system... We made the decision to leave the store system as they were in both Company B and HSC. Basically, we interface the HSC’s systems into our Cobol systems. This was seen as a lower risk. If we change the store system across the whole HSC network, that was about the same size of the stores under Company B at that time (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).

Thirdly, an appointment of Group A’s CIO to become Group ABC’s CIO was an example of a human beings’ *inscription*. The Group CIO had a positive reputation and acquired skills to ensure the success of ERP implementation as the group-wide IT infrastructure.

Lastly, *money* is associated with the availability of cash to fund the IT governance projects and its ability to provide something in return. The example of money as inscription can be seen in the case of University X. The readiness of the top management to allocate funding resulted in the implementation of the Investment Program. The benefits of the Investment program had also convinced all actors to accept it. One of the interviewees observed the following:

... The reasons that we are currently engaged in the business investment programme... are to make IT as an enabler rather than a hindrance... for example, the student information management system. We have to make sure that the system has a very good response time so that students can use the system when they want to... they get information when they

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<td>implementation</td>
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<td>Investment Program *Funding</td>
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20 The CIO had vast and in-depth experience in ERP implementation
want to... staff can use the system when they want to... (Interviewee X1, IT Review Panel, 2012).

7.3.4 Re-consideration of the Installed Base of IT infrastructure

Re-consideration of the installed base of the IT infrastructure as a device of *interessement* demonstrates how the IT governance trajectory between the global and local actors can be strengthened. The installed base of IT infrastructure is important to be considered because it “does not grow de novo: it wrestles with the ‘inertia of the installed base’ and inherits strengths and limitations from that base” (Star & Ruhleder, 1996, p. 113). Failure to consider the installed base of the IT infrastructure could cause technological traps (lock-ins)²¹ (Hanseth & Lyytinen, 2004). The importance of considering the installed base of IT infrastructure was evident at Company B, when they decided to replace their legacy COBOL system with Oracle ERP. Interviewee B5 explained the process they went through prior to choosing Oracle ERP as:

... We spent a good six months looking at how the business was operating, documenting process flow... we knew what we wanted the system to do... The key driver was the ability to take the Oracle ERP system and extend it. This means that we can build our own user interfaces... additional functionality... The Oracle ERP actually allows us to hook those in without changing the integrity of the code (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).

The upgrade process was a high cost project that had a major impact on Company B’s major processes. Hence, careful consideration of the installed base IT infrastructure was made to avoid resistance. A staged approach of upgrading the COBOL system to Oracle ERP was conducted through the Launchpad project.

Similarly, prior to making a decision to implement ERP as a group-wide IT infrastructure at Group ABC, the installed base IT infrastructure from the merged companies (i.e., Groups A, B, and C) was carefully considered. The consolidation and upgrade of IT infrastructure to ERP that were conducted in a staged approach, was successful. At University Y, re-consideration of IT infrastructure’s installed base is critical because the university decided to maintain its legacy application system.

²¹ “when a technology has been adopted, it will be very hard or impossible to develop competing technologies due to investments in the large installed base and resulting technological lock-ins” (Hanseth & Lyytinen, 2004, p. 220).
7.3.5 Understanding the Organisational Culture

The successful translation of interests between the local and global actors depends on the clarity and strength of the obligatory passage point. An obligatory passage point that is compatible with the organisational culture can steer the process of interests’ alignment. Organisational culture is a socially constructed phenomenon that is embedded in the very roots of organisational existence (Ogbonna, 1992). It is an interpretation of an organisation’s history, values and beliefs shared by its members than can serve as organisational control mechanisms (e.g., the right way to do things) (Martin & Siehl, 1983). In this context, if an obligatory passage point is not compatible with the focal actor’s organisational culture, conflict will occur. This is evidenced by the case of University X, which had a strong devolved culture and focused on collegiality between its staff. The centralisation project introduced by the ITS Director was seen as incompatible with the university’s culture. Interviewee X5 stated the following:

... How IT is developed in this university has been quite strange... it is very devolved... this university is probably more devolved than Oxford University, in terms of the intensity of people who had their own way of doing things... the approach taken was far too draconian... the devolved IT staff, they were suddenly put offside and not invited to collaborate (Interviewee X5, IT Review Panel, 2012).

The proposed change, from a highly devolved IT culture to a more centralised approach resulted in conflicts between individual interests (e.g., the ITS Director) and the interests of others (e.g., the faculties). The process of aligning the interests intensified when the local actors rejected the new roles defined for them under the centralised approach. The project was then halted by the university after the resignation of the ITS Director.

On the other hand, understanding its organisational culture helped Company B to sustain their IT processes. The ITS team developed and implemented all IT projects in accordance with Company B’s culture of integrity, respect, teamwork, achievement and innovation. For this culture, flexibility was promoted strongly. When Interviewee B1 was asked about his opinion on Company B’s culture, he answered the following:

It is the fantastic part of our culture... do not have to go through a ton of process in order to deliver something to the customer... the team member generally impounds to make the
decisions themselves because they have the feeling of ownership and accountability... people still make mistakes but that’s life and we learn from those mistakes... (Interviewee B1, IT Manager, 2012).

7.3.6 Negotiation Power of Actors

Stanforth (2007) noted that the analysis of stories using an ANT approach could lead to a better understanding of power and fluctuation of relationships among actors in the actor network. A power relationship describes how actors are defined, associated, and obliged to remain faithful to their alliances (Stanforth, 2007). In this study, negotiation power of actors reflects an outcome of the activities of enrolling, convincing and enlisting by which a network takes shape (Heeks & Stanforth, 2007, 2014; Stanforth, 2007).

The findings of this study show that the negotiation power of the global actors had contributed to strengthening the IT governance trajectories. The negotiation power could politically push the local actors to accept the obligatory passage point and also influence the way tasks were performed by them. As a result, a political mobilisation of the local actors was occurring. For example, the global actor of VC at University X used his negotiation power position to enrol the local actor networks. This was visible at four milestones (A-B, F-G, H-I, and J-K in Figure 14c) in the trajectory. The VC used his position to strengthen the IT governance network after the failure of the centralisation project. The negotiation power resulted in the appointment of the Librarian as the LDIT and the merger of the ITS and Library as the IS Division. In this context, the LDIT and the IS Division was politically mobilised into the IT governance network. Therefore, the VC had “the power to enact through others” as highlighted by Heeks & Stanforth (2007, p. 172). The VC had both power over (i.e., the VC officially had the power or authority over the IT governance at University X - cause of an action) and power to (i.e., power to influence people’s action - consequence). The use of power position in the negotiation process can be seen from the following excerpt:

I am pleased to announce that the Librarian will take responsibility for the Information Services Division. He will report directly to me (The VC, email communication, 26 February 2008).
7.3.7 Leadership Style of the IT Leader

The focal actor, who translated the primary global actor’s interests, held the IT leadership position. The focal actor led the IT governance project by identifying related actors and their interests, establishing the obligatory passage point and focusing on enrolling all actors into the projects.

In Group ABC, the Group CIO leadership was found to affect the IT governance trajectory. This was mainly due to his clear understanding of the business objectives and his ability to translate these to guide the IT development at Group ABC (e.g., through the IT vision and development of the three pillars of IT). His leadership style that focused on two-way communication within the three pillars of IT, and interaction with the business people, had successfully established a positive relationship between the local and global actor networks. Interviewee A2 explained the Group CIO’s leadership as follows:

The way the governance has been set up and the effectiveness of the structured process and the organisational structure itself... the particular person in the position, basically my boss (i.e., Group CIO)... I think generally, very effective and open as well... we have a regular discussion, not quite formal... and his open door policy, we always have a discussion if we have the idea and so on... (Interviewee A2, Head of Group IT, 2012).

7.3.8 Top Management Support

The ability of the top management (i.e., global actor network) to provide resources and space for action (Heeks & Stanforth, 2007; Law & Callon, 1992; Stanforth, 2007) is essential to help actors align their interests with the obligatory passage point. The space provided by the global actor can be conceptualised as providing support to the local actors for the implementation of the IT projects. The support is in the form of ensuring resources are available for the project to take place and includes appropriate funding. The findings of this study suggest that top management support could strengthen the IT governance trajectory between the global and local actor networks. For instance, at Company B, top management support was demonstrated by the active participation of its Managing Director in IT projects through both the Leadership Committee and Major Project Committee.
7.4 Summary

The cross case analysis conducted in this chapter has addressed the second research question in searching for an explanation of how do IT governance structures, processes, relational mechanisms and IT infrastructure become dynamically aligned to support IT governance implementation. This chapter also analysed the cross case findings to address the third research question on identifying the factors that contribute to the process of interests’ alignment. In this context, eight factors that contribute to the strengthening of the IT governance trajectories were disclosed. The eight factors are; well defined and clear obligatory passage point (OPP); top management support; role of inscription in perpetuating interests; re-consideration of the installed base of IT infrastructure; understanding the organisational culture; negotiation power of actors; leadership style of the IT leader; and using appropriate devices of interessement. A well defined and clear obligatory passage point (OPP); role of inscription in perpetuating interests; re-consideration of the installed base of IT infrastructure (i.e., the interests of the nonhuman actors); negotiation power of actors; and using appropriate devices of interessement were consistent with the main tenets of ANT. In light of this evidence, the use of ANT as a theoretical lens served to enhance an understanding of the emergence of a stable IT governance network. Specifically, these eight factors were found to influence the trajectories that helped the enrolment and mobilisation of both local and global actors into the IT governance network. These factors were found to be important to strengthening the IT governance trajectories which helps the process of aligning an initially diverse collection of interests into a network. A discussion on how these eight factors are recast as tactics to create a stable alliance of actors and how a formative model for IT governance implementation can be constructed, will be discussed in the next chapter.
CHAPTER 8: MODEL DEVELOPMENT

8.0 Introduction

In Chapter 7, the cross-case analysis of the IT governance trajectories was described. Eight factors that contribute to the strengthening of the IT governance trajectories were identified. The identification of these factors is important as it addresses the second and third research questions on how IT governance structures, processes, relational mechanisms and IT infrastructure become dynamically aligned; and the factors that contribute to their alignment of interests, respectively. These factors exhibit that an emerging network of IT governance becomes stable as an effect of its actors’ alignment of interests. To further examine the third research question, these eight factors are recast as tactics to create stable alliances of heterogeneous global and local actors in the IT governance network. Each tactic is discussed in the light of the wider body of relevant literature on IT governance and IS. In this context, each tactic is described together with relevant supporting literature as a foundation to guide the development of a tactical model for IT governance implementation. Emerging themes that are relevant to the tactics are also discussed in this chapter. The development of the tactical model (i.e., the fourth research objective) was aiming at using the findings from the preceding chapters 6 and 7 to provide a common guideline for management to improve the implementation of IT governance. The model is unique because it is derived from the analysis of dynamic interactions of IT governance actors.

8.1 Summary of Research Findings

Analysis of the historical background of the four participating organisations (Chapter 5) described different approaches to implementing IT governance arrangements (structures, processes, relational mechanisms) and IT infrastructure. The findings revealed that each organisation has developed their own way of governing IT. Each deployed a mixture of structures, processes, relational mechanisms and IT infrastructure in their IT governance arrangements. Variations in the way IT governance is implemented are not unexpected because each organisation needed to
respond to their unique organisational context, business requirements, and IT environment (Agarwal & Sambamurthy, 2002; Lunardi et al., 2013; Patel, 2004).

Even though all of the participating organisations had their own method of governing IT, the findings from the cross-case analysis (Chapter 7) found similarities in the approaches taken by the IT governance players (i.e., the global and local actors) to stabilise their IT governance implementation. By comparing and analysing the IT governance trajectories, eight factors contributing to the strengthening of the IT governance trajectories were identified. These are as follows:

1. well defined and clear obligatory passage point (OPP);
2. top management support;
3. role of inscription in perpetuating interests;
4. re-consideration of the installed base of IT infrastructure;
5. understanding the organisational culture;
6. negotiation power of actors;
7. leadership style of the IT leader; and
8. using appropriate devices of interessement.

The first seven factors listed above relate to the strategic actions taken by the global actors (see Figure 15a). These actions are used at the strategic level and are important for the organisations to maintain their viability over a long period of time. The last factor of using appropriate devices of interessement is concerned with the tactical actions taken by the global actor to ensure enrolment of the local actors to produce a stable IT governance network. These tactical actions are for short-term purposes, where the focus is on “how to get things done”. These include communication, appointment of a spokesperson, appointment of IT leaders, new IT organisational structure, establishment of IT governance committee, IT review, training/business engagement, and funding (see Figure 15b).
As explained in Chapter 2, IT governance implementation consists of structures, processes, relational mechanisms and IT infrastructure. Figure 15a shows how the mapping of the factors that contribute to the strengthening of IT governance trajectories can be traced back to the IT governance structures, processes, relational mechanisms and IT infrastructure. Hence, the mapping is in line with the suggestion made in Chapter 4 that IT governance is a mixture of structures, processes and relational mechanisms and it has a strong relationship with IT infrastructure.

It was found that the relationships between the IT governance structures, processes, relational mechanisms and IT infrastructure work in a virtuous cycle (represented by arrows in Figure 15a and 15b). Aral et al. (2006) propose that a successful IT investment initiates a virtuous cycle of additional investment. According to the authors, the virtuous cycle encourages further investments over the course of several periods. In the context of IT governance, the virtuous cycle can be described as follows: the management, through IT governance structures (e.g., IT governance steering committee) makes decisions on IT investment (e.g., a project to upgrade the IT infrastructure). Once the implementation of the IT project takes place, various processes are implemented to ensure the project is successful. Together with the processes, maintaining relationships between the management and the operational
level of IT (i.e., *relational mechanisms*) are crucial to ensure the vision for the management of IT is properly communicated, so that employees understand their contribution towards the success of the business. Technology is not static because it keeps on changing and needs to be maintained and upgraded, management will continue to re-invest in new IT development projects, thereby initiating further iteration of the virtuous cycle.

8.2 Operationalisation of the Strategic and Tactical Actions

The factors that contribute to the strengthening of the IT governance trajectories are summarised in Figure 16.

![Figure 16: Factors that contribute to the strengthening of the IT governance trajectories](image)

Both the strategic and tactical actions were analysed in terms of their contextual characteristics. The actions were then grouped and mapped together into themes to represent the core meaning of the approaches. Based on the abstraction of these strategic and tactical actions, the following four prevalent themes emerged:

1. Clarifying expectations;
2. Responsibility and accountability;
3. Fostering commitment; and
4. Increasing IT capabilities

Figure 17 below further maps the individual factors (in Figure 16 above) into the four themes. As mentioned earlier, even though “using appropriate devices of
interessement” is considered as a tactical action (i.e., short-term actions taken to achieve the intended result), their continuous interaction with strategic activities is necessary for maintaining alignment towards desired strategic outcomes. For this reason, both the strategic and tactical actions are assigned to an appropriate theme based on meaning, relevance and implicit connection between them\(^{22}\) (all of the factors associated with appropriate devices of interessement are coloured in blue - Figure 17).

![Diagram](image)

**Figure 17:** Mapping of the factors that contribute to the strengthening of the IT governance trajectories to the identified themes

Table 30 below further explains the mapping of factors into the four themes

<table>
<thead>
<tr>
<th>Tactical approaches</th>
<th>Contextual characteristics</th>
<th>Emerging themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well defined and clear obligatory passage point</td>
<td>A well defined and clear obligatory passage point is important as a “medium” to explain the interests of the focal actors, rules and assumptions that must be followed by the actors in the network</td>
<td>Clarifying expectations</td>
</tr>
<tr>
<td>Role of inscription in perpetuating interests</td>
<td>The obligatory passage point needs to be supported by inscription in the form of literacy, technical artefact, human beings and money</td>
<td></td>
</tr>
<tr>
<td>Understanding organisational culture</td>
<td>Culture is an interpretation of an organisation’s history, values and beliefs shared by its members (e.g., the right way to do things). It needs to be</td>
<td></td>
</tr>
</tbody>
</table>

\(^{22}\) It is important to note that the factor negotiation power of actors was not assigned directly to the theme responsibility and accountability. This is because the negotiation power of actors is embedded in the line of authority and accountability defined by the management. For instance, the negotiation power can be traced to the IT governance committee and IT organisational structure.
<table>
<thead>
<tr>
<th>Tactical approaches</th>
<th>Contextual characteristics</th>
<th>Emerging themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appointment of IT leader</td>
<td>Appointment of IT leader or focal actor is important to lead the translation process. It is the focal actor’s responsibility to ensure the obligatory passage point is accepted by the actors</td>
<td></td>
</tr>
<tr>
<td>Establishment of IT governance committee</td>
<td>IT governance committee delineates the responsibility and accountability of the committee to oversee IT governance implementation</td>
<td>Responsibilit y and accountabilit y</td>
</tr>
<tr>
<td>New (restructured) IT organisational structure</td>
<td>IT organisational structure is important to represent the authority and accountability for IT activities at all level</td>
<td></td>
</tr>
<tr>
<td>Negotiations power of actors</td>
<td>Negotiation of power reflects an outcome of the activities of enrolling, convincing and enlisting by which a network takes shape. Hence, this factor was not treated as a factor on its own, but it is embedded as part of the theme of responsibility and accountability</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>From the case studies, it was found that poor communication resulted in conflict especially in managing the diverse interests of the actors. The conflict resulted in difficulties to obtain commitment towards achieving the same obligatory passage point</td>
<td></td>
</tr>
<tr>
<td>Leadership style of the IT leader</td>
<td>Leadership style of the IT leader was crucial to unite the diverse interests of the actors. An effective IT leadership style lead the actors to successfully pass the obligatory passage point and engage in the IT governance network</td>
<td>Fostering Commitment</td>
</tr>
<tr>
<td>Top management support</td>
<td>Top management support can influence the commitment of other actors to continuously engage in the IT governance network development.</td>
<td></td>
</tr>
<tr>
<td>Appointment of a spokesperson</td>
<td>A spokesperson normally represents the actors by speaking on behalf of them. Actors will abide by the agreements signed off by their representatives</td>
<td></td>
</tr>
<tr>
<td>Training / IT business engagement</td>
<td>Training / IT business engagement could ensure that actors are committed to their role in the network</td>
<td></td>
</tr>
<tr>
<td>Re-consideration of the installed base of IT infrastructure</td>
<td>(Re)Considering the installed base of IT infrastructure is important to ensure its interests are compatible with the obligatory passage point. Failure to recognise its interests results in conflict during a network formation. A stable network of IT governance could not be established</td>
<td></td>
</tr>
<tr>
<td>Funding</td>
<td>Appropriate funding allocation is crucial for organisations to develop and subsequently convert their IT assets and services into strategic applications for sustainability and competitive advantage</td>
<td>Increasing IT capabilities</td>
</tr>
<tr>
<td>IT review</td>
<td>Conducting an IT review periodically could help organisations to assess their current state of IT usage. The review results can be used to plan for future improvement of IT and development and increase of IT capabilities</td>
<td></td>
</tr>
</tbody>
</table>
Based on the information provided in Table 30, a tactical model to guide IT governance implementation has been developed (Figure 18). The model addresses the third research question of what factors contribute to the alignment of interests during the process of implementing governance and infrastructure arrangements? Here, the model suggests how the identified factors could help organisations to maintain stable IT governance to support business operations. The model is depicted as a circular pie chart diagram to demonstrate the interconnections between each of the IT governance tactical approaches (i.e., factors that contribute to the strengthening of the IT governance trajectories). Each of the tactical approaches, however, are independent and flexible (i.e., not mandatory). For this reason, organisations can match a relevant tactical approach to their specific environment. Given that the factors contribute to the strengthening of the IT governance trajectories discussed above using the language of ANT (e.g., obligatory passage of point), this study renamed the factors for clarity and practicality. This exercise was conducted in light of the literature and the context of the case study.

