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A Framework of Practices Influencing IS/Business Alignment and IT Governance

A thesis submitted for the degree of Doctor of Philosophy

by

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ABSTRACT

The alignment of information systems (IS) strategies with business strategies has been a managerial priority in modern organisations. Information Technology (IT) governance is an alternative perspective that has recently been used as a management solution that can drive to desired levels of IS/business alignment. From a pragmatic perspective, both IS/business alignment and IT governance appear to be managerial solutions that corporations desire to implement in order to get the most of the business and IT relationship. Empirical research has addressed the idea that effective designs of IT governance enable IS/business alignment, however, the extent of such impact and related interactions are still unclear. This research is focused on those claims to contribute with pragmatic solutions towards IS/business alignment and IT governance by means of collective management practices.

This research explored challenges, assumptions and conceptualisations around IS/business alignment and focused on the assessment process of IS-business alignment to identify management practices for both IS/business alignment and IT governance. First, a quantitative analysis from data collected of an international survey was performed. This survey was conducted to identify extreme outcomes of relevant management practices in the IS/business alignment dynamics and links with IT governance. Second, a qualitative analysis from data collected of two leading large companies, one in the manufacturing and other in the financial sector, was performed by using a three-level (strategic, tactical and operational) assessment method. This case research aimed to identify how common relevant management practices interact across strategic, tactical and operational organisational levels. Results of both analyses were integrated to elaborate the constructors of the framework derived from this research, namely ALIS-G.

The results from this research can be summarised as follows: First, ALIS-G exhibits four core management practices *(IT investment management, budgetary control, strategic and tactical program management, strategic and tactical understanding of IT-business)* and four supportive *(IT-business planning, IT projects prioritisation, sponsorship & championship and change readiness)* to show collective and compelling influence over the IS-business alignment dynamics and the effectiveness of IT governance arrangements. Second, a well-established *IT investment management process* holds the most substantial positive impact in the IS-business alignment dynamics and design of IT governance arrangements. Finally, results highlights the fact, perhaps obvious, that the arrangement of IT governance and the dynamics of IS/business alignment are very much conditioned by the resilient assignment, allocation and administration of budgets

DEDICATION

Con todo mi amor para mi esposa Cristina quien decidió seguirme hace cinco años sin ninguna duda y por ser el soporte emocional de esta etapa. Nuestras risas, pláticas, diferencias, conversaciones, besos, abrazos y cada instante juntos han sido maravillosos. Gracias por ser la mejor mamá y esposa. Tú, Jorge y Andrés son la razón de mi andar.

A mis padres, Jorge y Quina, quien desde mi infancia y hasta el día de hoy siempre han apoyado mis irreverentes decisiones y alentado a poner mi corazón por delante. No hay palabras, letras y sonidos para expresarles todo mi cariño. Gracias Lilí por tu apoyo incondicional.

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No hay nostalgia peor que añorar lo que nunca jamás sucedió.

Joaquín Sabina, cantautor español y cantante.

No worse nostalgia than miss what never ever happen.

Joaquín Sabina, Spanish singer & songwriter.

DECLARATIONS

Journals	Thesis contribution
Gutierrez, A., Orozco, J. and Serrano, A. (2009). Factors affecting IT and business alignment: a comparative study in SMEs and large organizations. Journal of Enterprise Information Management, 22(2), pp. 197-211.	Explanatory phase Validation phase
Paper edited in books:	**Thesis contribution**
Gutierrez, A., Orozco, J., Serrano, A. and Serrano, A. (2007). Using tactical and operational factors to assess strategic alignment: an SME Study. In Kumar, P. (Ed.) Technology Management: Concepts and Applications. India: The Icfai University Press, pp. 113-127	Explanatory phase
Papers in referee conference proceedings	**Thesis contribution**
Gutierrez, A., Mylonadis, C., Orozco, J. and Serrano, A. (2008). Business-IS alignment: assessment process to align IT projects with business strategy. American Conference on Information Systems (AMCIS), Toronto, ON, Canada14-17 August 2008..	Explanatory phase
Gutierrez, A., Orozco, J., Papazafeiropoulou, N. and Serrano, A. (2008). Developing a taxonomy for the understanding of business and IT alignment paradigms and tools. European conference on Information Systems (ECIS). Ireland, Galway, UK, 9-11 June 2008.	Exploratory phase
Gutierrez, A., Nawazish, A., Orozco, J., Serrano, A. and Yaz, H. (2007). Comparing alignment factors in SMEs and large organisations: a planning integration perspective. American Conference on Information Systems (AMCIS). Keystone, Colorado, USA, 9-12 August 2007.	Explanatory phase & Validation phase
Gutierrez, A., Orozco, J., Serrano, A. and Serrano, A. (2006). Using tactical and operational factors to assess strategic alignment: an SME study. European and Mediterranean Conference on Information Systems (EMCIS). Alicante, Spain, 25-27 July 2006	Exploratory phase
Unpublished papers	**Thesis contribution**
Orozco, J. Hsin, C., Gutierrez, A. and Serrano A (2011) "Exploring the impact of planning integration strategies on IS/business alignment maturity factors: a search of management practices"	Validation phase & Interpretative phase
Orozco, J. and Serrano A. (2011) "A framework of management practices for improving the design of IT governance arrangements and enhancing the IT/business alignment dynamics"	Interpretative phase

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CHAPTER 1: IS/business alignment overview and research introduction

1.1 CHAPTER OVERVIEW

This chapter introduces the research conducted in this thesis by providing an overview of IS/business alignment. Next, the motivations and context that shape the research problem are addressed. Thereafter, the aim and objectives of this research are presented as well as a brief introduction of the research process and its four phases. This chapter ends by outlining the document structure.

1.2 IS/BUSINESS ALIGNMENT OVERVIEW

The whole world is experiencing a revolution in the way we are being served by technologies that store, process or distribute information. The use of Information Technologies (IT) and systems has become ubiquitous in the industrialised world (Baskerville & Myers, 2002). From an organizational perspective, more operations are becoming computer-based oriented and they show an inherent dependency on a variety of IT applications. More interesting, organisations are now continuously searching for innovative and differentiated models that improve business value and have capitalised IT as an asset that brings out new strategic advantages and higher business performance. From a theoretical perspective, Information

Systems (IS) has been developed itself as an independent and influent discipline with remarkable progress in its short period of life. This discipline has moved from a techno-centric into a technological-organizational-managerial-social focus being self-adaptive and flexible to changing organisational environments (Baskerville & Myers, 2002). From a practical perspective, IT is now considered indispensable to support business operations but also generates and consolidates new business models. This acknowledge has capitalized IT as an organisational asset that along other assets such as human, financial, physical, intellectual property and human relationships should be managed strategically in order to create business value (Weill and Ross 2004). Therefore, the strong relationship and inherent dependency between business and IT has pushed management for developing mechanisms to promote shared understanding between IT and business groups of people (Chan, Sabherwal & Thatcher, 2006; Reich & Benbasat, 2000; Luftman & Brier, 1999). However, these organisational transformations face the challenge to bring these two groups closer and align those technological changes with the dynamics of the organisation's environment (Orlikowski & Barley, 2001).

Either researchers or practitioners have consistently ranked IS/business strategic alignment, hereafter IS/business alignment, as a top management concern over the past two decades (Gallagher, 2010), in most cases, because literature has indicated several organisational benefits once tight alignment is achieved (Melville et al., 2004; Tallon & Kramer, 2003; Chan et al., 2006; Kaplan & Duchon, 1998; Melville, Kraemer & Gubaxani, 2004b). The concept of IS/business alignment itself seems to suggest a set of logical, sensible and a necessary management practices that should enhance the alignment between IT and business strategies, however how to identify and approach these practices is still unclear. To put in practice the process of integrating IT and business strategies and in synchrony with day-to-day operations requires clear management actions which, currently, seem complex and disperse. So far, different conceptualisations over time have engrossed the loci of IS/business alignment research and laid solid foundations for its understanding. However, research is still seeking to fulfil the gap between theory and practice (Mocker & Teubner, 2006) and there is a widespread disagreement about how to portray its complexity. One of the biggest challenges seems to identify what specific actions can build an organisational baseline to further the dynamics of IS/business alignment in practice.