Figure 18: A proposed tactical model to guide IT governance implementation

Table 31 summarises the themes, the tactical approaches and explanation of the factors.
### Table 31: Description on renaming the tactical approaches

<table>
<thead>
<tr>
<th>Themes</th>
<th>Tactical approaches using ANT language</th>
<th>Description on renaming the tactical approaches</th>
<th>Tactical approaches in the model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarifying expectations</td>
<td>Well defined and clear obligatory passage point</td>
<td>Having a well define and clear obligatory passage point acts as the key for a successful translation process. It was renamed as IT vision and mission because it needs to be shared across the organisation as a tool to align the diverse interests of actors</td>
<td>Well defined and clear IT vision and mission</td>
</tr>
<tr>
<td>Role of inscription in perpetuating interests</td>
<td>An inscription was recast as articulating IT strategy and processes. A high-level IT strategy and its processes (e.g., IT strategic plan, technical direction) needs to be articulated as a detailed directional statement to support the IT vision and mission</td>
<td>Articulating IT strategy and processes</td>
<td></td>
</tr>
<tr>
<td>Understanding organisational culture</td>
<td>The term “understanding organisational culture” is widely recognised as important because different organisations have distinctive cultures. Hence, this term will remain</td>
<td>Understanding organisational culture</td>
<td></td>
</tr>
<tr>
<td>Responsibility and accountability</td>
<td>Appointment of IT leader</td>
<td>The appointment of an IT leader will vary depending on the organisational needs. It can be the CIO or head of IT unit. Hence, this term will be retained in this study</td>
<td>Appointment of IT leader</td>
</tr>
<tr>
<td>Establishment of IT governance committee</td>
<td>The establishment of an IT governance committee is not mandated by the government. Organisations have their own governance committee as a mechanism to oversee both their business and IT direction. The findings of this study suggest that organisations should strengthen their existing governance committees. Hence, this study suggests that the term “establishment” be renamed as strengthening the IT</td>
<td>Strengthening the IT governance committee</td>
<td></td>
</tr>
<tr>
<td>Themes</td>
<td>Tactical approaches using ANT language</td>
<td>Description on renaming the tactical approaches</td>
<td>Tactical approaches in the model</td>
</tr>
<tr>
<td>-----------------------------</td>
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</tr>
<tr>
<td>New (restructured) IT organisational structure</td>
<td>In this study, the effort taken by the global actors to increase the attachment of the local actors was achieved by either introducing a new IT structure or restructuring the existing ones. The aim was to strengthen their internal IT to stabilise the network. Hence, this term was recast as strengthening IT internal structure</td>
<td>Strengthening IT internal structure</td>
<td></td>
</tr>
<tr>
<td>Fostering commitment</td>
<td>Communication</td>
<td>Communication was recast as two-way communication to reflect the needs of having upwards, downwards and lateral communication</td>
<td>Two-way communication</td>
</tr>
<tr>
<td>Leadership style of the IT leader</td>
<td>A broad term of “IT leadership” was used to indicate both the ability of the IT leader to: (1) motivate and drive the commitment of IT staff and (2) choose the right approach for the contingent situation in his/her organisation (i.e., leadership style)</td>
<td>IT leadership</td>
<td></td>
</tr>
<tr>
<td>Top management support</td>
<td>This term was retained in the tactical model</td>
<td>Top management support</td>
<td></td>
</tr>
<tr>
<td>Appointment of a spokesperson</td>
<td>The term “appointment of a spokesperson” in ANT refers to the appointment of a representative. A slight change is then proposed</td>
<td>Appointment of IT representative</td>
<td></td>
</tr>
<tr>
<td>Training / IT business engagement</td>
<td>This term was retained in the tactical model</td>
<td>Training / IT business engagement</td>
<td></td>
</tr>
<tr>
<td>Increasing IT capabilities</td>
<td>Re-consideration of the installed base of IT infrastructure</td>
<td>The term “installed base” refers to the existing IT infrastructure that includes an organisation’s legacy system. Hence, the term “re-consideration of existing IT infrastructure” was adopted in the tactical model</td>
<td>Re-consideration of existing IT infrastructure</td>
</tr>
<tr>
<td>Funding</td>
<td>Funding refers to the ability of management to allocate appropriate funds for IT investment.</td>
<td>Appropriate funds allocation for IT investment</td>
<td></td>
</tr>
</tbody>
</table>
8.2.1 Theme: Clarifying Expectations

Clarifying expectations is important in the process of governing IT because it removes misunderstanding and clears up ambiguity of the role of IT in supporting business operations. The analysis of the case studies in Chapter 6 showed that having a strong and clear obligatory passage point (OPP), the role of inscription in perpetuating interests, and understanding the organisational culture, helped the global actors align their interests with the local actors. Misinterpretation of IT vision and mission and its related practices will negatively affect business productivity and efficiency. Hence, management must clearly articulate, communicate and document their expectation on how IT is governed and the role played by the employees in fulfilling the expectations. Clarifying the expectations of top management is critical for the CIO to address the issue of business/IT alignment. Guillemette and Paré (2012) posit that three key contingency factors influence the adoption of IT management profiles in organisations. These are the CIO’s understanding of management’s perception of the IT adoption, the CIO’s view of his/her strategic influence in the organisation, and the CIO’s IT knowledge. Huff et al. (2006) reveal the disconnection between the perception of the CIO and the Boards in regards to the IT focus area. From the CIO’s point of view, the Board should focus on the IT vision, IT strategic plan, the impact of IT on competitive advantage and effectiveness, IT risk, and the decision on application development. On the contrary, their findings disclose that Boards only pay attention to IT risk. Hence, clarifying expectations is considered important because it could minimise the potential of “IT attention deficit” (Huff et al., 2006).
8.2.1.1 Well Defined and Clear IT Vision and Mission

A well defined and clear obligatory passage point can be translated into having a well defined and clear IT vision and mission. If it is related to the IT project, then the objectives of the project must be clear. A well defined and clear IT vision and mission can be used to convey the IT direction and its linkages with business vision and mission for the achievement of strategic alignment (Henderson & Venkatraman, 1993) and to define the tools that are needed to support their business operations (Al-Mashari et al., 2003).

8.2.1.2 Articulating IT Strategy and Processes

Inscription embodies patterns of use that can shape the actors’ action. It has the ability to protect the actors’ interests to prevent conflict before, during and after the implementation of the IT projects. The role of inscription in perpetuating interests in the tactical governance model is defined as articulating the IT strategy and processes (e.g., IT planning, policy, and job scope) to help guide employees’ behaviour towards the achievement of the IT vision and mission. This is because the articulation of the IT strategy and its related processes helps organisations to establish a strong foundation for defining and developing core IT processes that are aligned with the direction of the organisation. The findings from the case studies suggest that organisations should also articulate the IT strategy and its related processes in a formal written statement as a means to pull everyone in the same direction. The finding is consistent with Reich and Benbasat (2000) who suggest that business objectives, either in the form of a written plan or articulated by management are a necessary pre-condition for alignment. Communicating the IT strategy and its related processes could help organisations to pull everyone in the same direction. Having it in a written form will inform various stakeholders about the organisations’ intentions (Mintzberg, 1994). In their study, Doherty and Fulford (2006) highlight two important documents that need to be tabled in organisations, namely the strategic information systems plan and the information security policy. According to these authors, explicitly aligning the information security policy with the strategic information systems plan will help to reduce the incidence and severity of security breaches. Hence, clear IT strategy and processes are important tactics for helping organisations to define and prioritise the IT-related investment (Issa-Salwe et al., 2010; IT Governance Institute, 2003) to support business growth.
8.2.1.3 Understanding the Organisational Culture

Understanding the organisational culture was added under the theme of clarifying expectations based on Martins & Terblanche’s (2003) argument that culture can have influence on mission and vision, external environment, means to achieve objectives, image of the organisation, management processes, employee needs and objectives, interpersonal relationships and leadership. Understanding the organisational culture is identified as one of the most relevant contingency factors that must be considered by organisations before IT governance implementation (Pereira & Da Silva, 2012a), IS initiatives (Kappos & Rivard, 2008) and innovation projects (Ke & Wei, 2008). Leidner and Kayworth (2006) believe that culture may directly or indirectly influence the successful implementation and use of IT. According to Al-Gahtani et al. (2007), culture had an impact on the organisational acceptance of IT. Similarly, Ke and Wei (2008) found a supportive culture had a positive relationship with ERP implementation success. Davison & Martinsons (2002) suggest that culture should be taken into consideration when investigating IT-related phenomena because unexpected consequences due to organisational values and norms could occur. This is because failure to manage the cultural issue during the implementation of an IT project could result in resistance to acceptance of the project. This is consistent with Yeo (2002) who found organisational culture to be one of the main factors that contribute to the failure of IS projects. The findings of the University X case study (Chapter 7), showed how a failure of not deferring to an extant organisational culture resulted in resistance of accepting a new IT project. Hence, an understanding of the organisational culture is important because unexpected consequences due to organisational values and norms could occur (Davison & Martinsons, 2002). In addition, understanding the organisational culture is identified as one of the most relevant contingency factors for IT governance implementation (Pereira & Da Silva, 2012a).

8.2.2 Theme: Responsibility and Accountability

Appointment of an IT leader, establishment of an IT governance committee and new IT organisational structure are categorised under the responsibility and accountability theme. According to Bovens (2007, p. 449), accountability has become an “icon for good governance”, whilst Ko et al. (2011, p. 584) add that “accountability goes beyond responsibility by obligating an organisation to be answerable for its actions”.

Responsibility and accountability are considered as important elements in the tactical model to represent the factor negotiation power of actors. In this context, the negotiation power of actors is translated into a clear line of responsibility and accountability to represent the power that is conferred through a formal structure in organisations. Having clear structures in the governance committee and IT units together with the appointment of the IT leader, help organisations to set up specific roles and provide a clear line of control and reporting. It assists people within the structure to understand how their roles can contribute to the achievement of positive business performance.

8.2.2.1 Appointment of IT Leader

Appointment of an IT leader is found to be one of the tactical approaches from the analysis of the IT governance alignment trajectories. The findings suggested that such an IT leader is not necessarily named (or appointed) as the CIO. For example, in Company B, the General Manager of IT Services (ITS) led the ITS team, whereas in University Y, the Vice Chancellor of Research and Innovation was promoted to CIO. It is important to acknowledge however, that the CIO position is the most widely accepted title for the highest rank of IT executive (Banker et al., 2010). Weill and Ross (2004) found that in almost 100 percent of the firms they studied, the CIO was the one who led the IT governance implementation. The importance of the appointment of the IT leader is highlighted by Chen et al. (2010). According to these authors, the role of the CIO has been expanded from the focus of exploiting IT competencies to exploring IT as a strategic enabler. The CIO needs to have the ability to translate the business objectives into a clear and measurable IT expectation that could significantly influence how IT could deliver its value to the business.

In terms of the CIO’s reporting structure, the case studies produced mixed findings. For instance, the General Manager of ITS at Company B had a direct reporting line to the General Manager, but in Group ABC, the Group CIO reported to the Chief Financial Officer (CFO). Banker et al. (2011, p. 487) argue that “neither CIO reporting structure is necessarily optimal, and that the CIO reporting structure should not be used to gauge the strategic role of IT in the firm”. They suggest that the CIO reporting structure must align with the firm’s strategic positioning. Hence, the appointment of the IT leader in
the best strategic position, despite their reporting line (e.g., directly to the CEO, or to the CFO), is a crucial tactic to help organisations to strengthen their IT position. Organisations that can develop a culture of reciprocity with their IT executives are able to sustain their IT capability (Lim et al., 2013).

8.2.2.2 Strengthening the IT Governance Committee

An IT steering committee represents formal group and managerial team arrangements that are responsible for coordinating IT decision-making and providing strategic direction to IT operations. According to Vadapalli and Mone (2000), an IT steering committee can have a positive impact on an organisation. An example is greater business executives’ attention to IT related activities. It helps organisations to create contexts for the integration of business and technical knowledge by enhancing users’ intentions to explore technology to facilitate the direction for the technology deployment (Nambisan et al., 1999). Karimi et al. (2000) found a positive relationship between the presence and roles of IT steering committee and the level of IT management sophistication. Ferguson et al. (2013) expanded Karimi et al.’s (2000) work by analysing the impact of IT steering committees on IT governance implementation effectiveness. Using an agency theory and regression analysis, they found support for the preposition that an IT steering committee has a positive impact on IT governance effectiveness within an organisation.

This study conceptualises the attribute “establishment of the IT governing committee” as strengthening the IT governance committee to focus on the effort of the management to improve the IT decision-making process and its strategic direction. It uses the more general term of IT governance committee to reflect various committees that are involved in IT governance. For example, an IT steering committee and IT strategy committee fall under this classification. The use of this general term is important because its existence is optional (i.e., not mandated), depending on various factors such as size and the intensity of IT usage in the organisations. This claim concurs with Chan (2002, p. 104), who draws a conclusion that IS steering committees were not always necessary because “… different organisations might successfully
achieve structural alignment in different ways... In fact, viewing alignment from such a rigid standpoint was potentially detrimental... Organisations are, after all, as unique as the individuals they employ; they cannot be forced into standard, straightforward molds”.

From the analysis of the case studies, strengthening the IT governance committee can be achieved by engaging senior executives in IT decision making and ensuring a representation of both business and IT executives to discuss and decide the IT matters (Bowen et al., 2007; Ferguson et al., 2013; Huang et al., 2010). The involvement of senior executives who have diverse backgrounds, experience, and managerial roles could promote a shared IT understanding for the alignment of IT and business objectives. The more the involvement from the senior executives, the better the performance of the IT governance (Weill & Ross, 2004).

8.2.2.3 Strengthening IT Internal Structure

The findings from the cross-case analysis highlighted that all of the newly appointed IT leaders introduced a new IT organisational structure as an effort to build a better IT team in the organisations. Acknowledging the fact that most of the organisations had their own IT team prior to the appointment of a new IT leader, this study re-conceptualised “new IT organisational structure” as strengthening the existing IT internal structure. This tactical approach is important for new and existing IT leaders to ensure that their IT organisation possesses an aligned vision (with business vision), has a consistent communication approach across the team and promotes a clear line of responsibility and accountability. By strengthening the internal IT structure, the IT leader could determine and allocate the right people to the right job. A strong IT internal structure would result in a better team effort for task accomplishment.

8.2.3 Theme: Fostering Commitment

Commitment is essential for building determination among IT staff and business people. It leads people to take responsibility for completing their tasks efficiently and to engaging in positive behaviour during the implementation of IT-related projects. 

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23 The degree of “structural fit” between IS and the business. Structural fit relates to organisational structure and includes such areas as the location of IS decision-making rights, reporting relationships, (de)centralisation of IS services and infrastructure, and deployment of IS personnel.
Kwon and Suh (2004) found that trust is a critical factor in fostering commitment among supplier chain partners. The higher the level of trust, the more committed the employees are to fulfilling their work tasks. In a study of a human resource system development, Tansley and Newell (2007) found that leadership has an important role in generating trust as social capital, essential for effective relation-building and for building commitment in team members towards the vision of the leader. Gulzar et al. (2012) indicate that commitment of a project manager could lead to successful IT projects. Therefore, this study argues that commitment to IT governance implementation can be achieved by implementing two-way communication, competent IT leadership, top management support, appointment of the IT representative and training/IT-business engagement.

8.2.3.1 Two-way Communication

Weill and Ross (2004) contend that IT governance arrangements reflect how communication, responsibilities and the decision making structure are formalised in organisations. A good communication system allows business and IT employees to increase each other’s awareness of the importance of both perspectives in obtaining IT benefit (De Haes & Van Grembergen, 2005). The more management communicates about their IT governance mechanisms and their expectations, the more effective is the IT governance arrangement. Therefore, communication is regarded as essential in encouraging IT desirable behaviour in organisations (Weill & Ross, 2004). Hoogervorst et al. (2004) stated that, even though organisations engage in explicit and intentional communication with their employees, the message from the communication will not always be received in a neutral context. The acceptance of the message by the employees is influenced by the organisational culture, structures and systems and the management practices. This study suggests that two-way communication is a tactical approach that can be used by management to strengthen their IT governance. Two-way communication includes upwards, downwards and lateral communication that enables positive relationships between all IT governance players and for the build up of trust (Fielding, 2006). For example, two-way communication enables development of a feedback mechanism. Feedback is a critical tool to support IT governance players’ engagement. It helps management to resolve misunderstandings about the role of IT in organisations. Inability to resolve conflicts related to IT could result in disruption to
business operations (Johnson & Lederer, 2005). In addition, a good communication system allows business and IT people to increase each other’s awareness of the importance of both perspectives in obtaining IT benefit (De Haes & Van Grembergen, 2005). The more management communicates about their IT governance mechanisms and their expectations, the more effective the IT governance arrangements.

8.2.3.2 IT Leadership

The findings in this study showed that each of the IT leaders had/has a different IT leadership style. It is highly dependent upon the specific organisational context, and the maturity level of their followers (Hersey et al., 1979). Hence, no single leadership style is effective and can be generalised to all IT situations (Thite, 2000). The leadership style of the IT head is re-conceptualised as IT leadership to reflect the ability of the IT leader to (1) motivate and drive the commitment of IT staff and (2) choose the right approach for the contingent situation in his/her organisation (i.e., leadership style). In the context of IT, the leadership often emanates from the IT executives or highest ranking IT managers who have the ability to communicate with the most senior management, manage IT resources, influence organisational strategy, and plan for IT development to support business goals (Grover et al., 1993). The IS literature highlights that IT leadership is essential to drive IT value (Karahanna & Watson, 2006) and IT project success (Keegan & Den Hartog, 2004; Müller & Turner, 2007; Thite, 2000). There are various leadership styles discussed in the literature, such as Confucianism, trait, behaviour, contingency, charismatic and emotional intelligence (Müller & Turner, 2007), but no single leadership style can be generalised to all IT situations (Thite, 2000). Hence, Müller and Turner (2007) suggest that different leadership styles need to be applied to different types of IT projects. In this context, the IT leadership style is highly dependent upon the specific organisational context and as a result, the IT leaders should consider the culture of the organisation (Lim et al., 2013) and the maturity level of their followers (Hersey et al., 1979). For instance, Tyssen et al. (2014) explicate that contingent transactional and transformational leadership styles have positive effects on a follower’s commitment in a project.
8.2.3.3 Top Management Support

Top management support has been widely accepted by researchers as one of the most important critical success factors in IT related areas, such as SISP (Kearns, 2006; Lee & Bai, 2003), project management (Young & Jordan, 2008), IT alignment with business strategy (Luftman & Brier, 1999; Luftman et al., 1999; Teo & Ang, 1999), Enterprise Resource Planning (ERP) (Ifinedo, 2008; Lin, 2010; Nah et al., 2003), and IS projects (Boonstra, 2012). In the areas of ERP, Ifinedo (2008) conducted a study that focused on three contingencies, namely top management support, business vision and external expertise and its relationship with ERP success. They noted that ERP success will occur in the organisation as long as top management commitment is high. Nah et al. (2003) reviewed perceptions of the CIOs on the critical success factors for the implementation of ERP. The CIOs identified top management support as one of the five most critical success factors in ERP implementation. Bruque-Cámara et al. (2004) discovered that top management support is one of the IT-complementary intangible assets that can influence the extent and speed of IT adoption in an organisation. Prasad et al. (2010) and Weill and Ross (2004) found that top management support is one of the most important success factor in IT governance. In this study, sufficient top management support can be seen through an appropriate provision of IT resources (e.g., funding) for the IT implementation project.

8.2.3.4 Appointment of IT Representative

Appointment of a spokesperson is re-named as appointment of IT representative. The findings from the cross case analysis suggested that appointment of the IT representative is one of the tactical approaches that can support an effective IT governance implementation. Appointing a representative to represent the interests of a group of actors is crucial in making effective IT decisions (Bowen et al., 2007). Bowen et al. (2007) in their in-depth case study found that an effective IT governance performance outcome was associated with a balance of business and IT representatives in making IT decisions. Sarker et al. (2006) argued that appointing a representative to advocate for a group of actors (e.g., vendor and employees) is crucial to help the negotiation process during business process change. In a study conducted to explore IT governance funding and structure in a public university in Malaysia, Noor Azizi (2008) suggests that the IT Department should have a representative in a
planning group to advise and provide recommendations on the technical aspects. Hence, appointment of an IT representative is considered essential to support effective IT governance implementation.

8.2.3.5 Training/IT Business Engagement

Both training and IT business engagement can be used as tactical approaches to sustain positive relationships between IT and business people in organisations. Training can be achieved through a combination of formal and on-the-job training methods, such as job rotation and cross-training (Powell & Dent-Micallef, 1997) and should be commenced as early as possible prior to the implementation of any new IT projects (Umble et al., 2003). In order to improve governance performance through the implementation of an IT governance scorecard, Van Grembergen and De Haes (2005) suggested that organisations need to arrange for cross-sectional training/IT business engagement to help organisations to achieve better fusion between business and IT in enhancing IT governance performance. Training can also be used as a tool to enhance and promote engagement between IT and business people. Fonstad (2006) and Fonstad and Robertson (2006) introduced an IT engagement model that highlighted the need for IT and non-IT managers at all levels (corporate, business units and project) to be effectively engaged as a means to develop and sustain business value from IT. According to Fonstad and Robertson (2006), a successful engagement between IT and business partners could support strategic alignment and coordination across multiple organisational levels. Hence, maintaining the IT business engagement is essential for the organisation to ensure that IT is acknowledged as part of the business and plays its role as a strategic enabler for sustainability and competitiveness. For example, both Group ABC and Company B focused on developing training/IT business engagement as a means to assure that IT can be integrated as part of their business process to deliver intended business outcomes.

8.2.4 Theme: Increasing IT Capabilities

IT capabilities allow the organisations to innovate and exploit their IT resources for the achievement of competitive advantage (Liang et al., 2010; Wu et al., 2006). IT capabilities allow the organisations to innovate and exploit their IT resources for the achievement of competitive advantage (Liang et al., 2010; Wu et al., 2006). IT
capabilities are generated from IT resources (e.g., IT infrastructure) that are assembled, integrated and deployed together (Amit & Schoemaker, 1993; Bharadwaj, 2000; Helfat & Peteraf, 2003). IT capabilities are essential for improving organisational productivity if their characteristics are valuable, rare, imperfectly imitable and not substitutable (Barney, 2001). This study suggests that the organisation can fully exploit their resources in order to generate their very own, or unique, capabilities through the three tactics of considering existing IT infrastructure, appropriate allocation for IT investment and conducting IT/IS review.

8.2.4.1 Re-consideration of Existing IT Infrastructure

Re-consideration of the installed base of the IT infrastructure is important for organisations to ensure that their existing IT infrastructure is compatible with the new one. This is because IT infrastructure is not just a combination of various IT devices and applications (Sirkemaa, 2002). It comprises of “the interconnected practices and technologies that are institutionalised in the organisation” (Rolland, 2000, p. 583). Careful planning of its development and maintenance is essential because IT infrastructure has a tendency to drift from its original purposes, as a result of improvised usage (Ciborra, 1997, 2000, 2004; Ciborra & Hanseth, 2000). The installed base of the IT infrastructure needs to be considered to ensure related risks, such as an interruption in business production, are mitigated.

8.2.4.2 Appropriate Allocation for IT Investment

Funding refers to the ability of an organisation to be able to provide appropriate allocation for its IT investment. An IT investment is one of the important IT decisions that must be made by organisations to remain competitive and survive or grow in the market place. Weill and Ross (2004) found that IT governance top performers had clearer objectives of their IT investment. They shared common reasons for their investment, such as reduced cost, improved customer services, improved provision of information to management and support of the new ways of doing business. Organisations need to ensure that their allocation of IT investment is appropriate because overinvestment in IT infrastructure could result in wasted resources, while underinvestment could lead to limited integration and information sharing across business partners (Weill & Ross, 2004). Hence, making the right IT investment decision
is important for organisations to maximise their return on investment. This can therefore improve their overall performance (Gunasekaran et al., 2001; Mahmood & Mann, 1993; Stratopoulos & Dehning, 2000).

8.2.4.3 Conducting IT/IS Review

The tactical approach of IT review was renamed as conducting an IT/IS review. An IT/IS review can help organisations to measure the impact or benefit of their IT investment; identify both strategic and operational opportunities and risks; and evaluate their core ability in relation to their IT/IS assets and its capability to meet the business needs. However, there are few universally accepted guidelines for evaluating IT projects due to the lack of formal IT justification processes (Powell, 1992) and inadequate post implementation reviews (Gunasekaran et al., 2001). As a result, the benefits of IT investment have not been appropriately measured (Im et al., 2001) and in fact have resulted in a productivity paradox\(^{24}\). Therefore, an IT/IS review is necessary to evaluate the IT/IS contribution to organisational performance and productivity. In the IT/IS review process, all aspects related to IT/IS can be reviewed, assessed and evaluated. The findings of the review could provide feedback that can be used to help organisations learn and understand the underlying factors leading to its success or failure (Serafeimidis, 2001).

8.3 Summary

The goal of this chapter was to synthesise the factors that contribute to strengthening of the IT governance trajectories (discussed in Chapter 7). Mapping these factors into four themes led to the development of a tactical model to guide IT governance implementation. The proposed model was illustrated and arranged in an interpolated pie chart diagram to reflect the interconnections between each of the factors that contribute to the strengthening of the IT governance trajectories. These factors are the result of the ANT analysis which shows the entanglement of the social and the material in the IT governance practices.

The proposed tactical model to guide IT governance implementation was distributed to a sample of IT governance practitioners across Australia for validation and suggestions

\(^{24}\) despite enormous improvements in the underlying technology, the benefits of IS spending have not been found in aggregate output statistics (Brynjolfsson & Hitt, 1996, p. 541)
for improvement. The final validated tactical model is aimed at providing a basis for a common IT governance tactical approach for guiding organisations in assessing and improving their IT governance implementation. The result of the model validation by practitioners is presented in the next chapter.
CHAPTER 9: MODEL VALIDATION

9.0 Introduction

In Chapter 8, an IT governance tactical model which comprised of four themes (clarifying expectations, responsibility and accountability, fostering commitment and increasing IT capabilities) was developed. The model was illustrated in a modified pie chart diagram to reflect the interconnections between each of the factors that contribute to the strengthening of the IT governance trajectories. In order to further address the fourth research objective of developing a tactical model to guide IT governance in an organisation, a survey was conducted to validate the proposed tactical model. However, due to the low response rate (i.e., thirty three respondents), only descriptive statistics were computed to analyse the data. As a result, the final model could only be slightly varied to produce the adjusted preliminary IT governance tactical model. Given that the respondents were from the ISACA and IIA, in which most of them were auditors, this study acknowledges limited generasibility of the results. Therefore, the tactical IT governance model produced by this thesis will meet the criterion of external validity only when thoroughly tested among more varied respondents with diverse backgrounds in future research.

9.1 Demographic Data, Themes and Potential Contribution

Most respondents who participated in the survey were auditors (64%). Eighty five percent of the respondents were male. The majority of the respondents (88%) had held their current position for more than a year.

Table 32 below summarises the mean scores for each of the themes; calculated according to their relative importance:

<table>
<thead>
<tr>
<th>Items</th>
<th>Mean score</th>
<th>Standard deviation</th>
<th>Overall Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme: Clarifying Expectations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well defined and clear IT vision and</td>
<td>4.74</td>
<td>0.773</td>
<td>4.71</td>
</tr>
</tbody>
</table>

While the low standard deviations in the table demonstrates low variance and therefore helps strengthen the case for validity, the small sample size means that these results have to be treated with a degree of caution.
<table>
<thead>
<tr>
<th>Items</th>
<th>Mean score</th>
<th>Standard deviation</th>
<th>Overall Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Articulating IT strategy and processes</td>
<td>4.74</td>
<td>0.631</td>
<td></td>
</tr>
<tr>
<td>Understanding organisational culture</td>
<td>4.65</td>
<td>0.839</td>
<td></td>
</tr>
<tr>
<td><strong>Theme: Responsibility and Accountability</strong></td>
<td></td>
<td></td>
<td>4.38</td>
</tr>
<tr>
<td>Appointment of IT leader</td>
<td>4.48</td>
<td>0.769</td>
<td></td>
</tr>
<tr>
<td>Strengthening the governance committee</td>
<td>4.32</td>
<td>0.979</td>
<td></td>
</tr>
<tr>
<td>Strengthening IT internal structure</td>
<td>4.32</td>
<td>0.909</td>
<td></td>
</tr>
<tr>
<td><strong>Theme 3: Fostering Commitment</strong></td>
<td></td>
<td></td>
<td>4.55</td>
</tr>
<tr>
<td>Two-way communication</td>
<td>4.73</td>
<td>0.521</td>
<td></td>
</tr>
<tr>
<td>Training / IT-business engagement</td>
<td>4.50</td>
<td>0.682</td>
<td></td>
</tr>
<tr>
<td>Appointment of IT representative</td>
<td>4.17</td>
<td>0.950</td>
<td></td>
</tr>
<tr>
<td>Top management support</td>
<td>4.60</td>
<td>0.968</td>
<td></td>
</tr>
<tr>
<td>IT leadership</td>
<td>4.73</td>
<td>0.640</td>
<td></td>
</tr>
<tr>
<td><strong>Theme 4: Increasing IT Capabilities</strong></td>
<td></td>
<td></td>
<td>4.57</td>
</tr>
<tr>
<td>Re-considering existing IT infrastructure</td>
<td>4.52</td>
<td>0.634</td>
<td></td>
</tr>
<tr>
<td>Conducting IT/IS review</td>
<td>4.41</td>
<td>0.733</td>
<td></td>
</tr>
<tr>
<td>Appropriate allocation for IT investment</td>
<td>4.79</td>
<td>0.412</td>
<td></td>
</tr>
</tbody>
</table>

From Table 32 above, it can be seen that the theme clarifying expectations scored the highest (4.71) and the lowest overall mean score pertained to the theme responsibility and accountability (4.38). The selection of the theme clarifying expectations is supported by the findings of the case study (see Chapter 7 on the discussion and cross case analysis). In particular, the cross case analysis showed that having a strong and clear *obligatory passage point* (OPP), the role of *inscription* in perpetuating interests and understanding the organisational culture to help align the interests of the global with the local actors, were critical at the earlier stage of the translation process.

Respondents were also asked to evaluate what the potential contribution of the tactical model would be if it was implemented in their organisation. Their responses are summarised in Table 33 below:

<table>
<thead>
<tr>
<th>Items</th>
<th>Mean score</th>
<th>Standard deviation</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve strategic alignment</td>
<td>3.72</td>
<td>1.066</td>
<td>4</td>
</tr>
<tr>
<td>Improve value realisation from IT investment</td>
<td>3.66</td>
<td>0.974</td>
<td>4</td>
</tr>
<tr>
<td>Improve risk management</td>
<td>3.59</td>
<td>1.181</td>
<td>4</td>
</tr>
<tr>
<td>Improve IT resource management</td>
<td>3.41</td>
<td>0.018</td>
<td>3</td>
</tr>
<tr>
<td>Improve business performance</td>
<td>3.34</td>
<td>1.143</td>
<td>3</td>
</tr>
</tbody>
</table>
The highest mean for the impact on the proposed model, if implemented, is expected to improve strategic alignment with a mean score of 3.72. Improve value realisation from IT investment and risk management follow. It is observed that the respondents frequently chose 3 (neutral) and 4 (important to some extent) for each of the items. Hence, the overall potential contribution of the proposed model is rated relatively low (mean score below 4.00).

### 9.2 Ranking of Items in the IT Governance Tactical Model

Ranking of responses from the most important (1) to the least important (14) was made for each of the fourteen items in the IT governance tactical model. Table 34 presents the results:

<table>
<thead>
<tr>
<th>Items in the IT governance tactical model</th>
<th>Mean scores</th>
<th>Standard deviation</th>
<th>Ranking from 1 - 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training / IT business engagement</td>
<td>7.96</td>
<td>3.776</td>
<td>8</td>
</tr>
<tr>
<td>Appropriate allocation for IT investment</td>
<td>5.75</td>
<td>3.087</td>
<td>3</td>
</tr>
<tr>
<td>Top management support</td>
<td>3.32</td>
<td>2.970</td>
<td>1</td>
</tr>
<tr>
<td>Articulating IT strategy and processes</td>
<td>5.82</td>
<td>2.495</td>
<td>4</td>
</tr>
<tr>
<td>Conducting IT/IS review</td>
<td>8.86</td>
<td>2.902</td>
<td>11</td>
</tr>
<tr>
<td>Re-considering existing IT infrastructure</td>
<td>9.32</td>
<td>3.367</td>
<td>12</td>
</tr>
<tr>
<td>Appointment of IT representative</td>
<td>10.32</td>
<td>2.736</td>
<td>13</td>
</tr>
<tr>
<td>Strengthening the governance committee</td>
<td>5.93</td>
<td>3.800</td>
<td>5</td>
</tr>
<tr>
<td>Two-way communication</td>
<td>8.57</td>
<td>3.775</td>
<td>10</td>
</tr>
<tr>
<td>Well defined and clear IT vision and mission</td>
<td>4.11</td>
<td>3.247</td>
<td>2</td>
</tr>
<tr>
<td>Understanding organisational culture</td>
<td>7.68</td>
<td>3.692</td>
<td>7</td>
</tr>
<tr>
<td>IT leadership</td>
<td>7.39</td>
<td>3.881</td>
<td>6</td>
</tr>
<tr>
<td>Appointment of IT leader</td>
<td>8.07</td>
<td>4.682</td>
<td>9</td>
</tr>
<tr>
<td>Strengthening of IT internal structure</td>
<td>11.89</td>
<td>2.424</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 34 shows that the respondents ranked top management support as the most important item in the IT governance tactical model (mean score 3.32). This finding is consistent with Prasad et al. (2010); Kearns (2006) and Weill and Ross (2004), who
found top management support to be one of the important factors to promote successful IT governance implementation in organisations.

Both items from the theme clarifying expectations, namely well defined and clear IT vision and mission and articulating IT strategy and processes were ranked second and fourth, with mean scores of 4.11 and 5.82 respectively. A well defined and clear IT vision and mission are indicators of organisational commitment towards IT (Abbas et al., 2014) that will help management to define and prioritise the IT-related investment (Issa-Salwe et al., 2010; IT Governance Institute, 2003). In this study, appropriate allocation for IT infrastructure was ranked third with a mean score of 5.75.

While an understanding organisational culture was found to be critical in the four case studies, it is noted that this item was only ranked seventh. A possible explanation could be the abstraction of culture that cannot be measured or built into a quantitative survey. As a result, culture might be taken as read and seen as an inevitable part of an organisation that is difficult to be described and changed.

It should be noted that appointment of an IT representative and strengthening of IT internal structure were considered to be important factors contributing to successful IT governance implementation in the four case studies. These two factors were considered essential to support the new IT governance processes or IT projects introduced in the participating organisations. However, these two factors obtained the lowest ranks with mean scores of 10.32 and 11.89 respectively. Some of the respondents were of the opinion that the appointment of the IT representative might not be necessary. For example, Respondent #20 commented that “the attitude and commitment of the individual in the IT team are more important as compared to the internal IT structure”. He argued that IT staff could still deliver good IT services even when a team structure is problematic.

9.3 Evaluation of the IT Governance Tactical Model

In the survey, the respondents were also asked to provide suggestions and comments for improving each of the themes, as well as the overall model. At this stage, their responses were analysed and classified into several categories. These categories did not emerge from some pre-existing theoretical concerns, but rather from the
respondents’ responses (i.e., data). It is important to note that in this chapter, only categories with three or more supports (i.e., responses) were discussed.

9.3.1 Theme - Clarifying Expectations

Table 35 below presents the suggestions made by the respondents for the theme clarifying expectations:

Table 35: Suggestions to improve for the theme clarifying expectations

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearly articulate the IT vision, mission and strategy</td>
<td>11</td>
</tr>
<tr>
<td>Alignment of IT vision, mission and strategy with the business objectives</td>
<td>8</td>
</tr>
<tr>
<td>Alignment of IT vision, mission and strategy with business culture</td>
<td>8</td>
</tr>
<tr>
<td>Consideration of the stakeholder’s expectation in designing IT governance</td>
<td>4</td>
</tr>
<tr>
<td>Risk assessment</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 35 shows that the suggestions made by the respondents were relatively similar to the three items already listed in the original IT governance tactical model (well defined and clear IT vision and mission, articulating IT strategy and processes, and understanding organisational culture). The respondents re-emphasised the need for clearly articulating the IT vision, mission and strategy so that people understand the directions and what they should do in order to achieve the IT vision and mission (e.g., Respondent #9 and #12). The respondents were also of the opinion that alignment of the IT vision, mission and strategy with the business objectives and culture can contribute to the successful IT governance implementation (e.g., Respondents #23). In order to support the articulation of IT vision, mission and strategy that can be aligned with the business objectives and culture of the organisations, consideration of the stakeholders’ expectations and risk assessment are recommended to be included in the model. For example, Respondent #21 commented that if IT strategy was not aligned with the business objectives and culture, the organisation would be exposed to various risks. Management should also consider inviting the stakeholders’ (e.g., IT staff) to participate in the process of articulating the IT strategy to promote clear understanding of how such strategies could support the achievement of business objectives.
9.3.2 Theme - Responsibility and Accountability

For the theme responsibility and accountability (see Table 36 below), the most frequent suggestions made by the respondents were to include clear leadership from both the CIO and business leaders and the need to appoint the right leader with the right skills who had the power to influence others, especially in IT decision-making processes. As an example, Respondent #14 suggested that instead of having a reporting structure to the CFO, the CIO should report directly to the Board. Having such a relationship could increase the CIO’s chances of making changes in regards to IT. Respondents also suggested the need for incorporating a transparent business process, such as, do the right thing and lead by example (Respondent #12) and make informed decisions (Respondent #24). In this context, the availability of full information on the decision made in relation to IT could promote collaboration, teamwork and shared responsibility between the IT people and the management.