1.3 RESEARCH MOTIVATION

Empirical studies have proven the pervasive demand of IS/business alignment in today's organisations and have indicated that aligned organisations perform better than those not (Chan et al., 1997; Irani, 2002, Kearns & Lederer, 2003). The research in IS/business alignment has kept active for over three decades and constituted foundational theory, which contrastingly has been pretty much influenced by incipient studies. For instance, the strategic alignment model (SAM) proposed by Henderson and Venkatraman (1993) has remained as one of the preferred foundational references and few latter contributions have caused the same significant impact. Industry, from its side, has pursued its own initiatives using managerial tools such as balance scorecards, control-based frameworks or corporate governance methodologies to establish managerial baselines to enhance the dynamics of IS/business alignment. However, the effect of such initiatives is still difficult to assess and their impact can only be marginally assumed. Despite this fact, aligning IT and business strategies has been seen as determinant factor to increase perceptions of IS business value (Melville et al. 2004), further organizational performance (Tallon & Kraemer, 2003; Chan et al. 2006, Kaplan & Duchon, 1988; Melville, Kraemer & Gurbaxani, 2004b) or circumscribe a strategic differentiator against competitors (Melville et al, 2004; Van Der Zee and De Jong 1999, Sabherwal, Hirschheim & Goles, 2001a; Noy & Ellis, 2003). To support these organisational benefits, different research perspectives and conceptual approaches have been addressed in the literature. The relationship between IT and business strategies has been referred to as as fit, (Chan, 1992), integration (Henderson & Venkatraman, 1993), linkage (Reich, 1993) or fusion (Smaczny, 2001). Similarly, the literature has addressed the alignment of strategies (Broadbent and Weill 1993; Henderson and Venkatraman 1993; Ciborra 1997; Smaczny 2001), plans (Reich and Benbasat 2000; Cragg et al. 2002; Kearns and Lederer 2000), or structures (Weill and Ross 2004). Although most of these terms would not necessarily mean different concepts and the diverse loci have promoted debate and disagreement, most researchers and practitioners seem to agree that the most congruent objective is to understand the process of aligning business and IT strategies.

Either as management practice or organisational need, IS/business alignment has remain constantly in the academic interest. Literature in IS/business alignment is wide but diverse. IS/business alignment has remained and will continue as a relevant area of research but literature so far has yielded few resilient, practical and effective managerial solutions to further the alignment between IT and business (Guitierrez et al, 2008b). The loci of IS/business alignment have made more difficult to provide fully pragmatic solutions since the variety of studies has created confusion about how to assume a unique approach and, more important,

how to tackle practical implementations to enhance IS/business alignment. This is, in part, because embodying all the different organisational variables that take part in the dynamics of IS/business alignment portrays the assumption of several conceptual dimensions which can vary from intellectual, strategic, operational, political, practical to cultural understandings. Although IS/business alignment research is now extensive and currently holds a more mature basis, this has been predominantly conceptual and theoretical over practical objectives. There are different approaches that show their differences against others by establishing theoretical comparisons. Some studies, for instance, recognises the holistic and complex organisational variables that take part in the dynamics of IS/business alignment but often addressing conceptual dimensions and paradigms to make to comparison evident (Chan & Reich, 2007; Guitierrez et al., 2008b). In essence, the practical implementations of aligning IT and business strategies are still difficult to assume and put into practice (Chan & Reich, 2007, Avison et al, 2004.).

The literature has also failed to clearly indicate different stages that might take part in the IS/business alignment process. In most cases there is no differentiation between achieving, assessing or maintaining stages (Luftman, 2001, Avison et al. 2004) and no indication of a possible round-trip step-process to clarify the process of IS/business alignment. Conversely, each state is important to provide different insights and contributes independently among the IS/business alignment process. For instance, the assessing stage should advocate an adequate mean of measurement whilst this is considered one of the steps towards realising the level that an organisation sustains (Zee, 2001). Gutierrez et al. (2008b) indicates that most IS/business alignment assessment have been focused on evaluating perceptions at strategic level positions and measures are calculated by contrasting these between IT and business groups of people. Assessment studies commonly evaluate the process that integrates from strategic plans to IS and business strategies. Thus, the conciliation between bottom-up and top-down organisational levels is assumed and the relations between strategic and lower levels (tactical and operational) are expected to be consistent and uniform to ground decisions towards IT investments. This approach fails to examine the interaction across organisational levels and the dynamics of IS/business alignment across them (Newkirk, Lederer & Johnson, 2008; Tarafdar & Qrunflesh, 2009). Recent studies have indicated the need to consider tactical and operational levels in addition to strategic ones when assessing IS/business alignment. Following these claims, the consideration of having tactical and operational IS/business alignment will address the lack of guidance among managerial actions to enhance the overall dynamics of IS/business alignment across levels (Tarafdar & Qrunfleh, 2009; Jenkin & Chan, 2006). Management, thus, is the relevant driver that can ensure the thorough interaction between formal and informal

organisational structures at strategic and lower organisational levels (Tarafdar & Qeunfleh, 2009). The dynamics of IS/business alignment depends pretty much on the judgement of managers and their use of informal and formal actions. Nonetheless, the identification of those specific managerial actions is still one of the main challenge to overcome when aligning IT and business strategies. The literature show few, at least not many, managerial guidelines that shape the management practice to support management when making-decisions towards the dynamics of IS/business alignment. Following these arguments, this research finds an opportunity to investigate what specific management practices or actions can significantly leverage the dynamics of IS/business alignment.

1.4 RESEARCH IN CONTEXT

1.4.1 The IS/business alignment role

IS/business alignment research has advocated to understand the complexity of organisational relationships in order to integrate IT and business strategies (Weill & Broadbend, 1988; Henderson & Venkatraman, 1999; Ciborra, 1997; Smaczny, 2001). However, as previously discussed, disagreement exists to support a common approach to undertake alignment research. This disagreement can be confirmed by the wide variety of studies and their alternatives to research alignment even though they pursue similar objectives. There is significant interest to answer underlying questions such as *what management practices can enhance IS/business alignment* and *how organisations can ensure improved levels of IS/business alignment.* Literature has strengthened initiatives to better answer these questions and underpin IS business alignment but has faced the main challenge of integrating both pragmatic demands and theoretical proposals to further consumable research (Mocker & Teubner, 2006). In the view that researchers have called for additional theory and process-level research on IS/business alignment, there is also a demand for management practices that form part of this process (Tallon, 2008). At the end, the practice of aligning IT and business strategies rely on management which needs to procure mechanisms to support the complex IS/business alignment process. Management then not only needs to aggregate and understand a large number of organisational factors (Teo & Ang, 1999) but also to figure out which managerial tools would further this process.

Following the current trend of IS/business alignment research and having discussed that there is no a unique approach to research IS/business alignment, this research advocates for a more pragmatic perspective by focusing on the investigation of those management practices that can leverage the dynamics of IS/business alignment process. To identify those management

practices this research assumes that both organisations and business environment change continuously and sometimes unexpectedly. Under this umbrella, organisation changes are considered the result of differentiation, innovation and self-adjusted business models to keep or improve organisational performance (Allen & Varga, 2006). In agreement with this position, the definition of IS/business alignment provided by Benbya & McKelvey (2006) elaborates in these arguments. They propose an emergent nature that underpins IS/business alignment as:

> *"A continuous co-evolutionary process that reconciles top-down 'rational design' and bottom-up 'emergent process' of consciously and coherently interrelating all components of the IS/business alignment at three levels of analysis [strategic, operational and individual]" (Benbya & McKelvey, 2006).*

This definition assumes that IS/business alignment, as a management practice, has moved from static to a more process-oriented perspective (Benbya & Mckelvey, 2006; Pepppard & Breu, 2006). According to Benbya and McKelvey (2006) IS/business alignment is a process based on a series of adjustments at individual, operational and strategic organisational levels. The dynamics of the three levels enables organizational effectiveness as the function to achieve alignment. They justify causal dynamics rather than cause-effect logic as consequence of managerial actions to impact organizational levels and performance. Thus, specific managerial actions need to enable the dynamics of IS/business alignment. This perspective innovates on the integration of different theoretical dimensions to consolidate IS/business alignment theory. At strategic level, strategic IS co-evolves with business strategies whereas at operational level the IS department coevolves with the business. In this context, operational performance depends pretty much on structures and managerial capabilities to establish making- decision processes (Sabherwal, Hirschheim & Goles, 2001b) and how these should be arranged in order to realise IS/business value (Weill & Ross, 2004). At individual level, IS infrastructure coevolves with end user needs, which involves the social, structural and informal structural understanding of IS/business alignment.