In the cross case analysis, power to influence others was similar to the factor negotiation power of actor. This negotiation power however, was not included in the original IT governance tactical model because it was embedded in responsibility and accountability defined by the management. For instance, power was inscribed through mandated roles in the IT organisational structure, that was headed by the CIO (or General Manager of IT, or other similar position), and IT governance steering committee.

Table 36: Suggestions to improve for the theme responsibility and accountability

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear leadership from both the CIO and business leader are crucial</td>
<td>6</td>
</tr>
<tr>
<td>Right leader with the right skills, with power to influence others</td>
<td>6</td>
</tr>
<tr>
<td>Transparent IT/business processes</td>
<td>5</td>
</tr>
<tr>
<td>Clear reporting structure and accountability</td>
<td>4</td>
</tr>
<tr>
<td>Collaboration, teamwork and shared responsibility</td>
<td>4</td>
</tr>
</tbody>
</table>

9.3.3 Theme - Fostering Commitment

Table 37 below shows that respondents were looking at collaboration and communication strategy to promote the engagement and commitment of both the IT and business people. For instance, Respondent #15 suggested including feedback mechanisms as a means to encourage engagement and commitment among IT
governance players. While top management support was considered as important, the respondents also proposed a proactive approach by the business and IT leaders to foster a higher level of commitment. In addition, selection of appropriate language to communicate IT processes and a supportive culture could conduce to the achievement of a desired outcome in IT governance.

The items listed in the original IT governance tactical model, such as two way communication, training/IT business engagement, top management support and appointment of IT representatives were strategies (i.e., devices of interessement) taken by the focal global actors to encourage collaboration and engagement from both business and IT people.

Table 37: Suggestions to improve for the theme fostering commitment

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration and communication strategy for engagement</td>
<td>6</td>
</tr>
<tr>
<td>Leadership and proactive approach from both business and IT leaders</td>
<td>5</td>
</tr>
<tr>
<td>Communicating IT processes using plain language and supportive culture</td>
<td>3</td>
</tr>
<tr>
<td>Top management support is important</td>
<td>3</td>
</tr>
</tbody>
</table>

9.3.4 Theme - Increasing IT Capabilities

Based on the suggestions and comments made by the respondents in Table 38 below, it can be concluded that an ongoing review of IT infrastructure and allocation of appropriate investment for IT infrastructure could potentially contribute to increased IT capability. The respondents were of the opinion that IT infrastructure selection must be aligned and driven by business requirements (e.g., Respondents #8 and 9). In terms of existing IT infrastructure (i.e., legacy systems), a number of respondents suggested that organisations should make a critical assessment of its ability to enhance business capabilities. As an example, Respondent #18 commented that “simple fine-tuning of legacy system could saddle an organisation from an expensive and time-consuming to change over a new system”. In order to maximise the ability of IT infrastructure to produce IT capabilities, respondents recommended continuous recruitment/training for IT and business staff.

The top three suggestions made for improving IT capabilities were associated with IT infrastructure and its related investment. These suggestions confirm the relationships between IT governance arrangements of structures, processes and relational
mechanisms and IT infrastructure, as articulated in the proposed research model (see Chapter 3). An ongoing review of IT infrastructure and critical assessment of existing IT infrastructure were important from the respondents’ point of view, each had frequency scores of 7 and 5. Hence, the issue related to the drifting of IT infrastructure (see Chapter 2) could be addressed through an ongoing review of IT infrastructure and critical assessment of existing IT infrastructure.

Table 38: Suggestions to improve for the theme increasing IT capabilities

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ongoing review of IT infrastructure</td>
<td>7</td>
</tr>
<tr>
<td>Appropriate investment for IT infrastructure that fits and is driven by business requirements</td>
<td>6</td>
</tr>
<tr>
<td>Critical assessment of existing IT infrastructure (legacy system) and business capabilities</td>
<td>5</td>
</tr>
<tr>
<td>Continuous recruitment/training for IT and business staff to acquire the right skills</td>
<td>3</td>
</tr>
</tbody>
</table>

9.3.5 Suggestions for the Overall Model

Table 39 shows that the most frequent suggestion received from the respondents in order to improve the overall IT governance tactical model was to integrate the formal IT governance processes, by integrating IT governance frameworks and tools, such as COBIT 5, Prince2, and GTAG 17 (Global Technology Audit Guide on auditing IT governance). This suggestion was consistent with IT governance literature (see Chapter 2) on the use of a COBIT 5 as a comprehensive governance framework to understand and optimise the implementation of IT governance in organisations (Abu-Khadra et al., 2014; Al Omari et al., 2012; De Haes et al., 2013; Guldentops, 2004; Van Grembergen & De Haes, 2009a; Van Grembergen et al., 2003). This framework/tool was not incorporated in the original IT governance tactical model because the four participating organisations developed their own mechanisms combining several frameworks/tools to support their IT governance and business. However, considering the suggestions from the survey (Table 39), “formal IT governance processes” was included in the model.

Secondly, alignment between the IT strategy and business strategy was also suggested for inclusion in the model to reflect the positive impact of IT governance (see Chapter 2). The findings from the case studies however, did not explicitly frame strategic
alignment as a tactical or strategic action. The alignment between the IT and business strategy was implied as a part of the inscription that was viewed as a result (i.e., benefit) of IT governance implementation. Nevertheless, considering that strategic alignment had a frequency count of 4 and its important has been widely cited in IS literature (e.g., Chan et al. (2006); Luftman and Brier (1999); Schlosser and Wagner (2011); and Venkatraman et al. (1993)), strategic alignment was included in the adjusted IT governance tactical model.

Lastly, the suggestion was to include the encouragement of active participation in the governance process. An active participation among IT governance players in the governance process was referred to as the IT governance relational mechanisms. It covers the items under the theme fostering commitment, such as two-way communication, training/IT business engagement and appointment of IT representatives. Given that the frequency count for active participation was relatively low, this suggestion was not included in the adjusted IT governance tactical model.

Table 39: Suggestions to improve the overall IT governance tactical model

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrate the formal IT governance processes to improve the model</td>
<td>5</td>
</tr>
<tr>
<td>IT strategy should be driven by business to support strategic alignment</td>
<td>4</td>
</tr>
<tr>
<td>Encourage active participation for the governance process</td>
<td>3</td>
</tr>
</tbody>
</table>

9.4 Adjusted Preliminary IT Governance Tactical Model

Based on the discussion presented in subsection 9.3 on the evaluation of the IT governance tactical model that incorporated respondents’ comments and suggestions, five modifications were made to the original model. The modifications are as follows:

1. In the original model, IT leadership was categorised under the theme fostering commitment. However, based on the respondents’ comments (see subsection 9.3.2), the element of leadership was transferred to the theme responsibility and accountability. The categories of clear leadership from both the CIO and business leader are crucial; and the right leader with the right skills, with power to influence others, each had frequency counts of 6. Hence, in the final tactical model, IT leadership is re-categorised under the theme responsibility and accountability.
2. The theme clarifying expectations obtained the highest mean score of 4.71. In the model, the three items in this theme are graphically separated from the other themes to show its greater importance.

3. The adjusted IT governance tactical model numerically highlights the five most important factors ranked by the respondents (see subsection 9.2). These factors are (1) top management support; (2) well defined and clear IT vision and mission; (3) appropriate allocation for IT infrastructure; (4) articulating IT strategy and processes; and (5) strengthening the IT governance committee. In this context, these factors will be relatively critical for ensuring successful IT governance implementation in an organisation.

4. The final tactical model also includes the main suggestions from the respondents for each of the themes (i.e., represented by arrows). These suggestions further clarify the key tactical approach related to each theme, as outlined below:

   i. Clearly articulate the IT vision, mission and strategy (theme clarifying expectations);
   ii. Clear leadership from both the CIO and business leaders (theme responsibility and accountability);
   iii. Establish a collaboration and communication strategy for engagement of all related parties (theme fostering commitment); and
   iv. Conduct an ongoing review of the IT infrastructure (theme increasing IT capabilities).

5. The last addition to the final IT governance tactical model is the two factors of formal IT governance processes and strategic alignment. These two items were suggested by the respondents and had been discussed in previous subsection 9.3.5. The formal IT governance processes (e.g., COBIT 5) were added under the theme increasing IT capabilities because its usage could potentially help organisations to improve the efficiency and effectiveness of their IT governance. The item strategic alignment (between IT and business strategy) was added under the theme clarifying expectations because it is a part of the objectives of why IT governance is implemented in organisations.
To illustrate the modifications made to the original model, Figure 19 below was constructed.

Figure 19: Adjusted preliminary IT governance tactical model

9.5 Summary

This chapter further develops a model which provides organisations with a tactical approach for implementing IT governance. The four themes embedded in the model could be used as a focal lens to design, manage or evaluate existing IT governance arrangements in an organisation. Overall, the final adjusted IT governance tactical model supports the research model (see Chapter 3) that integrates the dimensions of the IT governance structures, processes, relational mechanisms and IT infrastructure and its ongoing relationships to shape, and be shaped by, the process of alignment of interests.

In the next and final chapter of this thesis, the conclusions and implication of this thesis for theory and management are presented. The practical contribution and theoretical relevance of the thesis are also addressed.
CHAPTER 10: CONCLUSION

Introduction

This chapter summarises how this thesis could be tied together by demonstrating how the four research objectives were met, how the three research questions were addressed and how the findings could contribute to both to the theory and practice. In Chapter One, the overarching problem discussed was how to uncover evidence that links the emergence of IT governance arrangements (structures, processes, and relational mechanisms) and IT infrastructure. If this relationship is not established, the evolving phenomenon of the emergence of IT governance remains vague. Hence, this thesis set out to bridge the gap between IT governance and IT infrastructure – a gap that has not been sufficiently addressed in the literature. Chapter Two detailed the need for exploring the relationship that exists between IT governance arrangements and IT infrastructure as a means to understand how they emerge in an organisation (i.e., the first research question). Following the argument that the material and the social are entangled in the praxis of governance mechanisms and infrastructure arrangements, this thesis subscribed to the perspective of sociomateriality to explore the emergence of IT governance arrangements and IT infrastructure in an organisation. In Chapter Three, details were provided on how ANT could be applied as a theoretical lens to understand how the interests of the IT governance and IT infrastructure become aligned and the factors that contribute to such alignment (i.e., the second and third research questions). Two mutually supportive strategies of the sociology of translation and the local/global network approach are applied to guide the analysis. Chapter Four introduced the design of the research (i.e., an exploratory two-phase sequential design with a dominant qualitative perspective), the method adopted to collect (multiple case studies and survey) and analyse (document analysis, interview and questionnaire) the data. The historical background of the four case studies and their summaries of activities in relation to the implementation of IT governance and IT infrastructure arrangements were described in Chapter Five. The activities were then analysed using ANT as its theoretical lens and the findings were reported in Chapter Six. In this chapter, the critical milestones from the IT governance implementation, the
actors (enrolled and not enrolled), the strategies, the impact of the actors’ enrolment (or not enrolled) to the network and the trajectory movement were analysed (i.e., using the local/global network approach). Further analysis guided by the research model was also conducted using the translation approach. The aim of Chapter Six was to address the first and second research questions. Chapter Seven presented the discussion and cross case analysis to address the third research question. Factors contributing to strengthening the IT governance trajectories were identified and explained in this chapter. The process of developing the tactical model of IT governance was elaborated in Chapter Eight. This chapter presented the process of how the factors contributing to strengthening the IT governance trajectories were mapped into four themes of clarifying expectations, responsibility and accountability, fostering commitment and increasing IT capabilities. A circular pie chart diagram, named a tactical model, to guide IT governance implementation was then proposed. Chapter Nine focused on the validation of the proposed IT governance tactical model developed in the preceding chapter using a survey. The results from the survey were then used to tentatively validate the tactical model. From the comments and suggestions received from the respondents, an adjusted tactical model of IT governance was then produced and this addressed the third research question.

Summary of Findings

The findings of this study are summarised in respect of the individual research question as follows:

Research Question 1

The first research question was how do IT governance and IT infrastructure emerge in an organisation?

In order to address this research question, multiple case studies in four participating organisations were conducted. Based on the historical background of the participating organisations provided in Chapter 5, the analysis of the IT governance implementation using ANT as a theoretical lens was explained. The results of the study suggest that the emergence of the IT governance and IT infrastructure was due to the interactions of its human and nonhuman actors. In this context, the actors’ interactions focused on how their diverse interests could be aligned to establish a stable IT governance network.
The use of ANT as a theoretical lens helped to trace and explain the process of how a stable network with an aligned interests is be created and maintained (i.e., its emergence). This thesis found that the emergence of IT governance in organisations was an effect of the dynamic interactions between IT governance arrangements and IT infrastructure. In particular, three key findings were identified in relation to the first research question:

1. Each of the participating organisations has their own unique arrangements for IT governance structures, processes, relational mechanisms and IT infrastructure. While these organisations had distinctive purposes (i.e., for-profit and not-for-profit), all aimed to establish stable governance and IT infrastructure arrangements;

2. The entanglement of the social and the material cannot be adequately understood without taking into account the fundamental elements that constitute its emergence. This study has shown that the IT governance arrangements and IT infrastructure are emerging through a process of translating the interests of various actors. Their patterns of interactions are unique and evolve over time. Through the lens of actor network theory (ANT), the research has revealed the complexity of the relationships between the IT governance structures, processes, relational mechanisms and IT infrastructure and their emergence that shapes and is shaped by the process of interests’ alignment;

3. The entanglement of the social and the material residing in the governance arrangements and IT infrastructure was also contingent upon their specific organisational settings (e.g., historical background) and social interaction (e.g., business culture), as well the material (i.e., IT infrastructure) through continuous usage and practice.

Therefore, the first research objective that was to explore the emergence of the IT governance arrangements and IT infrastructure in an organisation, was achieved.
Research Question 2

The second research question was how do IT governance structures, processes, relational mechanisms and IT infrastructure become dynamically aligned to support IT governance implementation? The use of both sociology of translation and the local/global network approach revealed how a successful IT governance network of aligned interests is created and stabilised. In this context, IT governance structures, processes, relational mechanisms and IT infrastructure became dynamically aligned through the process of interests’ alignment. The discussion provided in Chapter Six revealed the dynamic process of how a stable IT governance network could be established. It highlighted the various management manoeuvres in the process of aligning the diverse interests of the actors. Using the translation process, the role of focal actor in identifying the human and nonhuman actors and their identities and establishing an obligatory passage point in the network of relationships they were building were discussed (i.e., problematisation). The use of devices of interessement (i.e., interessement phase) helped to assist the actors’ interests to pass through the obligatory passage point. Once the actors accepted the new roles identified for them (i.e., the obligatory passage point), they were enrolled to the network (i.e., mobilisation phase). Mobilisation of actors into the network was achieved when a spokesperson to represent the enrolled actors was appointed.

Similarly, the network analysis using the local/network approach explores the dynamic relationships of actors during the process of interests’ alignment. This technique specifically highlighted the strategies used for achieving alignment of interests by producing an IT governance trajectory. An obligatory passage point and the use of devices of interessement was consistently found across the four case studies to contribute to the process of alignment of interests between IT governance structures, processes, relational mechanisms and IT infrastructure. As a summary, the key points in relation to the second research question are as follows:

1. The evidence from the case studies suggests that the interests of the IT governance structures, processes, relational mechanisms and IT infrastructure were stabilised through an alignment of interests’ process to support IT governance implementation. The alignment of interests is achieved through a
selection of appropriate strategies that are compatible with the environment in which their organisations exist (i.e., historical context; and culture);

2. The engagement of both the local and global actors depends on three interrelated elements. These elements are the dedication of the global actors to provide appropriate resources, the commitment of the local actors to engage in the IT governance project and the capacity of the project to establish an obligatory passage point to link the global and local actors’ interests;

3. The findings also suggested that the role of the focal actor is critical to delivering a successful IT governance implementation. The focal actor acts as the IT champion who has sufficient negotiation power to convince both the global and local actors to accept the obligatory passage point for enrolment of all actors in the IT governance network.

Based on the above key findings, the second research objective that was to investigate the complex relationships between IT governance structures, processes, relational mechanisms and IT infrastructure, was met.

**Research Question 3**

The last research question was what factors contribute to the alignment of interests during the process of implementing governance and infrastructure arrangements? The factors that contribute to the alignment of interests during the process of implementing governance and infrastructure arrangements were analysed in Chapter 7 on the discussion and cross case analysis of the four participating organisations. The factors were extracted by comparing the strategies used by the local and global actors during the process of interests’ alignment in the participating organisations. Following the identification of the factors, a proposed tactical model to guide IT governance implementation was elaborated on in Chapter 8. The key findings that address the third research question are highlighted below:

1. Eight strategies (i.e., factors) used by the participating organisations to strengthen the IT governance trajectories were revealed. These factors are well defined and clear obligatory passage point (OPP); top management support;
role of inscription in perpetuating interests; re-consideration of the installed base of IT infrastructure; understanding the organisational culture; negotiation power of actors; leadership style of the IT leader; and using appropriate devices of intérêt.

2. The factors were then renamed to facilitate practicality and usability. These factors were analysed based on their contextual meaning and grouped into four dimensions of clarifying expectations; establishing clear responsibility and accountability; fostering commitment; and increasing IT capabilities. A proposed tactical model to guide IT governance implementation was then developed.

The outcome of the survey that was distributed to the practitioners was used to tentatively validate and improve the tactical model for IT governance. Following the comments and suggestions by the respondents, two additional factors of formal IT governance model and strategic alignment were added into the proposed model.

Therefore, the third and fourth research objectives that focused on identifying the strategies used to support the implementation of IT governance, and developing a tactical model to guide IT governance implementation in an organisation, was achieved.

Contributions of the research

The following subsections discuss the significance of the research through its contribution to theory and practice.

Theoretical Contributions

This thesis extends the literature in two domains of IT governance and IT infrastructure by examining the complex relationships that exist between them. Previous studies treated both IT governance and IT infrastructure as a separate domain. Using a sociomaterial perspective, the emergence of IT governance has been found to be an effect of the dynamic interactions between IT governance arrangements and IT infrastructure. This study has demonstrated that a sociomaterial perspective; in particular, ANT; could provide a useful insight for better understanding the implementation of IT governance. The translation process enabled the analysis of the
dynamic relationships between IT governance structures, processes, relational mechanisms and IT infrastructure. The actors were treated as heterogeneous (i.e., human and nonhuman actors) and their interests were considered during the process of network formation. Hence, the entanglement of the social and the material that continually shape, and are shaped, by each other during the implementation of IT governance was revealed. The research model presented in Figure 1 was also new to the literature of both IT governance and IT infrastructure. The model contributes to the literature by integrating the framework of IT governance arrangements of structures, processes and relational mechanisms (i.e., the social) with IT infrastructure (i.e., the material). Further analysis using the local/global network approach also explained the strategies taken to achieve alignment of diverse interests, which has not yet been highlighted in the IT governance and IS literature. The various management manoeuvres in the process of aligning the actors’ interests were also explained and further analysed to produce a tactical model of IT governance implementation. Therefore, the use of ANT to explore the dynamic relationships between IT governance structures, processes, relational mechanisms and IT infrastructure is the major contribution of this study to the theory. The eight factors extracted from the IT governance trajectories, which are a well defined and clear obligatory passage point (OPP); top management support; role of inscription in perpetuating interests; reconsideration of the installed base of IT infrastructure; understanding the organisational culture; negotiation power of actors; leadership style of the IT leader; and using appropriate devices of interessement are of major importance for a successful establishment of an IT governance network. On top of these factors, an obligatory passage point is considered as the most important factor. It is the key that is necessary for satisfying the diverse interests of all the actors. If the obligatory passage point is weak, the later stage of interessement, enrolment and mobilisation of actors into the network will not occur. The eight factors were then recast as well defined and clear IT vision and mission; articulating IT strategies and processes; understanding organisational culture; appointment of IT leader; strengthening the IT governance committee; strengthening the IT internal structure; IT leadership; top management support; appointment of IT representative; training/IT business engagement; two-way communication; re-consideration of existing IT infrastructure; conducting IT/IS review;
and appropriate allocation for IT investment. In summary, the findings of this thesis contribute to the literature in four significant ways:

Firstly, this study shed light on the dynamic relationships between the IT governance arrangements (structures, processes, and relational mechanisms) and infrastructure by examining the underlying entanglement of their social and technical relations. Through ANT, the findings of this research have demonstrated that the interplay between the social, cultural, institutional background, historical events and the technology cannot be separated during the analysis of IT governance. Hence, the results of this study add to the literature by proposing that IT governance should be viewed as an emerging phenomenon whose stability depends on the successful alignment of the multiple interests of various IT governance actors.