1.4.2 The IT Governance role

IS/business alignment has been often connected with several research streams. For instance, IS business value and IT Governance have been related to and, inclusive, supported by IS/business alignment literature (De Haes & Van Grembergen, 2009; De Haes & Van Grembergen, 2010; Luftman, Ben-Zvi & Dwivedi, 2010). Particularly, IS/business alignment has been recently researched in terms IT Governance or vice versa. IT Governance, inclusive, has been categorised as the single most important determinant of IS business value realisation (Peterson, 2004). IT

Governance research is still emerging with arguably a decade of age. The need to have better arrangements of IT Governance has promoted the development of frameworks such as COBIT and ITIL, which actually dominate the industry practice and have been recently turn into potential tools to enhance IS/business alignment. Management has foreseen on these tools a systematic way to promote and guide IT Governance implementations.

The existence of IT Governance can be argued as being part of the corporate governance research however the current IT-driving era has been supported its own personality. IT Governance, as area of research and management practice, has evolved over the past years from an IT-oriented into a more business-oriented practice. The need to implement IT Governance has gained relevance either to promote efficient organizational IT performance (Weill & Ross, 2004) or accomplish legal regulations (ISO/IEC 38500, 2008). There are different definitions of IT Governance however the predominant explicit or implicit understanding lays on the conceptualisation of having a governance system to manage two main organisational elements: the processes of making-decisions and the shared understanding between IT and business managerial levels. Thus, definitions have stressed *how* management needs to make decisions rather than *what* decisions to be made. The common aim in most definitions draws the relevance of having IT Governance to impact over business organisational performance by means of a set of managerial practices (Brown & Grant, 2005). Relevant research has agreed that IT Governance is a control-based system that includes internal and external management practices that enable and influence IS/business alignment (Peterson, 2004). Peterson (2004) and Weill & Ross (2004) group management practices into three sets of key mechanisms [*process, relations, structures*] to assess organisations when making-decision processes and enabling organizational rules and procedures. They also suggest that once these mechanisms are accomplished, the resulting IT Governance architecture can enable the IS/business alignment process and enhance organizational IT/business value. IT Governance then can be seen as a set of management practices to promote organisational behaviours by establishing accountability and formal IT decision-making processes (Peterson, 2004; Weill 2004). The results after an effective and efficient implementation should point to establish governance controls and empowering stakeholder relationships that would keep and extend the IS/business alignment process and advance perceptions of IS business value (Peterson, 2004). Peterson (2004)'s definition of IT Governance explicitly integrates the above arguments by stating that IT Governance is:

"The system by which an organization's IT portfolio is directed and controlled. It (a) describes the distribution of IT decision-making rights and responsibilities among different stakeholders in the

organization, and (b) the rules and procedures for making and monitoring decisions on strategic IT concerns" (Peterson, 2004 p. 8).

This definition has been selected to conduct this research and is further discussed as part of this research in Chapter 3: Literature review.

1.5 THIS RESEARCH IN BRIEF

IS/business alignment research is now extensive and mature. The literature review indicates that research of IS/business alignment remains around three main focuses 1) evaluation of IS/business alignment organisational impacts, 2) theoretical conceptualisations and 3) robustness of practices to assess, achieve and maintain IS/business alignment. Having discussed that IS/business alignment research addresses the main challenge of bringing closer theory and practice, this research seeks to contribute with the latter focus and tends to come up with insights for better implementations of IS/business alignment. This research recognizes that underlying questions, such as what managerial actions influence significantly the alignment between IT and business strategies and how organisations can start taking advantage of them, needs additional investigation. Chan & Reich (2007) have indicated the need to focus on the essential and suggest exploring the interrelationships of IS/business alignment antecedents. The author of this thesis coincides with this notion but assumes that there is an influential relationship between IS/business alignment and IT Governance based on management practices that need to be investigated. Thus, additional research can clarify how this relationship is by evaluating common management practices between IT Governance and IS/business alignment implementations. The identification and examination of these common management practices would help practitioners to focus efforts on managerial actions to increase levels of IS/business alignment and impact positively the design of IT Governance arrangements. Therefore, this research tends to contribute with practical insights to improve implementations among IT Governance designs and the IS/business alignment process. The author recognises the need of provide pragmatic elements but also admit the conceptual complexity around IS/business alignment research which challenges formal and tangible pragmatic solutions for its implementation.

1.6 RESEARCH AIM & OBJECTIVES

This research intends to shed some light on how to resolve the challenge of integrating pragmatic demands and theory so as to further consumable research in the field of IS/business alignment and IT Governance. To this end, having discussed the relevance of IS/business alignment in today's organisations, the extensive need that practitioners and researchers claim for practical implementations, and the influential relationship between IS/business alignment and IT Governance, the research presented in this thesis proposes the following aim:

"Propose a novel framework based on relevant management practices to clarify how these practices influence and impact the implementations of both the IS/business alignment process and the design of IT Governance arrangements"

In order to perform this research, particular objectives have been defined. These objectives are below listed:

Objective 1	Compile relevant literature of IS/business alignment which focuses on its practical implications and indicate relationships between IS/business alignment and IT Governance
Objective 2	Develop a conceptual understanding of IS/business alignment research and position this research in terms of this assumption
Objective 3	Confirm the relevant relationship between IS/business alignment and IT Governance by assessing a set of relevant management practices in the IS/business alignment process
Objective 4	Identify what management practices influence significantly the IS/business alignment process across strategic, tactical and operational organisational levels
Objective 5	Identify how relevant management practices of IS/business alignment are being associated and related in real-life organisational environments and elaborate the design of the proposed ALIS-G framework
Objective 6	Discuss the aggregate results in terms of the contribution in the body of knowledge of IS/business alignment and IT Governance areas

1.7 RESEARCH PROCESS IN BRIEF

The research process serves as a guideline where the research aim and objectives can be related to the phases and activities of this research. Four phases were designed in order to conduct this research. They are below described with their associated objective(s).

Exploratory phase outlines IS/business alignment research and identify some of its different challenges, assumptions and conceptualisations.

- *Compile relevant literature of IS/business alignment which focuses on its practical implications*
- *Indicate relationships between IS/business alignment and IT Governance*
- *Develop a conceptual understanding of IS/business alignment research and position this research in terms of this assumption*

Confirmatory phase describes quantitative analysis data collected from an international survey based on management practices of IS/business alignment

- *Confirm the relevant relationship between IS/business alignment and IT Governance by assessing a set of relevant management practices in the IS/business alignment process*

Explanatory phase describes qualitative analysis of data collected from two large companies using a three-level assessment method for IS/business alignment

- *Identify what management practices influence significantly the IS/business alignment process across strategic, tactical and operational organisational levels*

Interpretation phase integrates results from the validity and explanatory phase to conduct an integrated interpretation of results and proposes the final version of the ALIS-G framework. In addition, the conclusions from the research are addressed.

- *Identify how relevant management practices of IS/business alignment are being associated and related in real-life organisational environments*
- *Elaborate on the design of the proposed ALIS-G framework*
- *Discuss the aggregate results in terms of the contribution in the body of knowledge of IS/business alignment and IT Governance areas*

1.8 OUTLINE OF THE THESIS

This document is structure as follows:

CHAPTER 1: IS/business alignment overview and research introduction

The main motivations that drove this research as well as the context that supports these motivations are discussed. The author explores incipient insights related to the context of IS/business alignment and argues its practical importance amongst current organisations. Some of challenges around IS/business alignment are addressed, particularly, the need for practical knowledge in its implementation. An overview of IT Governance and its relationship with IS/business alignment is also indicated. Moreover, this chapter outlines the fact that looking at and identifying those more relevant management practices in IS/business alignment can bring clarity to improve the design of IT Governance arrangements and the IS/business alignment process. After providing contextual arguments that delineate this research, the aim and objectives of this research are presented. Thereafter, an overview of the four phases involved in this research is mapped against the structure of this document in a diagram.

CHAPTER 2: Research process and design

The research process and the structure of this document are presented. The research process is outlined in four phases (exploratory phase, confirmatory phase, explanatory phase and interpretation phase) and illustrated in a flow chart diagram that integrates objectives, activities and outcomes for each phase. This chapter discuss the use of a multi-method design and provides theoretical support to justify its use. The selected multi-method design includes both quantitative and qualitative methods to collect data, quantitatively in the form of a survey and qualitatively in the form of a case research. Finally, philosophical and theoretical arguments are discussed in support of the research process and assumptions from the author.

CHAPTER 3: Literature review

Relevant literature of IS/business alignment research is reviewed, discussed and criticised. This literature review identifies different challenges, assumptions and conceptualisations amongst IS/business alignment research. An historical examination of philosophical assumptions and different conceptual understandings of IS/business alignment is discussed to identify challenges and research opportunities. From there, the relationship between IS/business alignment and IT Governance is addressed.