Secondly, this thesis also suggests that IT governance arrangements and IT infrastructure cannot be treated in isolation to each other. Their inter-relationship is important because an IT governance network is a result of continuous interactions among its actors that shapes, and is shaped by, the alignment of interests. Hence, the use of ANT is valuable for understanding how and why actors in structures, processes and relational mechanisms and IT infrastructure take action to achieve stable governance and infrastructure. This concurs with Doolin and Lowe (2002) who acknowledge ANT to be a powerful tool for understanding a heterogeneous relational network because of its relatively sophisticated combinations of resources and people that they mobilize... we can seek to demystify the facts and data that they produce... and show just how ordinary and mundane they often are. In doing this, actor–network theory offers the hope of a more fundamental appreciation and critique of the underlying relationships that pervade contemporary society (p. 76).

Thirdly, in relation to the above, it was found that the use of ANT in IT governance literature is limited. ANT has been used in the context of analysing specific IT implementation projects, such as Thailand’s smart card ID project (Gunawong & Gao, 2010); a business process change project (Sarker et al., 2006); and an Integrated Financial Management Information System (Heeks & Stanforth, 2007). This research contributes to the literature by examining IT governance implementation using the
translation process and the local/global network approach. Both the translation process and local/global network analysis revealed that IT governance implementation is complex and its components need to be carefully considered to understand why and how it emerges in organisations. Each of the actors, despite their status of human or nonhuman, and local or global, was treated symmetrically as having their own interests and right to decide to join (or not join) the alliance of IT governance implementation. Alignment of interests is the key to a successful IT governance network establishment.

Fourthly, an extensive analysis of IT governance implementation in four major case organisations located in Australia and Malaysia led to the development of a tactical model for IT governance implementation. The model could complement several extant frameworks for guiding IT governance implementation, such as Weill and Ross (2004) and Van Grembergen and De Haes (2009b). In this context, the IT governance tactical model goes beyond a framework to specify the decision rights and accountability to encourage desirable behaviour in IT usage (Weill & Ross, 2004) and to implement the IT governance processes, structures and relational mechanisms in the organisations (Van Grembergen & De Haes, 2008a, 2008b; Van Grembergen et al., 2004). The model highlighted the need for incorporating IT infrastructure (i.e., the new contribution of this study) in analysing the implementation of IT governance in an organisation. The tactical model proposed in this dissertation was based on the analysis of the interactions of the actors (i.e., structures, processes, relational mechanisms and IT infrastructure). The model highlighted four dimensions of clarifying expectations, establishing clear responsibility and accountability, fostering commitment and increasing IT capabilities as having practical utility for management. The model can be used for enhancing the knowledge about “what tactics should be considered” for improving an IT governance implementation in an organisation. Therefore, the model extends other IT governance models (or frameworks) and its contribution is as follows:

(1) within the clarifying expectation dimension, the concept of an obligatory passage point is of major import;

(2) it reflects the dynamic relationships that exist between IT governance arrangements and IT infrastructure;
(3) consideration of the voice of IT governance’s players is essential for improved implementation.

Fifthly, this thesis found that “understanding an organisational culture” is one important IT governance tactical action for IT governance implementation. It is suggested that organisational culture needs to be considered when the obligatory passage point (i.e., conceptualised as vision and mission) is established. Lack of understanding of the organisational culture could result in resistance to accepting the obligatory passage point, which then could result in the failure of IT governance implementation. Hence, this study adds to the IS and IT governance literature by highlighting the importance of understanding an organisational culture for IT governance implementation, as well as the need to have a vision and mission that culturally fits with the organisational IT governance practices. The findings contribute to the literature by addressing the issue raised by Aasi et al. (2014) who noted that there is a lack of knowledge on how culture can influence IT governance.

**Practical Contributions**

The practical contributions of this dissertation can be summarised as follows.

Firstly, a way of helping practitioners to understand how IT governance is implemented in organisations is introduced. The identification of the related IT governance players (i.e., the global and local actors); an obligatory passage point (i.e., a situation that exists to help the alignment of interests between all IT governance players); and the strategies (i.e., devices of interessement) used during the negotiation and enrolment of IT governance players, could assist them to evaluate the strengths, weaknesses, opportunities and threats (e.g., risk) related to their IT governance. This is in accordance with the conclusion that the key to successful IT governance implementation is the involvement of all actors, consideration of nonhuman actors (e.g., IT infrastructure) and the institutional context within which the organisations are situated (e.g., cultural and historical background).

Secondly, an organisation could obtain benefit from the multiple case studies analysis by following the suggestion that in order to establish a stable governance arrangement, concern should also be given to the IT infrastructure as part of the organisational governance practices. The decision to invest in new technology or
maintain the existing ones should consider the ability of such technology to support business operations. This consideration needs to include the ability of the management to provide various resources (including space/time, financial), the commitment and ability of their organisational unit to implement the project, and the appointment of the right people (e.g., the focal actor) to drive the IT governance implementation project.

Thirdly, the development of an IT governance trajectory provides insights into understanding the status of IT governance implementation (e.g., success, failure, lack of ability to perform the project or lack of resources). The information provided here could be used by management of an organisation to help them to decide which actions and protective measures need to be used to promote (or prevent) IT governance success (or failure). The shape of the trajectory indicated that the efficacy of IT governance implementation fluctuates over time. Hence, continuous monitoring and support from management are essential for maintaining the stability of IT governance implementation.

Lastly, the IT governance tactical model could become a tool for corroborating practitioners’ efforts to strengthen their IT governance practice. Using the tactical model, practitioners will be equipped with the ability to evaluate the status of their IT governance implementation, as well as identify the necessary tactical approaches for improving their existing IT governance implementation.

**Limitations of the Research**

The limitation of this study emerged mainly during the data collection stage in both the qualitative (case study) and quantitative (online survey) phases of the research. Obtaining permission from the for-profit organisations to participate in the case study proved challenging. For example, email invitations were sent to eighteen Malaysian listed companies in the Bursa Malaysia. Only Group ABC agreed to participate. Access to Australian for-profit organisations was also limited due to the location of the researcher in Perth, Western Australia. Most of the headquarters of sizeable Australian companies were located in either Melbourne or Sydney. Hence, the search had to be narrowed to a company that had a head office in Perth. The main contact to Company B was established through its principle company (Group XY). Only Company B was
available for the case study because its IT team and main IT infrastructure were centrally managed from Perth, Western Australia.

A potential source of bias rose from the fact that in the for-profit companies the researcher had to use a list of respondents provided by the organisations’ senior managers. In the not-for-profit organisations, most respondents selected from University Y were IT staff members. They volunteered and were interested in forming part of the study, whilst others from different departments were not able to participate in interviews (e.g., time constraints). The above limitation resulted in variation in the number, and type, of interviewees’ positions across the four cases. The researcher acknowledges that the results might therefore be subject to bias. Hence, all interviews were compared with each other and cross checked with the data obtained from the document analysis for each of the participating organisations. In addition, the use of a hybrid process to analyse the interview responses (data and theory driven) helped to reduce this potential bias during the data analysis stage. In addition, positioning the data analysis using Klein and Myers’ (1999) principles and suggestions made by Shenton (2004), Lincoln and Guba (1985); and Guba (1981); improved the interpretive quality and trustworthiness of the research findings.

In order to overcome the problem of getting the appropriate respondents to evaluate the IT governance tactical model (online survey), the researcher tried to establish initial contact with various associations in both Malaysia and Australia. The following associations were contacted, but did not accept an offer to participate in the study: (1) Malaysia - ISACA, Institute of Internal Auditor (IIA), PIKOM (The National ICT Association of Malaysia) CIO Chapters, and Government CIO under MAMPU (Malaysian Administrative Modernisation and Management Planning Unit); and (2) Australia – CIO Executive Council and Australian Computer Society. Two Australian associations agreed to help administer the online survey to their members (IIA and ISACA). Despite their efforts of sending follow up emails and reminders through the associations’ newsletters and an offer of a summary of the survey result, the response rate was still low. Only thirty-three responses were gained. Given that the researcher could not access the total number of the ISACA and IIA’s members, the precise response rate

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26 Did not accept the offer was accessed by (1) no response received after two follow up emails were made) and (2) outright rejection of the offer to participate.
could not be calculated. Hence, advanced statistical analysis using SPSS could not be conducted. On the other hand, given that the survey was exploratory, simple tests such as frequency distributions and mean scores were deemed sufficient. In addition, most of the respondents were auditors who might have held different perspectives compared to the other groups of business and IT managers and users. For this reason, only a tentative modification to the original IT governance tactical model was made. The model cannot therefore be generalised until it is thoroughly tested among more respondents with diverse backgrounds in the future. For all these reasons just a tentative modification to the original IT governance tactical model is the end result.

**Directions for Future Research**

Although this study has presented insight into how IT governance arrangements (structures, processes and relational mechanisms) and IT infrastructure are implemented, the limitations highlighted in the previous section do not indicate the findings were invalid. The limitations were recognised and can be addressed in future research.

Firstly, given that this study was conducted in the four selected organisations, similar research could be conducted in a range of other industries, like financial services, manufacturing or retailing (Chiasson & Davidson, 2005). The findings of such a new study could be used to complement this thesis’ findings, especially in the context of emergent culture and historical background.

Secondly, and in relation to the above, acute observation of how IT governance is implemented, in terms of the local and global actors’ interactions that occur and the role of nonhuman actors (IT infrastructure), is suggested for future research. In this context, ethnographic and longitudinal approaches could be used to explore the interactions of the local and global actors in their cultural context.

Thirdly, the use of ANT to explore the emergence of IT governance and its infrastructure arrangements is limited. Therefore, further research using ANT is warranted to better capture the role of the social and the material in shaping IT governance practices. Focus should be given to the role of an obligatory passage point, which was found to be the most important factor in aligning the interests of the actors. In this context, further research should continue to investigate the characteristics that
contribute to the development of a powerful \textit{obligatory passage point} that supports the enrolment of IT governance actors into the network.

Fourthly, the research model proposed in this study (i.e., in Figure 1) could be further refined and tested through replication in more case studies. The findings could increase the robustness of the model. New insight on how the link between IT governance arrangements and IT infrastructure could be improved, can be explored. In addition, replication could help to determine whether the same factors identified in this research are relevant to other organisations.

Fifthly, this research has produced some preliminary findings on how culture can affect the implementation of IT governance. Since research on how culture can influence IT governance is very limited (Aasi et al., 2014), future research should therefore be conducted to explore the specific role of culture and how it affects IT governance implementation.

Lastly, future research could more extensively re-validate the IT governance tactical model among a wider group of practitioners. In this thesis, only tentative modifications were made to the tactical model due to the low response rate. It is also suggested that having more direct access to the potential respondents (e.g., at a conference or hand distribution at an Association meeting) is the best option so that a researcher could directly control the distribution of the questionnaire and thereby improve the response rate. A higher response rate would allow advanced statistical tests to be conducted and more concrete improvements and modifications to be made to the tactical model.

\textbf{Concluding Remarks}

This dissertation has presented and discussed the findings that address the overarching research questions of how do IT governance arrangements and IT infrastructure emerge in an organisation?; how IT governance structures, processes, relational mechanisms and IT infrastructure become dynamically aligned to support IT governance implementation?; and what factors contribute to the alignment of interests during the process of implementing governance and infrastructure arrangements? The findings of the study revealed the IT governance trajectories, which were then used to develop a tactical model to guide IT governance
implementation. Figure 20 diagrammatically presents the main findings in a toolbox for optimising the governance implementation.

Figure 20: Toolbox for optimising IT governance implementation result

Figure 20 diagrammatically presents the main findings in a toolbox for optimising IT governance implementation. The toolbox goes beyond a framework to specify the decision rights and accountability to encourage desirable behaviour in IT usage (Weill & Ross, 2004) and to implement the IT governance processes, structures and relational mechanisms in the organisations by:
i. Integrating the need for organisations to consider the IT infrastructures as part of their IT governance practices. Understanding the relationships that exist between IT governance structures, processes, relational mechanisms and IT infrastructure could help organisations analyse their current state of IT governance implementation. An analysis of the actors who are involved (i.e., the local/global) and how their interests become aligned could assist them to develop their IT governance implementation trajectory.

ii. The trajectory acts as an indicator to review the tactics they currently use to implement IT governance. Based on the location of the trajectory, two solutions are proposed. Firstly, if the trajectory is located in the bottom left quadrant (i.e., failure to attach to the network) or top left and bottom right quadrants (i.e., limited attachment of actors in the network), an organisation could replace their existing tactics with those suggested in the IT governance tactical model. Lastly, if the trajectory is located in the top right quadrant (i.e., success), an organisation can use the IT governance tactical model to further enhance its existing strategy.

iii. Once the areas of discrepancies (i.e., failure and limited trajectories) and enhancement (i.e., success trajectory) are identified, an organisation can develop a sound plan for IT governance implementation.
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### APPENDIX A: Interview Schedule

#### Questions to guide the interviews

<p>| 1. | Basic demographic information questions (age, gender, company, rank, education background) |
| 2. | How did you get involved in the IT governance implementation process in the current company? Please give us a brief history of your own career. |
| 3. | What is your current role in the IT governance implementation process? |
| 4. | Please provide a brief history of your organisation. What are the main products (or mission), main market, number of employees, annual budget &amp; sales volume, and the market position? |
| 5. | How did your organisation get involved in the IT governance implementation process? Please provide me with a brief history of your organisation's involvement in the IT governance implementation process? |
| 6. | What are the main roles that your organisation is playing in the IT governance implementation process? |
| 7. | What is your organisation’s perspective on the IT governance implementation process (on competition, market, technology, standards, and applications)? |
| 8. | What type of IT governance implementation process is your organisation pursuing? |
| 9. | What role is your organisation playing in the development of the IT governance implementation process, if any? |
| 10. | What effect has your organisation had on the development of the IT governance implementation process? |
| 11. | Who made the decision to implement IT governance in your organisation? |
| 12. | What actors do you interact with? Who are they? What role do they play? Whom do you think we need to talk to? |
| 13. | What is your relationship with those who you just mentioned? |
| 14. | How are your relationships with each of these actors changing? |
| 15. | What is the main objective of the implementation of IT governance in your organisation? |
| 16. | Which groups within the organisation are responsible for the selection of IT governance processes? |
| 17. | What are other key technologies that affected (either facilitate or impede) the development of IT governance processes, structures and relational mechanisms in your organisation? |
| 18. | What are the specific software or other IT artefacts used in your organisation? |</p>
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. What is the benefit of adopting those specific IT artefacts?</td>
<td></td>
</tr>
<tr>
<td>20. Would you consider the IT governance structures, processes and relational mechanisms implemented in your organisation successful? Why?</td>
<td></td>
</tr>
<tr>
<td>21. What are the keys issues and challenges during the implementation of IT governance framework in your organisation?</td>
<td></td>
</tr>
<tr>
<td>22. Were there any changes that you could see after the IT governance process was implemented in your organisation?</td>
<td></td>
</tr>
<tr>
<td>23. Could you explain the main benefit of having IT governance implementation in your organisation?</td>
<td></td>
</tr>
<tr>
<td>24. If you had to rate your organisation on a score from 1 to 7 (1 indicates the lowest and 7 indicates the highest) for the extent to which your organisation is successful in IT governance implementation, how would you rate your company?</td>
<td></td>
</tr>
<tr>
<td>25. Are there any characteristics or factors which you think could impact on IT governance implementation success in your organisation?</td>
<td></td>
</tr>
<tr>
<td>26. In your opinion, how well do the IT strategies support business strategies in your organisation?</td>
<td></td>
</tr>
<tr>
<td>27. Do you think the technology that your organisation uses currently supports its business strategy, and leads to competitive advantage?</td>
<td></td>
</tr>
<tr>
<td>28. Is it important to have an aligned IT strategy with business strategy?</td>
<td></td>
</tr>
<tr>
<td>29. In your opinion, could you explain the benefit (internal or external) of having strategic alignment in your organisation?</td>
<td></td>
</tr>
<tr>
<td>30. In general, how well aligned do you think the business and IS strategy in your organisation?</td>
<td></td>
</tr>
<tr>
<td>31. How does top management involvement and user participation affect the achievement of strategic alignment in your organisation?</td>
<td></td>
</tr>
<tr>
<td>32. If you had to indicate on a scale of 1 to 7 (1 indicates not aligned at all and 7 indicates very well aligned), where would you place the alignment level of your organisation’s business and IT strategy?</td>
<td></td>
</tr>
<tr>
<td>33. In your opinion, what factors might contribute to the achievement of strategic alignment in your organisation?</td>
<td></td>
</tr>
<tr>
<td>34. Do you have any additional comments regarding the IT governance implementation process and strategic alignment in your organisation?</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B: Participant Information Form (Interview)

Information Letter

You are invited to participate in a research project being undertaken by UWA Business School’s PhD student Hafizah Mohamad Habollah, under the supervision of Associate Professor Alan Simon and Associate Professor Nicholas Letch.

Project title
A Network Analysis of the Dynamics of Information Technology Governance (ITG): Towards a Tactical Model to guide ITG implementation
(HREC Approval RA/4/11/4885)

Project Background
The study focuses on the implementation of Information Technology Governance (ITG) and its impact on strategic alignment. Well formulated ITG mechanisms, which are ITG structures, ITG processes and relational mechanisms, will provide a clear and rational basis for governing IT in organisations. The impact of ITG on strategic alignment is believed to be important to drive an organisation’s achievement of IT value delivery and competitive advantage. The results of this study will be used to develop a framework to guide the implementation of ITG to achieve strategic alignment.

Your Involvement in the Project
You have been invited to participate in this study because you are one of the key personnel who is involved in ITG implementation at your organization.

If you agree to take part in this study, you will be asked to participate in an interview that will last approximately 30 to 60 minutes. With your permission, these interviews will be recorded. During the interview, you will be asked questions concerning: your role and involvement in the ITG implementation process, your understanding of ITG structures, processes and relational mechanisms in the organisation, and the ways you are assessing the impact of ITG implementation on your organisation’s strategic alignment.

The Privacy of Your Responses
Specific details discussed during interviews that identify you personally will not be divulged to other project participants, your superiors or your colleagues. The interview will be recorded to allow transcription. The researcher has put in place a number of measures to maintain the confidentiality of the information you provide in interviews. In computer records that identify you individually, your name will be replaced by a code number and the reference to this number will be stored in a separate file. This code number will be used in the analysis of interview data. In the thesis and any publications arising from this study, the name of your organization and your own name will be changed to pseudonym to ensure anonymity. Upon completion of the research, any recordings from your interviews will be erased.
A copy of the analysed transcription will be made available to you if you are interested in reviewing the quotes that will be used in the study.

**Your Participation is Voluntary**

Your involvement in this study is entirely voluntary. You can decide whether or not to take part in the study. You can also change your mind and withdraw your consent at any stage during the study, and any records containing your provided information will be destroyed. If you do decide not to participate, there will be no prejudice toward you.

**Your Questions about the Research**

Should you have any questions about the research or would like to discuss any aspects of the study in more detail, please contact:

<table>
<thead>
<tr>
<th>Research Investigator</th>
<th>Research Supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mrs Hafizah Mohamad Hbollah</td>
<td>Associate Professor Alan Simon</td>
</tr>
<tr>
<td>Business School</td>
<td>Business School</td>
</tr>
<tr>
<td>The University of Western Australia</td>
<td>The University of Western Australia</td>
</tr>
<tr>
<td>35 Stirling Highway, Crawley WA 6009</td>
<td>35 Stirling Highway, Crawley WA 6009</td>
</tr>
<tr>
<td>Email: <a href="mailto:20789427@student.uwa.edu.au">20789427@student.uwa.edu.au</a></td>
<td>Email: <a href="mailto:alan.simon@uwa.edu.au">alan.simon@uwa.edu.au</a></td>
</tr>
<tr>
<td>Tel: 08 6488 5673</td>
<td>Tel: 08 6488 2781</td>
</tr>
<tr>
<td></td>
<td>Associate Professor Nicholas Letch</td>
</tr>
<tr>
<td></td>
<td>Business School</td>
</tr>
<tr>
<td></td>
<td>The University of Western Australia</td>
</tr>
<tr>
<td></td>
<td>35 Stirling Highway, Crawley WA 6009</td>
</tr>
<tr>
<td></td>
<td>Email: <a href="mailto:nick.letch@uwa.edu.au">nick.letch@uwa.edu.au</a></td>
</tr>
<tr>
<td></td>
<td>Tel: 08 6488 3741</td>
</tr>
</tbody>
</table>

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time.

In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to hreo-research@uwa.edu.au

All research participants are entitled to retain a copy of any Participant Information Form and/or Participant Consent Form relating to this research project.
APPENDIX C: Consent Form

Consent Form

A Network Analysis of the Dynamics of Information Technology Governance (ITG): Towards a Tactical Model to guide ITG implementation (HREC Approval RA/4/1/4885)

I __________________ have read the accompanying information sheet and understand that:

- My participation is voluntary and that I may discontinue my participation at any time without penalty or explanation.
- I will be able to seek further information about the study before, during or after any interview session.
- An audio recording of the interview will be made and I will be able to review the analysed transcription upon my request to review my quotes that will be used in the study.
- I understand that all identifiable (attributable) information that I provide is treated as strictly confidential and will not be released by the investigator in any form that may identify me.
- The conduct of this research involves the collection, access and/or use of my identified personal information. The information collected is confidential and will not be disclosed to third parties without my consent.
- I can contact the manager, research ethics, at University of WA Human Research Ethics Committee on (08) 6488 3703 if I have any concerns about the ethical conduct of the project.
- I have read the information letter and the consent form. I agree to participate in this study and give my consent freely.

Participant __________________ Date __________________

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time.

In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to hreo-research@uwa.edu.au

All research participants are entitled to retain a copy of any Participant Information Form and/or Participant Consent Form relating to this research project.
APPENDIX D: The Questionnaire

Default Question Block

Project title:
A Network Analysis of the Dynamics of Information Technology Governance (ITG): Towards a tactical model to guide ITG implementation
(HREO Approval RA/4/1/6660)

Important notes:
1. Information letter can be read at: Participant information form
2. Advancing to the questions will be taken as an implied consent to participate in the research
3. Should you have any questions about the research or would like to discuss any aspects of the study in more detail, please contact:

Doctoral student
Mrs Hafizah Mohamad Habollah
Business School
The University of Western Australia
35 Stirling Highway, Crawley WA 6009
Email: 20789422@student.uwa.edu.au
Tel: 08 6488 5673

Research Supervisors
Associate Professor Alan Simon
Business School
The University of Western Australia
35 Stirling Highway, Crawley WA 6009
Email: alan.simon@uwa.edu.au
Tel: 08 6488 2781

Associate Professor Nicholas Letch
Business School
The University of Western Australia
35 Stirling Highway, Crawley WA 6009
Email: nick.letch@uwa.edu.au
Tel: 08 6488 3741

Thank you !!!
Please comment on the framework I developed during my doctoral studies to guide ITG implementation. This model has been constructed from case studies I conducted in two for-profit companies and two not-for-profit organisations located in Malaysia and Australia. Each of the elements in the model was obtained from a comparison and analysis of the approaches taken by the four participating organisations in implementing and maintaining their IT governance arrangements and IT infrastructures.

The model strives to provide common guidelines that reflect the work of other researchers in the area of ITG. The aim of my proposed model is to suggest to management what the best approach is for improving their ITG arrangements. For this reason, the elements inside the model are flexible (i.e., each factor is not mandatory) and organisations can match a relevant tactical approach to their specific organisations.

As inducement to participate in my study, I am offering all respondents who complete this questionnaire, a report summarising the main findings.

I hope to strengthen my model from your responses and suggestions. The proposed model is articulated in Figure 1. Each of the tactical approaches within the model is further categorised into four themes, and they are summarised below:

<table>
<thead>
<tr>
<th>Theme</th>
<th>Explanation</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarifying expectations</td>
<td>To re-affirm the guidelines of the organisation. It covers the purpose, code of conduct and underlying values that must be adhered to by all</td>
<td>• Well defined and clear IT vision and mission</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Articulating IT strategy and processes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Understanding organisational culture</td>
</tr>
<tr>
<td>Responsibility and accountability</td>
<td>To clearly define the structures and processes related to IT decision-making. It includes aligning the right person to the right position</td>
<td>• Appointment of IT leader (e.g., CIO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Strengthening the governance committee</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Strengthening IT internal structure</td>
</tr>
<tr>
<td>Fostering commitment</td>
<td>To encourage collective action, develop close relationships and secure commitment from all parties involved in the ITG</td>
<td>• Two-way communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IT leadership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Top management support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Appointment of IT representative (e.g., IT representative in business)</td>
</tr>
</tbody>
</table>
### Table

<table>
<thead>
<tr>
<th>Increasing IT capabilities</th>
<th>Planning</th>
</tr>
</thead>
</table>
| To position IT as a strategic enabler in the organisation | • Re-considering existing IT infrastructure  
• Appropriate allocation for IT investment  
• Conducting IT/IS review |

### Figure 1: The proposed ITG tactical model

Your critical evaluation of my proposed model for IT governance should take approximately 10 - 20 minutes to complete.

### Section A: Respondent profile

Please answer the following questions:
A1. What is your job title?

A2. How long have you held your current post?

A3. What is your gender?
   • Male
   • Female

Section B: Evaluation of the tactical approach

Please rate the following factors in regards to how important they are for assisting your organisation to improve its ITG implementation.

<table>
<thead>
<tr>
<th>Theme: Clarifying expectations</th>
<th>Very Important</th>
<th>Some Importance</th>
<th>Neutral</th>
<th>Little Importance</th>
<th>Of no Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well defined and clear IT vision and mission</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Articulating IT strategy and processes</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Understanding organisational culture</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>
Please elaborate your answer:

Are those any other items you would add to this theme (clarifying expectations)?
- Yes
- No

If YES, please provide them below:

<table>
<thead>
<tr>
<th>Theme: Responsibility and accountability</th>
<th>Very important</th>
<th>Some importance</th>
<th>Neutral</th>
<th>Little importance</th>
<th>Of no importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appointment of IT leader (e.g., CIO)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Strengthening the governance committee</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Strengthening IT internal structure</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Please elaborate on your answer:
Are those any other items you would add to this theme (clarifying expectations)?
- Yes
- No

If YES, please provide them below:

<table>
<thead>
<tr>
<th>Theme: Fostering Commitment</th>
<th>Very important</th>
<th>Some importance</th>
<th>Neutral</th>
<th>Little importance</th>
<th>Of no importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-way communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Training/IT-business</td>
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</tr>
<tr>
<td>engagement (e.g., IT</td>
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<tr>
<td>business liaison)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Appointment of IT</td>
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<td></td>
</tr>
<tr>
<td>representative (e.g., IT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>representative in business</td>
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<td></td>
</tr>
<tr>
<td>planning)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top management support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please elaborate your answer:
Are those any other items you would add to this theme (fostering commitment)?
- Yes
- No

If YES, please provide them below:

<table>
<thead>
<tr>
<th>Theme: Increasing IT capabilities</th>
<th>Very important</th>
<th>Some importance</th>
<th>Neutral</th>
<th>Little importance</th>
<th>Of no importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-considering existing IT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>infrastructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conducting IT/IS review</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate allocation for IT</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please elaborate your answer:

Are those any other items you would add to this theme (increasing IT capabilities)?
- Yes
- No

If YES, please provide them below:
Section C: Evaluation of the overall model

Please give your opinion on whether the tactical approach in this model, if used in your organisation, would be able to:

<table>
<thead>
<tr>
<th></th>
<th>To great extent</th>
<th>To some extent</th>
<th>Neutral</th>
<th>To little extent</th>
<th>To no extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve value realisation from IT investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve strategic alignment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve risk management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve IT resource management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve business performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Section D: Final ranking of the items in the model

Please rank (drag and drop) these elements in your opinion most important to least important (1 being most important and 14 being the least important).

• Training / IT business engagement (e.g., appointing IT-business liaison)

• Appropriate allocation for IT investment

• Top management support

• Articulating IT strategy and processes

• Conducting IT/IS review

• Re-considering existing IT infrastructure

• Appointment of IT representative (e.g., IT representative in business planning)
• Strengthening the governance committee
• Two-way communication
• Well defined and clear IT vision and mission
• Understanding organisational culture
• IT leadership
• Appointment of IT leader (e.g., CIO)
• Strengthening IT internal structure

Section E: Overall comment

Please provide any additional suggestions for improving my model to guide ITG implementation. This is a critical part of the evaluation of my model.

If you are interested to obtain the summary of the main findings from this questionnaire study, please fill in the following:

Your name:

Email / postal address:

Thank you for your time and cooperation!
APPENDIX E: The Three Pillars of IT

The “three pillars of IT” was introduced as the new IT governance structure:

![Figure E1: The three pillars of IT](Source: Group IT briefing document)

The first pillar of IT was the Group IT, an organisation directly under the Group CIO. The Group IT acted as a centre of excellence that had primary responsibility for IT principles, architecture and planning, common IT infrastructure, business application needs, and IT investment and prioritisation.

The second pillar of IT was the Division IT that was responsible for specific divisional business applications. After the merger, Group ABC focused on six core businesses that were run by six divisions. Each of the divisions had their own IT team, and its size differed depending on the size of the division. The Division IT Head had a 50% functional reporting line to the Group CIO and another 50% to the Divisional CFO. The Division IT was called Retained Organisations because it was located in the business division where the business operations took place.

The third pillar of IT was the Global Service Centre. After the merger, management decided to detach Company XYZ from the Group IT and rebrand it Global Service Centre, a subsidiary company for Group ABC with 100% ownership. Global Service Centre was responsible for providing IT group shared service for Group ABC and was headed by the Group Head of Global Service Centre. The primary units under the Global Service Centre were headed by Group Shared Service Head (i.e., Vice President). The units were the Group Shared Service (GSC), namely GSC-Application, GSC-Infrastructure, GSC-Finance and GSC-Human Resource. The GSC-Finance and GSC-Human Resources teams were responsible for the group’s transaction processing in the areas of financial and human resources. The GSC-Application team focused on providing a standardised IT application, such as the ERP, whilst the GSC-Infrastructure team was responsible for provisioning the common group-wide infrastructure (e.g., data centre, desktop and network support). All of the GSC Heads had a 50% functional reporting line to the Group CIO and another 50% to the Group Head of the Global Service Centre.
APPENDIX F: New IT Governance Structure

![IT governance structure at Group ABC](FigureF1)

(Source: Group IT briefing document)

The three pillars of IT was built upon a federated approach and its aim was to optimise asset utilisation for cost effectiveness. The Group IT (i.e., Centre of Excellence) acts as a “skill centre” with a primary responsible for developing IT principles, architecture and planning, providing common IT infrastructure, determining business standardised application needs, and making decisions on IT investment and its prioritisation. The Group IT provided its common IT infrastructure through Group Shared Service. The Group CIO led the Group IT and he reported directly to the Group CFO. Nine units had been established to support the Group IT.

Six divisions at Group ABC had their own IT teams, and they were each known as the Division IT. Each Division IT was led by the Division IT Head, who reported directly to the Division CFO, as well as to the Group CIO (50% functional reporting). The Division IT focused on delivering an enhanced business function and concentrated on decision support and value creation to promote local innovation. The Division IT used common IT infrastructure provided by Group Shared Service, but at the same time, also developed and managed the specific IT infrastructure and applications to suit the business needs. In regards to this, the Division IT had units of IT planning and budgeting, specific system development and support and divisional IT service management and infrastructure requirement planning.

The Group Shared Service acted as a “scale centre”, delivering an industrialised back office function to support customer service. It provided common group-wide IT services in terms of IT service management, application and infrastructure. Each of the four Global Service Centre’s units was led by a Vice President (VP) and these VPs have a 50% functional reporting line to the Group CIO and another 50% to the Group Head of Global Service Centre.
APPENDIX G: IT-Business Partnership Framework

If there was a request from users for new capabilities (i.e., technology or system) for company-wide IT usage, and Group IT had the skills, the Group Shared Service IT (Application and IT infrastructure) was responsible for the project. For new capabilities requested from a specific division, Group IT made an assessment to find out if they could embark on the project on their own. The Division IT team was responsible for identifying the business solution for the fulfillment of the needs of the division. For Group ABC’s common IT project, Group IT covered the cost and the Project Management Office conducted the implementation at divisions. Once the project was completed, the GSC took up the project for maintenance and support.
APPENDIX H: The Leadership Model of Company B

The Leadership Model was driven by both culture and strategy towards the achievement of Company B’s vision.

![Figure H1: Company B’s Leadership model](Source: ITS briefing documents)
APPENDIX I: Why Oracle ERP?

The Oracle ERP was chosen for three reasons:

1. The Oracle system had the capability to be extended to follow Company B’s growing business requirements. For example, Oracle ERP allowed the ITS team to build its own user interfaces and add various additional functionalities to the system they were developing. Most importantly, the implementation of Oracle ERP would allow the ITS team to continuously develop new systems in-house and maintain the flexibility of the system.

2. The selection of Oracle ERP was deemed to be appropriate because the ITS team already had Oracle skills in-house. Hence, the ITS team could support the development of IT infrastructure. At that time, the ITS team had already used Oracle technology, such as Oracle forms and database management systems. For example, Company B’s financial system was an Oracle application and the payroll system was an off-the-shelf application (i.e., the Alesco payroll system) that also ran on an Oracle technology platform.

3. The Oracle ERP offered the flexibility to upgrade the system (i.e., from COBOL to Oracle ERP) in phases. A staged process could lower the risks associated with stock-outs and system failure.
APPENDIX J: The Impact of Business Culture on the ITS Operations

The culture and role of the ITS is represented in its vision, “We provide and support creative sustainable solutions to enable the business to build the best... Our team, shared values and customer focus make it happen” (Company B, 2012). Its impact can be explained as follows:

1. Following the culture of the ITS team (i.e., *We provide and support creative sustainable solutions to enable the business to build the best*), all of the IT projects were driven by the management of Company B. The Leadership Committee played an important role in deciding and prioritising all the IT projects to ensure the projects were aligned with the business strategies and objectives. In accordance with the vision, the ITS team was responsible for supporting store success and supporting business growth using the technology platform. In line with the culture, the ITS did not have a formal IT strategy and plan to set out its operations.

   Business will change very quickly, so we need to be flexible for enabling business requirements delivery. We can have a five-year plan around what IT thinks as a plan, but at the end of the day the business requirements are the main driver of IT activity (Interviewee B2, General Manager of IT, 2012).

2. The ITS team also did not implement any specific modules or framework for the IT governance processes. The IT governance processes are described as follows:

   There’s no driver for ITIL at the moment... they are not really having something that I would describe as proper project management methodology. Even in the system development life cycle, they don’t really implement into a great degree of specific methodologies (Interviewee B4, IT Manager, 2012).

3. The vision revealed the important role of the ITS team in the delivery of IT projects (i.e., *Our team, shared values and customer focus make it happen*). For example:

   We are very people focused, we rely more on people to make decisions rather than systems that make decisions for people. We give people information to allow them to make a quick decision (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).
APPENDIX K: Delivering Business Requirements and Governance Processes

Aligned with the ITS vision to support the business, all of the IT projects were driven by the Leadership Committee. The processes were explained as follows:

If the general manager really wants something, he would have to drive a very strong business case to the Managing Director and the rest of the general managers. Every general manager would want their program to be actioned first and then, a bit of negotiation at that very senior level to ensure the project aligned along with the resource, so it’s a viable tactic (Interviewee B3, IT Manager, 2012).

Prioritised business requirements prepared by the Leadership Committee were communicated to the IT Leadership team. The team would decide the best IT solution to deliver the prioritised business requirements. A Project Manager was appointed to deliver the IT requirements projects and he/she reported directly to the Major Project Committee (formerly known as the Governance Committee).

The IT Leadership team was retained in this phase and met quarterly to discuss the strategic IT agenda for Company B. However, at that point in time, the IT Leadership team did not formulate any formal IT strategy.

During that meeting, we don't have to produce a document around IT strategy. We make those decisions consciously to be flexible, to enable us to not dictate the business (Interviewee B2, General Manager of IT, 2012).

The importance of maintaining flexibility in Company B was explained:

I think the IT team try to keep it as flexible as possible. This business hates red tape because it is a waste. We are a retailer and our brand builds on lowest prices every day. We do not do that by upping all the costs. So, you got to try and do everything to bare minimum because we have a price guarantee which we have to live by (Interviewee B4, IT Manager, 2012).

The ITS vision embedded the important role of the team to help them in delivering business requirements projects. The ITS team’s shared values acted as a compass to describe how the members behaved and worked towards achieving the ITS vision.