CHAPTER 4: Evaluating the relationship between IT Governance and IT/business alignment

An international survey is conducted to confirm the relationship between IS/business alignment and IT Governance. This survey includes an assessment of confirmed relevant management practices and four integration planning strategies to identify significant factors in the IS/business alignment process. The design of this questionnaire considers that a well-established IS planning process and effective management practices underpins the dynamics of IS/business alignment.

CHAPTER 5: Organisational assessment of management practices in the IS/business alignment process

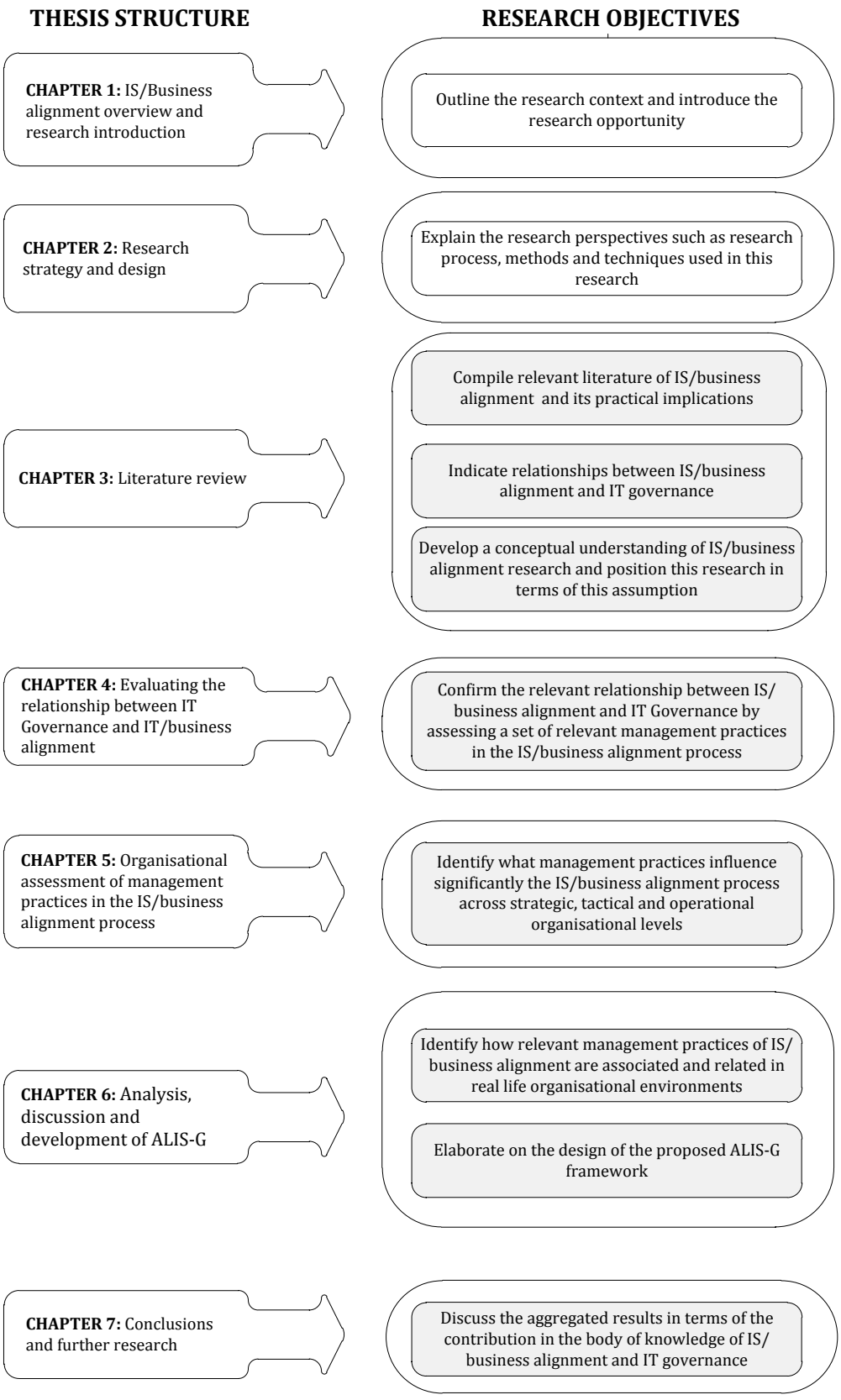
A case research is conducted in two independent large companies to explore empirically what management practices influence significantly both the IS/business alignment process and the design of IT governance. A three-level IS/business alignment assessment was design to collect data from strategic, tactical and operational managerial positions in different business projects with strong IT dependency. Results aimed to identify those management practices that show higher impact on the IS/business alignment process as well as higher variability amongst the three organisational levels assessed.

CHAPTER 6: Analysis, discussion and development of ALIS-G

An integrated analysis is conducted to identify how the resulting relevant management practices from the explanatory phase impact over the IS/business alignment. To elaborate on the results, a coding analysis was designed and later implemented in Nvivo to review and code the content of interviews from the case research presented in the explanatory phase. To design the method of coding two management tools were mapped: SAMs framework by Luftman & Rajkumar (2007) and the ITGAP model by Peterson (2004). The mapping integrates Luftman & Rajkumar (2007)'s set of management practices into the Peterson (2004)'s capability's criteria. The aggregated results from the analysis elaborate on the design of the ALIS-G framework, which is presented and discussed at the end of this chapter.

CHAPTER 7: Conclusions & further research

Conclusions and findings of this research are presented. To help the reader, main conclusions are presented in bullet points and later discussed. Intentions of further research are listed.


THESIS STRUCTURE
RESEARCH OBJECTIVES
CHAPTER 1: IS/Business alignment overview and research introduction
Outline the research context and introduce the research opportunity
CHAPTER 2: Research strategy and design
Explain the research perspectives such as research process, methods and techniques used in this research
CHAPTER 3: Literature review
Compile relevant literature of IS/business alignment and its practical implications
Indicate relationships between IS/business alignment and IT governance
Develop a conceptual understanding of IS/business alignment research and position this research in terms of this assumption
CHAPTER 4: Evaluating the relationship between IT Governance and IT/business alignment
Confirm the relevant relationship between IS/ business alignment and IT Governance by assessing a set of relevant management practices in the IS/business alignment process
CHAPTER 5: Organisational assessment of management practices in the IS/business alignment process
Identify what management practices influence significantly the IS/business alignment process across strategic, tactical and operational organisational levels
CHAPTER 6: Analysis, discussion and development of ALIS-G
Identify how relevant management practices of IS/ business alignment are associated and related in real life organisational environments
Elaborate on the design of the proposed ALIS-G framework
CHAPTER 7: Conclusions and further research
Discuss the aggregated results in terms of the contribution in the body of knowledge of IS/ business alignment and IT governance

CHAPTER 2: Research process and design

2.1 CHAPTER OUTLINE

This chapter is structured as follows. Firstly, an overview of research processes is described and later graphically illustrated. The research process is presented as a flow of activities with outputs and outcomes to guide the reader among the research conducted. In the graphical representation of this process, the four defined phases, exploratory, confirmatory, explanatory and interpretative, are discussed and explained in terms of their aim, objectives and related activities. Secondly, theoretical support for the selected research approach is presented. Finally, philosophical assumptions for the multi-method approach are addressed in support of this research.

2.2 RESEARCH PROCESS

The research process serves as a guideline to indicate how the research aim and objectives are related to each research phase and activities. The diagram shown in Figure 2.1 illustrates the overall methodological[1] reference in this study. Although, a flow diagram is used to describe the research process in this study, the execution not necessarily implies a linear nature; it is more realistic to clarify that this research involved several iterations, which helped to refine and improve the outcomes of this research. These iterations are not indicated and illustrated since a linear sequence can better and fluently exemplify a set of phases and their activities. The main objective Figure 2.1 is to make clear outputs and inputs along the research process, thus arrows and boxes are meant to do so.

Rounded boxes represent four phases: ***exploratory***, ***confirmatory***, ***explanatory*** and ***interpretation***. In each phase, square boxes represent activities and boxes with a missing corner represent activity outcomes. For instance, the ***exploratory phase*** generates two main outputs, *d) the conceptual analysis* to identify important arguments in the rationale of IS-business alignment and *c) selected models and tools* that provide theoretical support for the development of the survey in the *confirmatory phase* and guidelines for the case research in the *explanatory phase*. In the ***confirmatory phase***, there are three main inputs, also outputs of the exploratory phase, that feed activities for the construction of the survey: *a) research objectives*, *b) research context* and *c) selected models and variables*. In addition, three outputs are generated in this phase, *e) survey instrument*, *f) survey data* and *g) descriptive and inferential statistics*. The most important outcome in this phase is *g) descriptive and inferential statistics*, which will be later integrating the aggregated analysis (activity 12). In the ***explanatory phase***, inputs from preceding phases provide design elements for the case research protocol. Moreover, five outputs are generated *h) case study guidelines, j) assessment of issues and problems in pilot case study, i) initial findings of relationships and patterns of variables, k) documentation of case studies, k) refined findings of relationships and patterns of variables*. The main outcome in this phase is the relationships and associations of management practices, which in the ***interpretation phase*** are integrated with the results from the *confirmatory phase*.