Even though the General Manager of ITS was relatively new, he did not face difficulty in leading the team. This was explained as follows:

We offer a leadership model around having the right people in the right roles with the right values, as well as understanding the overall vision and what it takes to get there. There is no formal

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27 The General Manager of ITS was appointed in February 2010, from his previous post as the General Manager of the Commercial Department. Prior to that, he was the General Manager of the Business Development Department at Company B. His expertise was in finance and business strategy.
governance structure within the ITS itself. It is just individual accountabilities for various aspects of
the operation. But at the end of the day, I am responsible for all...there is a lot that I don’t
understand in IT. I don’t have to understand all because we have right and capable people. I can
trust them to do what needs to be done (Interviewee B2, General Manager of IT, 2012).

Agreeing with Interviewee B2, Interviewee B3 commented as follows:

If A said that this is it, we believe and trust him, as long as he can take his belief forward. It is very
rare that we have to put it in black and white (Interviewee B3, IT Manager, 2012).

To support his leadership, a strong internal communication paradigm was considered to be
paramount:

It is important for me to communicate what the business and IT are trying to achieve so that
everyone could understand... our IT leadership team communicate among each other very strongly
and communicating out to the business abroad as well (Interviewee B2, General Manager of IT,
2012).

In terms of IT governance processes, all interviewees agreed that ITS did not fully adopt
specific methodologies and standards in the IT processes. Interviewee B5 observed that,

We adopt those methodologies and standards, but we don’t need to follow exactly what they said.
We don’t believe in world best practice in anything. We believe in Company B best practice... what is
the best for us. What is best for us is not what is world best practice (Interviewee B5, IT Manager and
former Launchpad Project Manager, 2012).

Interviewee B1 explained that the team did not adopt such standards and procedures to
maintain the flexibility in delivering the projects. He added that,

It is about the ability to deliver. We are not having to go through a ton of process in order to deliver
something to the customer. This is the fantastic part of our culture. People still make mistakes but
that is life and we learn from those mistakes... through this process, people have the feeling of
ownership and accountability themselves (Interviewee B1, IT Manager, 2012).

The ITS team adopted a risk assessment procedure to ensure that they could deliver the IT
projects, even though they found defects in the new system. For example, if the team found
that the system that they developed had some defects (i.e., bugs) prior to its implementation
in stores, the team must decide whether to go back to the production stage and fix the defects
or continue with implementation. The team conducted an assessment to determine the best
decision, comparing the cost of the delay to the business operations (e.g., fix the defects)
versus the risks of the system still going live (implementation) with the defects that they
already knew. If the benefit outweighed the risk, the system would opt for implementation
and the team supported and managed the impact of the defects through IT support. Interviewee B3 explained this practice as common and said:

From IT professional point of view and governance, you don’t want bugs. But we have the team members who understand the risk and they can support that. This is the essence of our successful approach (Interviewee B3, IT Manager, 2012).
APPENDIX L: Formalisation of a New IT Strategy

In relation the development of a new IT strategy, the following comments were made:

It took us about a year to basically have a formal catch up, that moved us to get together and have an open discussion, agree on principles, and on what measurement we see as deliverables for success criteria, for us to move forward (Interviewee B3, IT Manager, 2012).

The IT strategy was carefully planned because the team did not want the flexibility that they currently had to be affected and to avoid dictation to the business. The rationale was explained as follows:

We are not risk adverse, as long as we know what the risks are and manage them. We try to have a balance between managing the risks and governance because the more governance we have, the reality is we will become less flexible and agile (Interviewee B5, IT Manager and former Launchpad Project Manager, 2012).

The first formal IT strategy for Company B was produced to support the ITS operations and guide IT infrastructure development.

Figure L1: The new IT strategy

(Source: Summarised from the ITS strategy document)
APPENDIX M: Example of Devolved IT Infrastructure at University X

A university-wide email system did not exist at University X. Instead, each faculty maintained its own email system using multiple email platforms, including Eudora, Outlook and internet-based email. At the same time, the central administration had its own email account and provided it to staff members who needed to access any administration systems, like the payroll system. As a consequence, several email servers existed during that time and staff could only access their email while they were on campus.

Everything was devolved to departments and faculties. The infrastructure was not developed in a very strategic way. There had been a network, but it was really hiccupy picuppy (Interviewee X5, IT Review Panel, 2012).
APPENDIX N: The Centralisation Project

After the establishment of the ITS, University X had approximately twenty individual IT services departments including the ITS, library, faculties’ and schools’ IT divisions. Each of the individual IT service departments had its own IT infrastructure that used multiple technology platforms and operated independently. At the same time, the university had its own university-wide application services (such as the record management system, student records, financial system, staff information system, and library information system). The devolved culture promoted local autonomy within the business units and was self-funded. Hence, the individual IT service departments planned their IT usage locally, and as a result, there was no university-wide IT plan to guide IT development.

Following the IT vision and mission formulated in the IT Strategic Direction and the findings from the two reviews conducted earlier, the ITS decided to provide a set of core standardised IT services at the university (i.e., centralisation project). Through the centralisation project, it was aimed that the ITS could expand the central service by offering to re-centralise core IT services that previously had been devolved to various IT services at the library, faculties and schools. In accordance to the investigation and assessment phase that was completed in six months, a business case for the centralisation project was prepared. The business case listed four important projects in the areas of physical infrastructure, security, central email and calendaring, and opt-in services to support the centralisation project.
### APPENDIX O: Transformational change in University X IT governance committees from 2000 to 2011

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<tbody>
<tr>
<td>IT Reference Group</td>
<td>Not applicable</td>
<td>To become a steering committee to the IS Committee and Technical Advisory Group</td>
<td>Responsible for coordinating information management policy across the campus</td>
<td>Approving major information management projects</td>
<td>Advising the VC on resources required for approved projects</td>
</tr>
<tr>
<td>Information Management Board</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>• VC – Chair</td>
<td>• VC – Chair</td>
<td>• VC – Chair</td>
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<td>• Senior Deputy VC</td>
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<td>• Deputy VC (Research and Innovation)</td>
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<td></td>
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<td></td>
<td>• Executive Director (Academic Services) and Registrar</td>
<td>• Executive Director (Academic Services) and Registrar</td>
<td>• Executive Director (Academic Services) and Registrar</td>
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<td></td>
<td></td>
<td></td>
<td>• Two Faculty Deans (appointed by the VC)</td>
<td>• Two Faculty Deans (appointed by the VC)</td>
<td>• Two Faculty Deans (appointed by the VC)</td>
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<td>• Librarian</td>
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<td>• Director of ITS</td>
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<td>• Director of Public Affairs Manager of ITS - Strategy and Architecture</td>
<td>• Director of Public Affairs Manager of ITS - Strategy and Architecture</td>
<td>• Director of Public Affairs Manager of ITS - Strategy and Architecture</td>
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<td></td>
<td>• Co-opted members (as determined by the Chair)</td>
<td>• Co-opted members (as determined by the Chair)</td>
<td>• Co-opted members (as determined by the Chair)</td>
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<td>Committee</td>
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</table>
| IT Policy Committee | To provide the university with coordination, coherence and a consistent IT policy and development plan | • Deputy VC and Provost - Chair  
• EDFR or nominee  
• Executive Director (Academic Services) and Registrar  
• Chair of the Academic Board  
• Librarian or nominee  
• President of the Undergraduates  
• Representative from the faculty group nominated by Deans  
• Three members of the academic or general staff (appointed by the Academic Board),  
• IT Executive Officer | IS Committee | To establish and maintain an IT strategy to support the university’s core business, provide advice on the implementation of the strategy including the budget priorities and to maintain a policy framework | • Deputy VC and Provost - Chair  
• EDFR or nominee  
• Executive Director (Academic Services) and Registrar  
• Librarian  
• President of the Undergraduates  
• IT Executive Officer  
• A nominee from the Teaching and Learning Committee  
• A nominee from Research Committee  
• A nominee from Technical Advisory Group |
| IS Committee | To establish and maintain IT strategy to support the university’s core business, provide advice on the implementation of the strategy including the budget priorities and to maintain a policy framework | • Deputy VC (Research and Innovation - Chair)  
• EDFR or nominee  
• Executive Director (Academic Services) and Registrar  
• Librarian  
• IT Policy Executive Officer  
• President of the Undergraduates  
• A nominee from the Teaching and Learning Committee  
• A nominee from Research Committee  
• A nominee from Technical Advisory Group  
• Director of ITS | IS Programme Committee | Responsible for the detailed coordination, integration and oversight of the implementation of approved projects | • EDFR - Chair  
• Deputy VC (Education) – or nominee  
• Deputy VC (Research and Innovation) – or nominee  
• Executive Director (Academic Services) and Registrar  
• Librarian  
• Director of ITS |
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<td></td>
<td>coordination between professional IT experts and the IT Policy Committee for ensuring their expertise is available to the University as a whole</td>
<td>consideration and providing technical advice if requested</td>
<td>consideration and providing technical advice if requested</td>
<td>campus.</td>
</tr>
<tr>
<td>• Librarian – Chair</td>
<td>• Librarian - Chair</td>
<td>• Librarian - Chair</td>
<td>• Librarian - Chair</td>
<td>• Librarian - Chair</td>
</tr>
<tr>
<td>• IT Executive Officer</td>
<td>• IT Executive Officer</td>
<td>• IT Policy Executive Officer</td>
<td>• Director of ITS</td>
<td>• Director of ITS</td>
</tr>
<tr>
<td>• Director of Administrative Computing Services</td>
<td>• Director of Administrative Computing Services</td>
<td>• Strategy and Governance Manager, ITS</td>
<td>• Two nominees of the Director of ITS</td>
<td>• One nominee of the EDFR</td>
</tr>
<tr>
<td>• A computer manager from each faculty group (nominated by Deans)</td>
<td>• Manager University Communication Services</td>
<td>• Technical Services Manager, ITS</td>
<td>• One nominee of the Executive Director (Academic Services) and Registrar</td>
<td>• One nominee of the Librarian</td>
</tr>
<tr>
<td>• A nominee of the Librarian</td>
<td>• A computer manager from each faculty group (nominated by Dean)</td>
<td>• A computer manager from each faculty group (nominated by Dean)</td>
<td>• One nominee of each of the nine Faculty Deans</td>
<td>• One nominee of the Librarian</td>
</tr>
<tr>
<td>• A member of Library staff with IT skills</td>
<td>• A member of Library staff with IT skills</td>
<td>• A member of Library staff with IT skills</td>
<td>• One nominee of the Student Undergraduates</td>
<td>• One nominee of the Student Undergraduates</td>
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APPENDIX P: Appointment of the LDIT and IT Governance Processes

The appointment of the Librarian as the LDIT was aimed at helping the university to improve IT services delivery. In terms of his background, the LDIT joined the university at the end of 1996 as a librarian and subsequently became a member of various committees in the university. As a result, he had a vast understanding of the faculties (e.g., he was a member of the Academic Board) and the devolved culture of the university. The following comments are made:

Because of the history of the university, we took a more gradual approach rather than a big bang approach to just throw everyone together and make it happen. (Interviewee X10, Former LDIT, 2012).

The ITS continued to use ITIL as part of its IT governance processes, but the analysis revealed that its implementation was not fully utilised.

It is a lazy implementation of ITIL. The university seems to pick and choose which part they want to use and then choose something that is more convenient (Interviewee X11, IT Manager, 2012).

In terms of IT policy, there was no evidence that the ITS developed a new policy that could support centralisation efforts across the university. In relation to the IT governance relational mechanisms, the LDIT’s leadership was viewed as follows:

The LDIT never had the intent to completely take over IT. He basically healed the gap between Information Services Division and the rest of the university community in a more consultative approach (Interviewee X9, Faculty IT Manager, 2012).
APPENDIX Q: Summary of IT Governance Implementation in Phase 4 at University X

The LDIT retired at the end of 2009, after 14 years of service as Librarian and two years as LDIT. Following that, the new LDIT was appointed. Prior to her appointment, she had been a Deputy Chief Information Officer and Director of Research & Learning Support at a UK university. She had a good record of leading her previous organisation to roll out their first centrally supported e-learning system and the development of a research information management system. The VC was thought to play an important role in the appointment of the new LDIT.

I made the librarian responsible for IT. When I appointed the replacement for that person (i.e., the LDIT), I advertised for someone who would be responsible for both IT and library (Interviewee X4, Former VC, 2012).

A review of ITS was undertaken in August 2010. Six panel reviewers were appointed, including the new LDIT. The review served to highlight two broad issues. Firstly, the wide spread IT responsibility given to business units had resulted in inefficiencies and vulnerabilities for IT services. Secondly, the role of the ITS in the ISD was reconsidered. As a result, twenty-three recommendations were made that focused on four important aspects of; (1) the nature of the IT services; (2) the effectiveness, efficiency and quality of service provided by the ISD; (3) the interactions of the ISD with cognate areas of the administration units including the faculties; and (4) the ISD priorities.

The new LDIT decided to amalgamate both the staff members of the ITS and Library into a single team. The converged team was renamed Information Services. Five units of Resources and Development, Policy and Planning, Infrastructure and Operation, Client Services and Research and Learning Support were established, each of which was led by an associate director.

A new website was launched to reflect the successful integration of the ITS and Library as the Information Services. As part of the recruitment process to support the integration, a strategic planning workshop was conducted. Accordingly, a new strategic and technical plan, as well as behavioural competencies for the Information Services staff, was established. A series of briefings was held for the staff to understand the changes and their impact upon their career development. Training was also emphasised for up-skilling the staff and to assist them to be more multi-skilled. The Information Services was also committed to the implementation of ITIL to improve overall quality, effectiveness and efficiency of the IT services delivery. Hence, the

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28 The LDIT received Professional Services Awards for her achievement in developing the research information system in the UK.
Information Services started to assess its internal processes to follow and fulfil the ITIL requirement.

**Investment Program**

Following the appointment of the new LDIT, the VC requested the Information Services to prepare a plan to address the findings and recommendations of the ITS Review. As a result, paperwork for an Investment Program was prepared. The Investment Program was developed premised on the following; (1) the ITS Review Report and its recommendations; (2) the Student IT Needs’ Study 2010; (3) audit report concerning risk, business continuity and disaster recovery; and (4) extensive consultation with the Executive, Deans, Heads of Schools, Faculty Managers, Faculty IT Managers, key Central Administration management and IT staff, as well as Guild representatives. The Investment Program aimed to raise IT to be a strategic enabler in support of the University’s strategic goal and to support student mobility. It was a major IT investment for the university to improve the standard of IT infrastructure. The Investment Program was a three-year program with $45 million funding allocation. The funding allocation conveyed the commitment of the VC to support the improvement in the governance approach.

> It was quite a lot of money, but I set it aside to support that program. I had to take some money away from the next year’s budget, but at the same time, I needed to balance how we spend money on IT and on the other parts of university activity (Interviewee X4, Former VC, 2012).

The Investment Program identified and prioritised nine major projects for implementation. The projects were in the areas of: (1) network upgrade; (2) directory consolidation; (3) identity and access management; (4) data centre consolidation; (5) managing operating environment; (6) hardware procurement; (7) software procurement and license management; (8) asset management; and (9) policies, standards and guidelines. During a briefing session with the faculties, the new LDIT emphasised that the Information Services was seeking a collaborative relationship with faculties rather than centralisation of expertise.

> The LDIT uses the term collaboration because it breaks down the barriers and helps people to understand (Interviewee X6, Faculty Manager, 2012).

In addition to using the term collaboration, the new LDIT and Information Services utilised the concept of partnership in an effort to obtain buy-in from the faculties.

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29 The Teaching and Learning Committee’s E-Learning and Learning Spaces sub-committee conducted the Student IT Needs Study to explore students’ learning needs related to IT. The findings revealed what the student wanted. These include wireless internet access available anywhere, anytime and 24/7 access to any computer lab on campus.

30 Students association
For the purpose of the Investment Program, we are the partner of central IT and work together to achieve the target environment. Once we achieve the target environment, we will revert to being a client to the Information Services (Interviewee X11, Faculty IT Manager, 2012).
APPENDIX R: Summary of IT Governance Implementation at University Y (Phase 1)

In 2002, the university appointed its fourth Director of IT. The new Director reported directly to the Deputy VC (Research and Innovation). Figure R1 below depicts the structure of the IT Centre.

![Figure R1: Structure of the IT Centre](Source: IT Strategic Plan 2004-2010)

Through its five units, the IT Centre was able to centrally develop, support, maintain and upgrade all of the IT infrastructure used in the university. Each unit was led by a Head of Unit who reported directly to the Director of IT.

As a Malaysian Public Institution of Higher Education, IT management at University Y needed to follow the requirements and regulations set out by the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU). Following MAMPU requirements, University Y established a Computer Steering Committee that was responsible for planning, approving, coordinating and monitoring the implementation of IT projects. The membership of the Computer Steering Committee was similar to the Executive Council and was scheduled to meet twice a year. However, the following was noted by an interviewee:

> Everything must go through the Executive Council meeting... but in that meeting, there were lots of agenda to be discussed... sometimes, we could not present our paper work in two consecutive meetings... we had to wait even though it caused a delay in our important paperwork (Interviewee Y9, IT staff, 2012)

In terms of the IT governance processes, each unit developed an internal IT policy that followed circulars released by the MAMPU. The IT policy, however, was maintained internally without the endorsement of the Executive Council. The IT Centre had prepared the first IT Strategic Plan for the period 2004 to 2010 to follow the IT Strategic Plan Guide circulated by MAMPU in 2003. The IT Strategic Plan became a blueprint that defined the vision, mission and IT strategic direction of the university. It highlights the implementation strategies and plans of action for University Y to accomplish its IT vision and mission.
The IT Centre received funding from two sources. The first source was from an operating fund in the Bursar’s department. The fund was used to support the IT Centre’s operating expenses such as for example, software license renewals. The second source of funding was from the government through the Malaysia Plan for IT infrastructure development. In order to obtain the funding, a document listing the requested budget needed to be prepared two years before the Malaysia Plan was approved. The document was developed as part of the IT Strategic Plan and was submitted to the Ministry of Higher Education for endorsement. The Ministry forwarded the document to the MAMPU for approval. The Director of IT was required to present and defend the requested budget.

Even though every aspect of IT needed to be maintained centrally, some of the faculties/departments employed their own IT staff to support their operation. The IT staff reported directly to the Deans/Heads of Department. Through the Eighth Malaysia Plan (2001-2005), the Malaysian government funded the development and upgrade of existing university-wide IT infrastructure. Most of the application systems used at University Y were internally developed and managed centrally. Users at the faculties/departments shared the same application systems depending on their level of authority. The university decided to maintain the use of its legacy application systems, as summarised in Table R1.