[1] The term methodology refers to the actual research methods in this specific research. This differentiation is indicated to clarify which connotation is used in the section as the term methodology might suggest different meanings (Mingers, 2001).

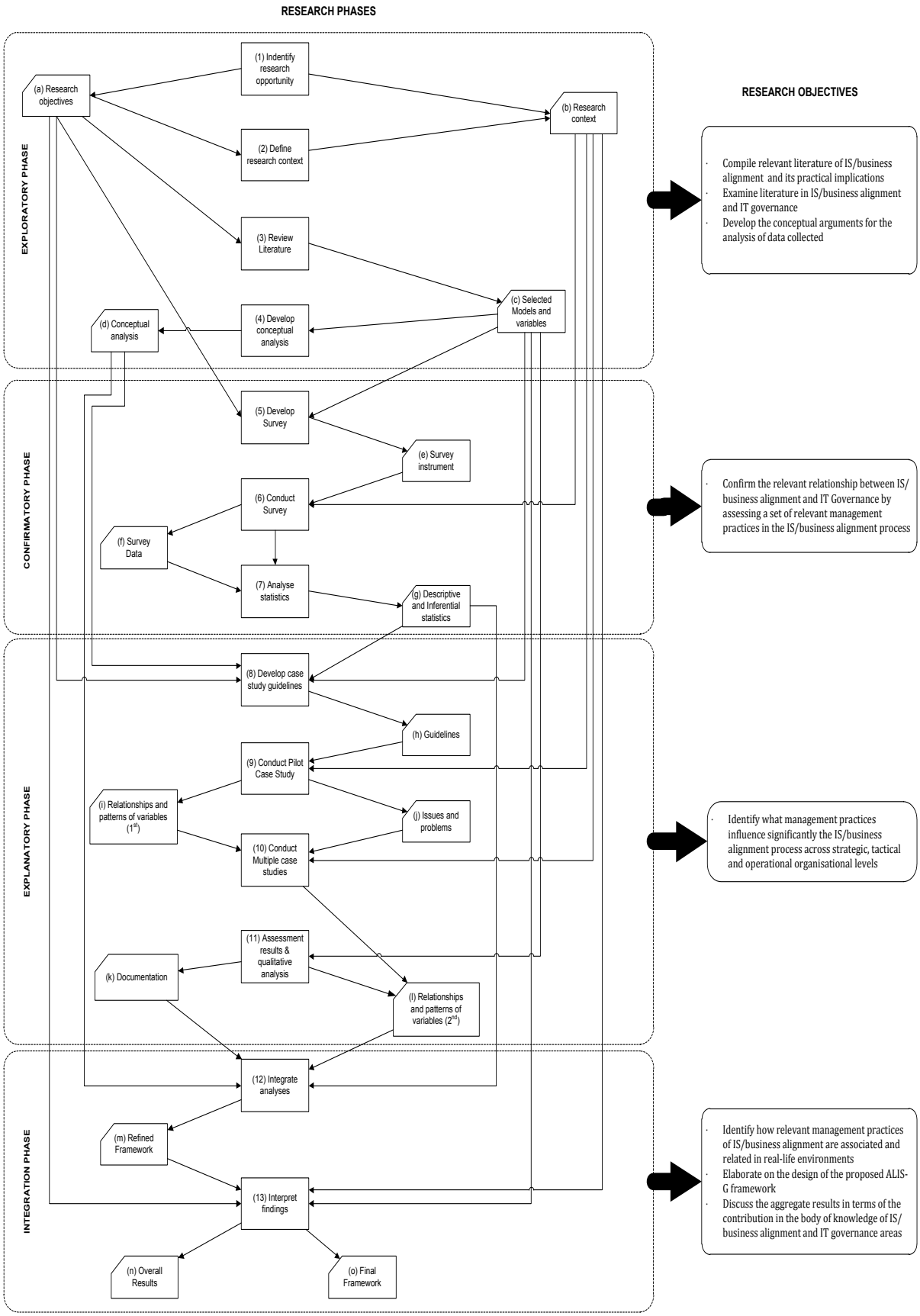


Figure 2.1 Research process flow

2.2.1 Exploratory phase (*conceptual constructors*)

Three main objectives demarcate this phase:

- Compile relevant literature of IS/business alignment and its practical implications
- Examine literature in IS/business alignment and IT governance
- Develop the conceptual arguments for the analysis of data collected

The main activity in this phase was the compilation of literature in order to identify and examine theoretical constructors for the conceptual framework. The rationale of selecting these constructors was based on available tools of IS/business alignment. A selection process was conducted to identify representative articles concerning IS/business alignment, particularly those studies that focused on assessing IS/business alignment. E-resources were used as the primary means to carry out such selection. Different databases were used in doing so, for instance the web of science", part of "ISI web of knowledge service for UK education", and its associated database "science citation index expanded" provided some searching resources. This database indexes 5900 major journals across 150 scientific disciplines (ISIknowledge, 2006) and permits a review of wider selection of databases.

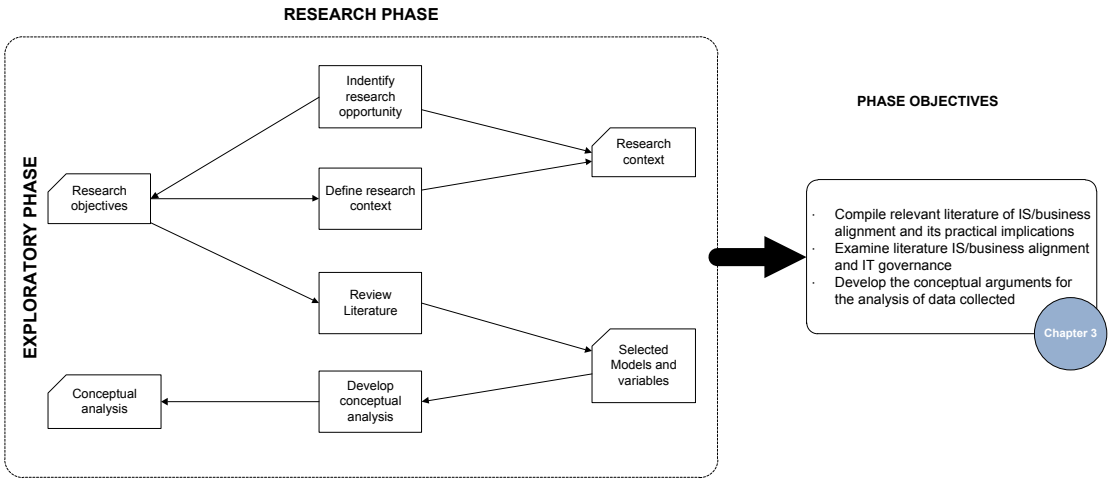


Figure 2.2 Exploratory phase flow

The selection of useful articles during this process permitted drill down to other relevant articles. Although this activity was performed mainly at this phase, additional searches along the whole research process allowed update the compilation of relevant articles. One of the main activities of this phase was the selection of theoretical models that support the design of the survey and protocols for the case research. The selected models tended to provide conceptual insights into proposed framework as well as guided the collection of data in proceeding phases.

The main objective of this phase was to develop a conceptual analysis based on previous research. In addition, this phase helped to feed with insights to activities of preceding phases, particularly the explanatory phase. See Figure 2.2 for further details about the activities and links involved in the exploratory phase.