Table R1: List of legacy application systems in Phase 1

<table>
<thead>
<tr>
<th>Application Systems</th>
<th>Introduced in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Records and Student Information System</td>
<td>1990</td>
</tr>
<tr>
<td>Integrated Financial and Accounting System</td>
<td>1992</td>
</tr>
<tr>
<td>Personnel Information System</td>
<td>1991</td>
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<tr>
<td>Students Affairs Information System</td>
<td>1994</td>
</tr>
<tr>
<td>Graduate Academic Record System</td>
<td>1992</td>
</tr>
<tr>
<td>Research and Consultation Information System</td>
<td>1993</td>
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<tr>
<td>Practicum Information System</td>
<td>1994</td>
</tr>
<tr>
<td>Security Information System</td>
<td>1995</td>
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<tr>
<td>Clinical Information System</td>
<td>1996</td>
</tr>
<tr>
<td>Public Affairs Information System</td>
<td>2002</td>
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</tbody>
</table>

(Source: IT Strategic Plan 2004-2010)

All of the legacy application systems had been continuously upgraded following the owners’ requirements. For example, the Integrated Financial and Accounting System underwent a major revamp in 2003, following the request of the Bursar’s department (i.e., the owner of the system). Despite maintaining the legacy application systems, IT staff also developed new application systems. For example, a Management Information System (i.e., a community portal) was developed as a platform to enable users (staff and students) to access information from the various existing application systems.
APPENDIX S: Problem Related to the IT Council

The establishment of the IT Council was expected to solve the problem faced by the previous Computing Steering Committee (e.g., the difficulty in setting times for meetings) and it focused on overseeing the IT processes at the university. However, the IT Council failed to arrange any meetings in this period. As a result, all of the IT Centre’s paperwork for IT development was brought to Executive Council’s meetings for discussion and approval. The limitation of not having IT Council meetings was explained as follows:

Executive Council could not discuss the IT project in detail because the scope was too broad. Normally, when it was first discussed, the council member would ask the project to be referred to the expert, seeking for second opinion... the Deputy VC (Research & Innovation) would need to discuss it back with the Director of IT... it resulted in paperwork that would be discussed in several council meetings... It’s just a waste of time (Interviewee Y8, Librarian, 2012).
APPENDIX T: Summary of a New College System

In January 2008, the VC introduced and implemented a new college system (Figure 6). Under this structure, thirteen faculties were merged into three Colleges. Each College was led by an Assistant VC. The three new colleges were autonomous in managing their administrative and financial procedures. By integrating the related fields of knowledge, the merger expected to create a synergy in promoting the university programs more effectively and efficiently. The controversy in the implementation of the new college system was explained as;

The VC made a major blunder by introducing the college system. He thought he could solve the management problem by having the faculties grouped into colleges. He did not engage with all staff, hence the staff couldn’t see and appreciate why we need to have the colleges (Interviewee Y6, Director of IT, 2012).

Despite the controversy and resistance that mostly came from the academics, the university decided to continue with its decision. Following the establishment of the new college system, the Director of IT decided to pull back (i.e., centralise) all of the IT staff who were located in the faculties/departments. The aim was to support the additional workload that had resulted from the new college system and to achieve synchronisation between all IT staff centrally at the IT Centre.

...it was normal, before we could implement the plan, everyone was angry... I could not implement it. I needed to write letters to all heads of departments to inform them. Some of the IT staff at the department did not do anything, other than preparing power point slides! But they keep on asking for new IT people, they said who are going to help them in preparing power points slides? (Interviewee Y7, Former Director of IT, 2012).
APPENDIX U: IT Infrastructure and the New College System

The upgrade and improvement of the existing IT infrastructure were made under the Ninth Malaysia Plan (2006-2010). The university continued to develop and maintain its application system in-house.

…the VC will always ask… do you have the people, expertise, platform, hardware, and software to do this? If you have, then you do it (Interviewee Y6, Director of IT, 2012).

…the management also asked us to develop a system just to cater for the problem faced by the university’s drivers. At that time, there were many complaints from the university’s drivers on their overtime. I did not agree. I met the VC and said the idea of having IT is to support the university core process. As for me at that time, we are not using IT to support our core process, teaching and learning… I wanted them to think, to invest in anything that bring values to the university… (Interviewee Y7, Former Director of IT, 2012).

The establishment of the three colleges had a significant impact on the IT infrastructure. Prior to the merger, the IT Centre had a plan to integrate its entire legacy application systems. When the college system was introduced, the priority had to be transferred to support the college system. In this context, most of the IT application systems needed to be modified in accordance with the new structure. For example, any systems that previously required approval from the Deans of the Faculties needed to be changed to a new authorisation structure that was under control of the Assistant VC. At the same time, the IT Centre had to focus on developing new application systems as requested by the university (Table U1).

Table U1: List of new application systems in Phase 2

<table>
<thead>
<tr>
<th>Application Systems</th>
<th>Introduced on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Lecture Hall System</td>
<td>2008</td>
</tr>
<tr>
<td>Lecture Attendance System</td>
<td>2008</td>
</tr>
<tr>
<td>Convocation Voice Integrated System</td>
<td>2007</td>
</tr>
<tr>
<td>Courses Evaluation System</td>
<td>2007</td>
</tr>
<tr>
<td>ISO Documents Management System</td>
<td>2008</td>
</tr>
<tr>
<td>Online Meeting System</td>
<td>2009</td>
</tr>
<tr>
<td>Voting System</td>
<td>2009</td>
</tr>
<tr>
<td>e-Post System</td>
<td>2009</td>
</tr>
</tbody>
</table>

(Source: IT Strategic Plan 2004-2010)
APPENDIX V: IT Governance Arrangements and IT Infrastructure

The new Director re-strengthened the structure of the IT Centre (Figure V1). The Director was supported by the IT Management team that met weekly to discuss issues related to the IT Centre. Its membership included the Director as Chair, Deputy Director and all heads of units.

![Organisational structure of the IT Centre](image)

Figure V1: Organisational structure of the IT Centre
(Source: IT Strategic Plan 2011-2015)

The MAMPU requested all Malaysian universities to appoint a CIO. Once or twice a year, the MAMPU summoned the CIOs to attend a conference to discuss IT matters at their universities. The Management Committee decided to nominate the Deputy VC (Research and Innovation) for the CIO position.

The practice is always the Director of IT who is the one that goes to the conference because the CIO could not contribute much. For example, I have to defend the IT budget for the 10th Malaysia Plan, not the CIO because I know all the rationale behind the projects that we are planning to do (Interviewee Y6, Director of IT, 2012).

Following the new transformation plan, an IT Steering Committee was established to replace the IT Council, following the MAMPU’s guidelines. The IT Steering Committee met twice a year and its roles were to plan, approve, coordinate and monitor the implementation of IT projects. A sub-committee of an IT Security Committee was also established with the role of planning, updating, monitoring and enforcing the implementation of IT policy. The CIO chaired this committee, with the IT Security Officer acting as the secretary. Other members were appointed by the CIO. This committee was requested to conduct its meetings quarterly.

A new IT Strategic Plan was prepared for the period 2011 to 2015 with the purpose of providing an appropriate framework to inform IT development to be aligned with University Y’s mission and vision. The aim was to support the needs and requirements
of current and future IT in accordance with the transformation plan. All of the projects listed in the IT Strategic Plan were thoroughly planned to achieve six key outcomes of: (1) IT service quality; (2) highly capable IT infrastructure; (3) efficient delivery system; (4) quality in academic computing; (5) business intelligence and tools to support the strategy of the university; and (6) secure and trusted IT infrastructure and data integrity. The IT Strategic Plan was approved and endorsed by the IT Steering Committee at its first meeting on March 2012. The IT Steering Committee also endorsed the updated IT policy prepared by the IT Centre. The policy was communicated through the IT Centre’s website. The purpose was to ensure that the university community was aware of the existence of the IT policy and well informed of their responsibilities when using the IT facilities. The aim was to minimise damage, destruction and abuse of IT usage at the university.

In terms of IT governance processes, it was found that the IT Centre did not adopt specific procedures for application systems development, and there was no formal indicator to measure the performance.

We are not applying everything as guided by the Prince 2, we use it selectively to save time... we don’t have any monitoring tools... we just look at the IT Strategic Plan and KPIs. For example, what we want to achieve this year? Let’s say, we want to develop a new system... for the assessment, we look at the system that we have developed, if the system is completed, it means that we achieved our KPIs (Interviewee Y11, IT staff, 2012).

With support from the VC, the Director had successfully relocated back the IT staff from the faculties/departments to the IT centre. It was achieved in two stages. For the first stage (in 2011), the IT staff were still located in their faculties/departments. Their reporting structure was changed to both their Deans/Heads of Departments and Director of IT equally. In the second stage (in 2012), the IT staff were all relocated back to the IT Centre and they reported directly to the Director. Following the relocation of the IT staff, a zone system was introduced. Under the zone system, several faculties/departments were grouped together and served by two or three IT staff.

Previously, we had about twenty IT staff who were allocated to twenty faculties/departments. Another forty faculties/departments were left with no service and they were crying... they demanded service but we could not provide... A paperwork was prepared and presented to the IT Steering Committee to solve this problem... it could be
achieved by pulling them back to the IT Centre. By doing this, the forty faculties/departments said thank you, but the other twenty, said it was not fair... (Interviewee Y6, Director of IT, 2012).

The benefits of the zone system were also for the IT staff, who now could be recognised in terms of their services and for them to provide services that were related to their job scopes. Several faculties/departments that insisted on having their own IT staff managed to maintain the staff upon obtaining specific approval from the VC.

The university’s transformation plan had a major impact on the existing application systems. Firstly, the re-structuring of the college system resulted in new relationships between roles, in terms of how the staff and students interacted. For example, in this new structure, staff in the faculties reported directly to the new Deans, and the Deans to the Assistant VC. Hence, all of the existing IT application systems needed to be modified to reflect the changes.

Secondly, the IT Centre continued its regular scope of work for updating all of the existing application systems and developed several other application systems as set out in Table V1.

<table>
<thead>
<tr>
<th>System</th>
<th>Introduced on</th>
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</thead>
<tbody>
<tr>
<td>e-Nomination for the Assistant VC and Dean’s post</td>
<td>2011</td>
</tr>
<tr>
<td>University’s Agreement System</td>
<td>2010</td>
</tr>
<tr>
<td>Courses Content Management System</td>
<td>2010</td>
</tr>
<tr>
<td>Distance Learning Online System</td>
<td>2010</td>
</tr>
<tr>
<td>My Idea System</td>
<td>N/A</td>
</tr>
<tr>
<td>Web pages</td>
<td>N/A</td>
</tr>
<tr>
<td>Learning Zone</td>
<td>2010</td>
</tr>
</tbody>
</table>

(Source: IT Strategic Plan 2011-2015)

The Management Committee also requested the IT Centre to develop a new application system for calculating the KPIs (i.e., e-Strategic system). The new application system was designed to record and calculate the KPIs for all departments. The system allowed each department to view their achievements in relation to their KPI fulfilment and compare their results with the University’s KPIs. This system was internally developed and maintained. However, due to the lack of integration between all application systems, the following challenge was highlighted:
We took the operational data, manually from our database and presented it in summary form. Our problem now is that the data does not support the system that we want to develop (Interviewee Y9, IT staff, 2012).

Lastly, even though the university linked its various disparate application systems under the University Management Information System (i.e., the portal), the systems were still operated separately, on different databases, and this caused a lack of integration. Hence, access to the important information processed by the application systems was limited and caused a delay in the decision-making process. Therefore, the VC requested the IT Centre to develop a new Integrated Database Management System (IDMS). The VC initiated this system in July 2011 with the aim of enhancing the decision-making process from the basis of a consistent and accurate database. Among others, the IDMS could support one of the aims of the university to be categorised as a research university. In this context, the IDMS could facilitate management monitoring individual lecturers’ KPIs in terms of their research and publications output. The Director of IT decided to develop the IDMS internally for the following reason:

The thing is that you just could not get one package that is readymade and can be used instantly... the way we operate in this university is different from the other universities and there is no other university in Malaysia that has this system... So if we can develop the system, we’ll become a leader and we can commercialise it. The systems not only help our university internally, but also can generate revenue (Interviewee Y6, Director of IT, 2012).

However, the IDMS could not be delivered on time due to IT staffing issues:

None of the IT staff involved in the IDMS is working as a full time team. They are also doing their current work. We are pulling them in to deliver the IDMS and now they are doing double or triple work (Interviewee Y6, Director of IT, 2012)

In addition, the development of IDMS required new IT infrastructure such as a server and database. Limited funding allocation affected the development process adversely.
APPENDIX W: List of the devices of *interessement* used in the participating organisations

<table>
<thead>
<tr>
<th>Group ABC</th>
<th>Company B</th>
<th>University X</th>
<th>University Y</th>
</tr>
</thead>
</table>
| **Appointment of IT leader** | **Milestones B-C:** *Appointment of the CIO*  
**Milestone D-E:** *Appointment of the Group CIO*  
*Appointment of the CIOs from Groups B and C as the Division IT Heads* | **Milestones B-C:** *Appointment of new Managing Director* | **Milestones B-C:** *Appointment of the ITS Director*  
**Milestones F-G:** *Appointment of the Librarian as the LDIT*  
**Milestones H-I:** *Appointment of new LDIT* | **Milestones F-G:** *Appointment of new Director of IT* |
| **New IT organisational structure** | **Milestones B-C:** *Establishment of Group IT and its two units*  
*Adding Company XYZ under the CIO’s portfolio*  
**Milestones E-F:** *Establishment of Global Service Centre*  
**Milestones F-G:** *Clear decision-making structures, responsibilities and accountabilities through the three pillars of IT* | **Milestones B-C:** *New management structure for the ITS*  
*IT staff relocation to the ITS*  
**Milestones H-I:** *Amalga**mation of ITS and Library as one central unit*  
*Restructuring the IS and the establishment of five new units*  
**Milestones I-J:** *Successful integration of ITS and Library into Information Service*  
*Establishment of Investment Program Project team* | **Milestones F-G:** *New organisational structure for IT Centre*  
*Relocation of IT staff to the IT Centre* | **Milestones F-G:** *New organisational structure for IT Centre*  
*Relocation of IT staff to the IT Centre* |
<p>| <strong>Communication</strong> | <strong>Milestones D-E:</strong> <em>Communication on the benefit of the merger</em> | <strong>Milestones D-E:</strong> <em>Communication – direct report to the Managing Director through</em> | <strong>Milestones G-H:</strong> <em>Two-way communication – consultation with the faculties</em> |</p>
<table>
<thead>
<tr>
<th>Milestones E-F:</th>
<th>Milestones F-G:</th>
<th>Milestones H-I:</th>
<th>Milestones I-J:</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Two-way communication (i.e., briefing session)</td>
<td>*Communication – direct reporting to the Managing Director through Major Project Committee</td>
<td>Briefing session to the IS staff</td>
<td>* Two-way communication and active participation and collaboration with the faculties</td>
</tr>
<tr>
<td><strong>Milestones F-G:</strong></td>
<td><strong>Milestones G-H:</strong></td>
<td><strong>Milestones I-J:</strong></td>
<td>* Extensive consultation</td>
</tr>
<tr>
<td><em>Two way communication (i.e., brown bag sessions)</em></td>
<td><em>Series of meetings of the IT Leadership team</em></td>
<td>* Use of appropriate language (collaboration and partnership)*</td>
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</tr>
<tr>
<td><em>Informal communication with Group CIO</em></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Milestones G-H:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Two-way communication across the three pillar of IT</em></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Establishment of IT governance committee</th>
<th>Milestones D-E:</th>
<th>Milestones A-B:</th>
<th>Milestones B-C:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Establishment of the Merger Integration Committee</em></td>
<td><em>Establishment of the Integration Governance Committee</em></td>
<td><em>Establishment of IT Reference Group</em></td>
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<tr>
<td></td>
<td><em>Establishment of IT Steering Committee</em></td>
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<td></td>
<td></td>
<td><strong>Milestones C-D:</strong></td>
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<td></td>
<td></td>
<td><em>Establishment of Information Management Board</em></td>
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<td></td>
<td><strong>Milestones C-D:</strong></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td><em>Governance Committee to govern the Launchpad project</em></td>
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<td></td>
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<td><strong>Milestones J-K:</strong></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><em>Establishment of the IM Working Party and Senior Leadership Group</em></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appointment of a spokesperson</th>
<th>Milestones B-C:</th>
<th>Milestones C-D:</th>
<th>Milestones C-D:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Appointment of the Infrastructure Service Manager and SAP Project Manager</em></td>
<td><em>Appointment of two project managers</em></td>
<td><em>Appointment of the Faculties IT Manager as spokesperson in Technical Coordination Group</em></td>
</tr>
<tr>
<td></td>
<td><em>Appointment of the IT head unit for newly established Group IT</em></td>
<td>* Project managers report directly to the Managing Director in the Governance Committee*</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Milestones F-G:</strong></td>
<td><strong>Milestones D-E:</strong></td>
<td><strong>Milestones F-G:</strong></td>
</tr>
<tr>
<td></td>
<td><em>Appointment of a project</em></td>
<td></td>
<td>* LDIT reported directly to the VC and appointed as the spokesperson for ISD*</td>
</tr>
<tr>
<td></td>
<td><strong>Milestones G-H:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group ABC</td>
<td>Company B</td>
<td>University X</td>
<td>University Y</td>
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</tr>
<tr>
<td>spokesperson to represent business units</td>
<td>manager for Stage 2 *Project manager reports directly to the Managing Director in the Governance Committee <strong>Milestones F-G:</strong> *Project manager reports directly to the Major Project Committee</td>
<td>*Appointment of Associate Directors from both ITS and Library under the IS <strong>Milestones H-I:</strong> *Appointment of new LDIT as a spokesperson for IS</td>
<td></td>
</tr>
<tr>
<td>Training / IT-business engagement</td>
<td><strong>Milestones F-G:</strong> *IT training</td>
<td><strong>Milestones D-E:</strong> *Engagement with business people</td>
<td><strong>Milestones H-I:</strong> *Training for the IS staff’s up-skilling</td>
</tr>
<tr>
<td>Review</td>
<td><strong>Milestones C-D:</strong> <em>Pre-requisite assessment</em>* <strong>Milestones F-G:</strong> <em>Risk assessment procedure</em>* <strong>Milestones G-H:</strong> *Appointment of KPMG for IT project independent review</td>
<td><strong>Milestones C-D:</strong> <em>Conducting Information Management Review</em>* <strong>Milestones H-I:</strong> *Conducting the ITS Review</td>
<td></td>
</tr>
<tr>
<td>Funding</td>
<td></td>
<td><strong>Milestones I-J:</strong> <em>Funding</em>*</td>
<td><strong>Milestones D-E:</strong> <em>Funding</em>*</td>
</tr>
<tr>
<td>Consideration of the installed base of the IT infrastructure / development of new IT infrastructure</td>
<td><strong>Milestones B-C:</strong> <em>Implementation of the SAP/ERP blue print at a selected pilot site in a staged approach</em>* <strong>Milestones D-E:</strong> Implementing ERP as group wide IT infrastructure in a staged approach <strong>Milestones E-F:</strong></td>
<td><strong>Milestones B-C:</strong> <em>Developing application interface</em>* <strong>Milestones C-D:</strong> <em>Pilot trial for business process upgrade</em> <em>Staged approach in upgrading the IT infrastructure</em>* <strong>Milestones D-E:</strong></td>
<td><strong>Milestones I-J:</strong> <em>Instalment phases for the implementation of the project under the Investment Program</em> <em>Upgrading the aging and devolved IT infrastructure</em> <em>Pilot site for the network migration</em></td>
</tr>
<tr>
<td>Group ABC</td>
<td>Company B</td>
<td>University X</td>
<td>University Y</td>
</tr>
<tr>
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</tr>
</tbody>
</table>
| * Consolidation of IT infrastructure through Group Shared Service  
**Milestones G-H:**  
*Implementation of new IT infrastructure* | *Upgrading the overall network in a careful manner  
**Milestones F-G:**  
*Converting Stage 3 as a small project  
*In house migration process in staged phases  
*Delivering business requirement projects*  
**Milestones G-H:**  
*Upgrading the ERP Oracle in a staged process  
*Delivering business requirement projects* | | |