2.2.2 Confirmatory phase (*survey*)

A general objective depicts this phase:

- *Confirm the relevance relationship between IS/business alignment and IT Governance by assessing a set of relevant management practices in the IS/business alignment process*

The research method used in this phase is an online survey. This method assess the relevance of perceptions of IS and business professionals in relation to those management practices that enhance the process of IS/business alignment. The collection of data is focused on compiling perceptions of a large number of professionals by means of an online questionnaire. The construction of this survey was based on a selected framework, outcome of the explanatory phase; that focuses on the assessment of IS/business alignment by means of the ranking of management practices. This online implementation helped to increase the number of individuals but also reach different organisations worldwide. The implementation was carried out in isolation from the case study. During the implementation it was expected that the language and meanings were interpreted in the same way by all respondents. The analysis of results was achieved by means of descriptive and inferential statistics and responses were assumed to reflect an objective reality as part of his/her organisational experience. Data collected was analysed looking at the extreme outcomes and used to generalise the results (most relevant perceived management practices) towards the IS/business alignment process. Since literature shows a relationship between IS/business alignment and IT governance, this phase aimed to confirm such claim and identify how such relationship is being conformed. Thus, this phase serves methodologically with confirmatory purposes but also supported exploratory objectives. To achieve exploratory objectives, inferential and descriptive statistics were used to support final results. To achieve the confirmatory objectives, results with extreme outcomes were identified and compared with relevant elements of the literature review. Whilst this method can be classified as cross-sectional, the analysis presumed possible weakness regarding the cause and effect results. However, the multi case study, in the explanatory phase, would complement the analysis and results from this phase. The outcomes of this phase are the results provided by the descriptive and inferential statistics that feed the aggregated analysis (activity-

12) which also helped to triangulate results with the explanatory phase. See Figure 2.3 for further graphical explanation.

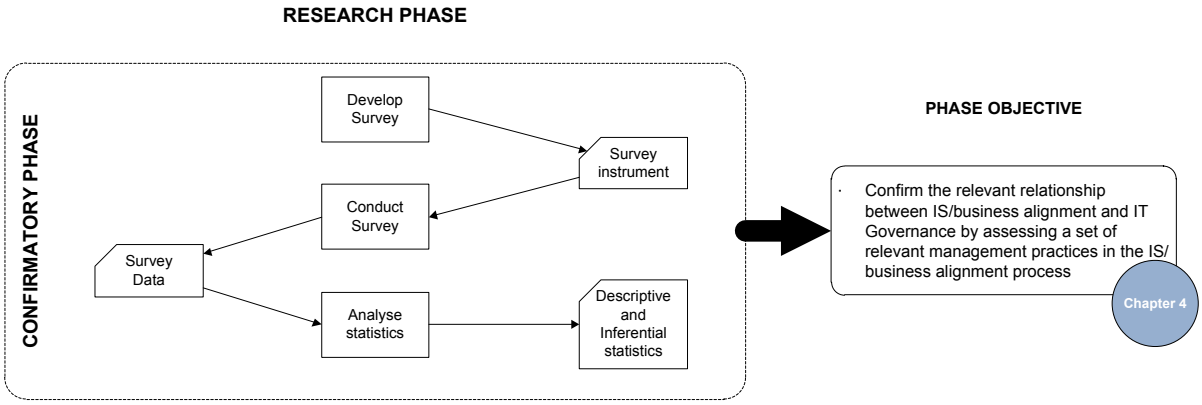


Figure 2.3 Confirmatory phase flow

2.2.3 Explanatory phase (*case research*)

A general objective depicts this phase:

- Identify how relevant management practices of IS/business alignment interact in the three level dynamics of IS/business alignment

The case research proposed, in this phase, aimed to establish an insider's perspective of the organisations in comparison to outsider's perspective established by the online survey of the confirmatory phase (Gable, 1994). IS has commonly adopted case-oriented research with qualitative methods to more likely produce contextual features for the outcomes of rigorous IS research with practical value (Benbasat & Zmud, 1999). This research followed this idea and considered the research benefits it addresses. For instance, doing a case research has proven research benefits by 1) providing the natural settings, 2) allowing to understand the complexity of the process by helping to answer *how* questions, as this phase aims, and 3) gaining new topics that might emerge from the research itself (Benbasat, Goldstain & Mead, 2002). Thus, it was assumed a case research should "examine a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one of a few entities (organisations, IT projects and individuals in this research). The boundaries of the phenomenon are not clearly evident at the outset of the research and no control or manipulation is used" (Benbasat, Goldstain & Mead, 2002 p.81).

A multiple case research scenario was designed to identify the relationships of management practices and analysing their various interactions with particular organisational contexts. A

special emphasis was concentrated on the participation of individuals across strategic, tactical and organisational levels. An interpretative analysis was carried out in this phase where evaluating other people's interpretations and perceptions were the main role in the data collection. In agreement with Walsham (1995)'s suggestions for interpretive case studies, theoretical constructors generated in other phases, in this case the exploratory and confirmatory phases, were used to develop guidelines and protocols for the collection and interpretation of data in this phase. The multiple case study design consisted of an exploratory single pilot case study followed by an explanatory cross-case analysis of two leading and large independent organisations, one in the UK and other in Mexico. The multiple case studies helped to make comparisons as well as triangulate information relevant for the analysis. More than one source of information supported this case research as suggested by Benbasat, Goldstain & Mead (2002). Different data was collected in this phase in the form of 1) questionnaires – to collect general data about the organisational profile, 2) interviews – face to face semi-structured interviews with individuals at different organisational levels, 3) observation – each interview conveyed actions and organisational environment. Although this phase involves mainly qualitative data, perceptions scales were analysed quantitatively using descriptive statistics. As illustrated in Figure 2.4, this phase was input by preceding outcomes generated in both exploratory and confirmatory phases. The output of this phase is the interpretation of the IS/business organisational assessment and the qualitative data content analysis, common outcomes of interpretive case study research (Walsham, 1995).

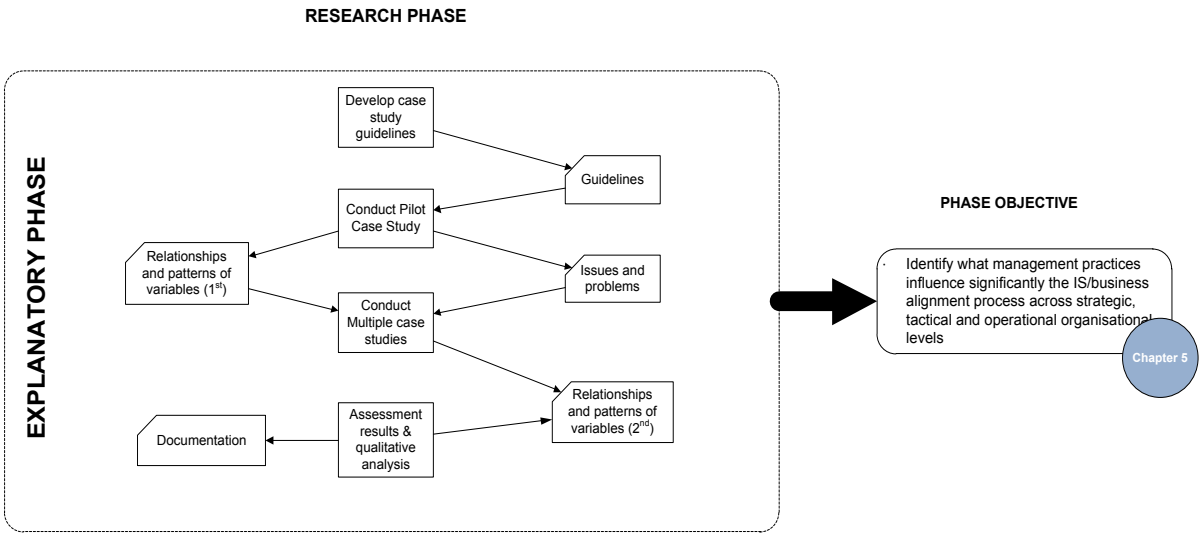


Figure 2.4 Explanatory phase flow

2.2.4 Interpretation phase (*combined data interpretation*)

Three general objectives depict this phase:

- Identify how relevant management practices of IS/business alignment are associated and related in real-life organisational environments
- Elaborate on the design of the proposed ALIS-G framework
- Discuss the aggregate results in terms of the contribution in the body of knowledge of IS/business alignment and IT governance areas

The integration of quantitative or qualitative data collection took place is in this phase where the main objective was the interpretation of consolidated data. The aggregated analysis conducted an interpretation based on the analyses of both confirmatory and explanatory phases. The results of these phases converged after an independent analysis in each phase in order to consolidate the final analysis and discussion. Since this research proposes a framework that provides a set of management practices that can reference practical implementations, the generalisation from this phase draw specific implications in particular domains of action; in these case, the context of two large organisations and perceptions from a group of business and IS professionals. After the interpretation of findings, the final version of the A-IS-G framework, which is the main outcome of this phase, is presented.

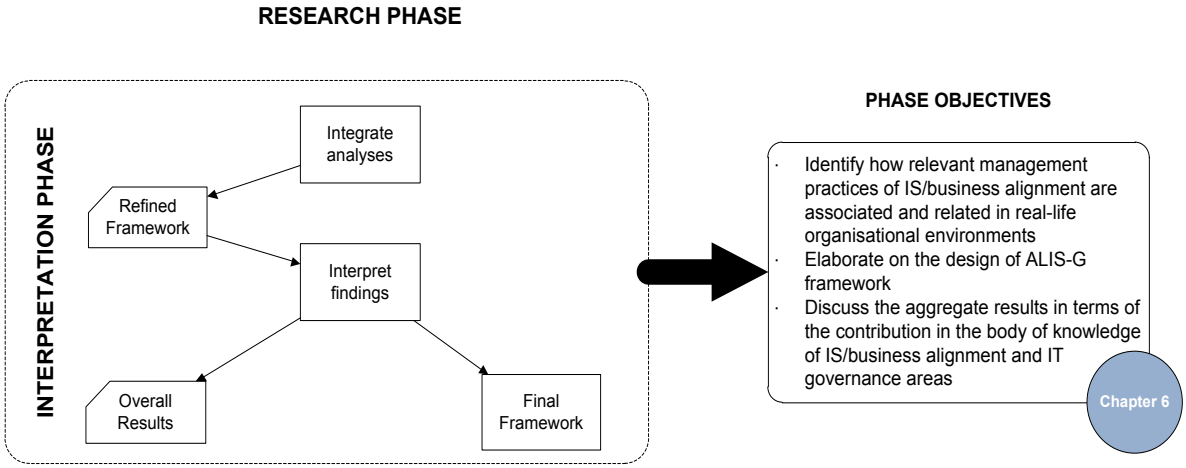


Figure 2.5 Interpretation phase flow

2.3 THEORETICAL SUPPORT FOR THE RESEARCH PROCESS

To this end, the aim and objectives of this research has been addressed. As previously discussed, this research seeks to investigate management practices of IS/business alignment that also contribute positively with the design of IT governance arrangements. In addition, two main objectives were defined to start such investigation. Firstly, identify *what* management practices impact significantly the process of IS/business alignment; and secondly, understand *how* such relevant management practices interact in the IS/business alignment dynamics and towards effective designs of IT governance arrangements. To follow this endeavour, the research process included four phases, explanatory, confirmatory, explanatory and interpretation, to address the aim and objectives of this research. The *explanatory phase* starts compiling relevant literature on IS/business alignment and IT governance. Thereafter, the *confirmatory phase* aims to validate the relationship between IS/business alignment and IT governance by assessing relevant management practices in the IS/business alignment process. The *explanatory phase* then helps to make clear the results from the confirmatory phase and focuses on what management practices significantly impact the process of IS/business alignment along strategic, tactical and operative organisational levels. Finally, the *interpretation phase* seeks to integrate and analyse the results from previous phases to elaborate on the final findings and present the proposed framework. The aforementioned research structure was designed base on supportive theoretical arguments which are discussed in the following sections.

To the extent that it is feasible to use mixed methods in IS research and following the contextual characteristics of this research, multiple modes of data and multiple methods seem to fit the aim and objectives of the aforementioned phases. By adopting a pluralist position and considering that there is no single valid way to delineate the weakness and strengths of different research approaches, a qualitative and quantitative research methods are been considered to underpin this research. Thus, results and findings were integrated by means of these two research methods. Particularly, a survey and multiple case studies are appropriate methods to collect data according the objectives of each phase. This combination of methods has shown research advantages, for instance, Kramer (1991) states that survey and fieldwork are both alternative rather than substitutive methods. Specifically, the combination of survey and multiple case studies has been undertaken by Gable (1994) who presents an analysis of the benefits integrating them. Even though no widely accepted, IS research community recognise the advantages of mixing methods to collect or analyse data and indicated that such approach adequately addresses the impact of the IS discipline (Gutek, 1991; Kling, 1991).

Bryman (2006) justifies the selection of mixed research methods based on five criteria, *triangulation, complementary, development, initiation* and *expansion*; this research takes advantage of three of these main justifications; *triangulation, development* and *complementarity*. The selection of survey and multiple case studies seek to *complement* strengths and weaknesses between each other; see Table 2.1 to examine the advantages and disadvantages when combining case studies and surveys. In this research data are qualitatively collected in the form of a case study and quantitatively in the form of a survey. Then, data analysis is based on two analytical techniques: 1) inferential and descriptive statistics for the analysis in the survey whilst 2) content and pattern analyses techniques for a crossed-case analysis in the case research. The results of the survey are mean to *develop* additional insights and *inform* results to the case research in order to integrate the results of both methods. Moreover, final findings and results were sought to *triangulate* results from each independent research method. The research design and the integration of both research methods are further detailed in the following sections.

Table 2.1 Strenghts between Survey and Case Study (based on Gable, 1994)

Strengths	Survey	Case Study
Controllability	Medium	Low
Deductibility	Medium	Low
Repeatability	Medium	Low
Generalizability	High	Low
Discoverability	Medium	High
Representability	Medium	High

2.3.1 Typology of selected research methods

In agreement to Creswell et al., (2003), this research follows their definition of a mixed method study.

> *A mixed method study involves the collection or analysis of both quantitative and/or qualitative data in a single study in which the data are collected concurrently or sequentially, given a priority, and involve the integration of the data at one or more stages in the process of research (Creswell et al., 2003 p. 213).*

Four factors were used to determine the type of mixed methods design for this study; the ***implementation of data collection***, the ***priority*** given, the stage at which ***integration*** of quantitative and qualitative research occurs and the potential of ***theoretical perspective***. The type of mixed methods designed in this research might be called *triangulation method design*

which indicates the triangulation of data collection, separate data analysis and the integration of both analyses at the interpretation phase. In order to address the way in which both qualitative and quantitative methods are used in this thesis, the illustration in Figure 2.6 tends to represent the contribution of each method. Since two stages of data collection exist, two phases were defined to

To discuss in detail the design of this research, the following data collection and data analysis sections expand the arguments.

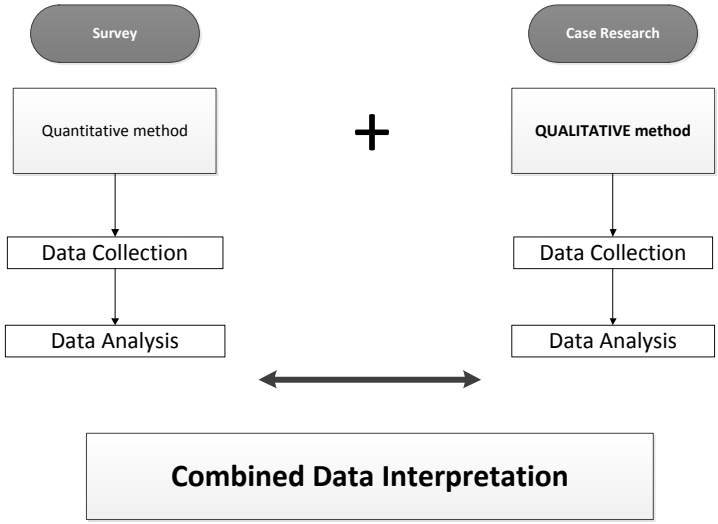


Figure 2.6 Overall study design

2.3.2 Data collection

The ***implementation of data collection*** refers to the sequence that was used to collect both qualitative and quantitative data. Data was collected over two different periods of time, then two phases. In the first phase, quantitative data was gathered and in a second phase qualitative data was collected. This sequential order, firstly, evaluate perceptions about the relevance of management practices in a large sample of people. Then, explore in a more depth scenario the interaction of these management practices in two large organisations. By using this sequential implementation, this thesis includes data analysis of each independent phase. The integration of results is later aggregated in an analysis phase.

2.3.3 Data analysis

Priority is given essentially to qualitative research however both qualitative and quantitative are equally important in terms of the research contribution. The reason of assigning such

priority severs the purpose of a deductive preference. The study starts with a quantitative orientation with focus on the relevance of management practices and proceeds with qualitative research to investigate how such management practices interact in a real-life organisational scenario. Therefore, qualitative outcomes can provide more effective interpretations of the findings and results to IS professionals. The analysis ***integration*** of quantitative or qualitative data collection takes place at the interpretation stage. Both qualitative and quantitative results converge after an independent analysis in each case. Lately, both analyses are integrated at the interpretation stage. A typology of this integration is described in Table 2.2. At formal level, this study includes theoretical perspectives which purpose is to promote practical implications, so the **theoretical perspective** is explicit.

Table 2.2 Typology of the research integration

Research process	Research purpose	Data collection method	Analysis procedure	Data interpretation
Quantitative	Confirmatory Exploratory	Survey based on predetermined theory	Descriptive statistics Inferential statistics	Generalisation Interpretation of theory
Qualitative	Explanatory	Interviews Questionnaires	Identify variables Look for interconnectedness among variables	Contextualization

2.4 PHILOSOPHICAL ASSUMPTIONS IN THIS RESEARCH

2.4.1 One of many IS definitions

Two main characteristics might depict the current IS discipline: 1) the natural evolution towards an "engineering-reformatory-managerial" age with continuous reassertion of its existence and funding (Bryant, 2008) and 2) an inevitable engagement with a variety of other subjects, fields, domains or disciplines which address issues of boundaries and demarcations that are inevitable unclear. In addition to these characteristics, the inclusion of processes, infrastructure and people in the universe of IS questions a unique body of knowledge. To this end, IS has been developed itself as multidisciplinary and self-influenced discipline from different disciplines which pressures to consolidate its autonomy and own definition. Paul (2002) started an ongoing debate about what the identity of IS is. This debate aims to better understand the way we should realise the uniqueness of IS as well as to define a solid definition. In a first attempt to contribute to define the personality of IS, he defines IS in terms of its own characteristics and practical implications.

> "IS is *what emerges from the usage and adaptation of the information technology and the formal and informal process by all its users*" (Paul, 2002, p.194). This definition argues that informal processes are what human beings create or invent in order to ensure that the useful work is done. And, formal process are currently assumed to be pre-determinable with respect the decisions about what IT to use. These processes commonly change quickly due to either unexpected changes or adapted changes following the changing world around them.

The author of this thesis finds in this definition appealing practical techno-social implications and an up-to-dated vision of IS that agrees the aim and objectives of this research. Considering the complexity shape of IS, this definition indicates relevant pragmatic characteristics that the IS discipline aims to contribute. Interestingly, IS, as discipline, pursues practical implications that should be considered from the starting to the ending point of any research. This research, particularly, tends to contribute with practical insights and make use of the philosophical support of this definition.

2.4.2 Information Systems in practice?

The dynamism of IS implies limitations in its own research endeavours, particularly in its practical implications. There is a clear symbiosis between practical implications and academic research in IS. However, both can sit opposite one each another as consequence of unbalance positions between IS research rigour and relevance. Because IS research outcomes are often seen pragmatic, the lack of relevance to practice with substantial rigour is the challenge to overcome (Benbasat & Zmud, 1999). Rosemann & Vessey (2008) identify that the lack of placing more value on relevance lays on three reasons; *desertion*, because conducting pragmatic research cannot not be accepted in top IS journals, *unbalance relevance and rigour* and *limited research exposure* to practitioner communities. What seems to be an evident fact, and one relevant for IS professionals, is the capacity of IS to produce applied research and practical implications. Nonetheless, IS research outcomes appear after practice rather than before the leading practice does and rigorist research methods delay outcomes far from the technology's acceptance (Benbasat & Zmud, 1999).

Some pragmatists argue that IS consumable research should stand for knowledge that improves action and makes a practical difference. Goldkuhl (2008) relates the pair of *knowledge* and *action* to underpin pragmatic research perspective in IS. He describes pragmatic IS research by means of knowledge *for* action, knowledge *about* actions and knowledge *through* action. In Table 2.3 these three relations are explained. Ideally, the three pragmatic relations can be

applied and combined to provide functional capabilities to IS research. From a model perspective, bringing IS research into practice is the challenge of defining assumptions that should represent the reality as faithfully as possible (Avison, 2003). In these two perspectives, it can be assumed that IS research should involve social reality, careful deliberation and extensive empirical investigation (Agerfalk, 2010). Consequently, the need of practical implications has suggested viable and independent alternatives to research IS. To this end, what is useful for the aim of this research lays on adopting a pragmatic perspective which research methods can support consumable IS research. Essentially, IS is a pragmatic discipline which outcomes should bring valuable benefits to different stakeholders (society, students, IS professionals, other researchers, organisations). Nevertheless, such benefits exist if stakeholders consider using them and applying them. Relevant research, "one that is potentially useful for, as well as accessible by, its intended audience" (Benbasat & Zmud, 1999) is what this research aims and wants to bring about as the main contribution.

Table 2.3 Relations between knowledge and action

Foundational questions?	Foundations of practical implications		
Why knowledge?	Knowledge *for* action	Action is the purpose	Change and improvement
What knowledge?	Knowledge *about* action	Action is the object	Activities and practices
How knowledge?	Knowledge *through* action	Action is the source and medium	Experimentation and exploration

2.4.3 Overview of paradigms and research methods in IS

As discussed in the previous sections, three main characteristics describe the current shape of IS research; 1) IS discipline is having constant changes that are reasserting its own existence and funding, 2) IS has been and will be inevitably engaged with a variety of other disciplines which have led to issues of IS identity and demarcation.3) different issues affect consumable research in IS. The complex IS environment have arisen different perspectives about *how* it needs to be researched and *what* constitutes a relevant research topic and legitimate and valid research methods. In the literature, there are extensive research methods which have been borrowed from other disciplines and for which there is no evidence whether they can be appropriate or inappropriate to the body of knowledge of IS. Moreover, the ongoing research in IS has challenged what we understand by research process, research approach, research method, research methodology or research techniques. For instance, the terms method or methodology have often used interchangeably which have caused imprecisions; methodology can be literally understood as the study of methods, but also can refer to the actual used method for a specific research (Tashakkori & Teddlie, 1998) or combinations of methods (Avison &

Landry, 1990). These variations have been used as proxies to represent different meanings, concepts or dimensions in the IS research process.

Conventionally, choosing a research method or methodology makes assumptions about the nature of the world and knowledge to be taken in the research, these set of assumptions are been called paradigms. Different worldviews or paradigms has been used to embrace IS research. A paradigm is a construct that specifies a general set of philosophical assumptions covering ontological (*what is the nature of reality?*), epistemological (*what is the nature of knowledge*), axiological (*what is right?*) and methodological (*what approach?*) beliefs. Thus, choosing a paradigm sets research beliefs in order to box what should be study, how it should be studied and how results should be interpreted (Bryman, 2004). One of the most cited[2] differentiation between paradigms in IS has been described by Orlikowski & Barley (2001). Although other classifications have been indicated, such as (Guba & Lincoln, 1994), for this research, the classification of Orlikowski & Baroudi (1991) is followed. They consider three different *research epistemologies* in IS research; *positivism*, *interpretivism* and *critical* approaches. These three approaches have widely been accepted by scholars and currently enclose most IS research. However, emerging mainstreams such as pragmatism claims to be seen as another that brings an independent viable alternative (Van Der Heijden, 2009); where action research and design science are both its expressions.. Despite these emergent mainstreams, the main competing research paradigms seem to be positivism *(scientific, naturalistic, objectivist, functionalist)* and intrepretivism (*subjectivist, constructivist*), see Table 2.4 to contrast both perspectives. The adoption of one of these paradigms has also generalised the adherence to purely qualitative or quantitative approaches. For instance, selecting a quantitative approach commonly implies the holding of the positivist paradigm; condition based on strategies that are often predetermined by numeric data. In turn, qualitative often tends to be associated with interpretivism; conditions based on strategies that often results in open ended and textual data.

Table 2.4 Philosophical assumptions of positivist and interpretive paradigms, after (Orlikowski & Baroundi, 1991) and Walsham(1995)

Philosophical assumptions or beliefs	Positivist	Interpretivist
Physical and social reality *Ontology* *(Nature of reality)*	• Physical and social reality exists independent of humans • Base on facts	• Reality is constructed and reconstructed by subjective meanings and symbolic actions in the process

[2] According to EBSCO host database, this article has been cited 131 times until this thesis was submitted.

Table 2.4 Philosophical assumptions of positivist and interpretive paradigms, after (Orlikowski & Baroundi, 1991) and Walsham(1995)

Philosophical assumptions or beliefs	Positivist	Interpretivist
Knowledge *Epistemology* *(Nature of knowledge)*	• Generalised knowledge is based on causal relationships and tight coupling among explanation, prediction and control • Base on subjective constructions	• Knowledge is acquired getting inside the world that involves the social process
Theory & practice	• Primarily technical and detached from the phenomena of interest	• There is no value-neutral stance but a value judgement

2.4.4 Selecting a research approach: a multi method perspective

Historically, positivism has been underpinned most IS research but interpretivism emerged recently, about two decades ago, to emphasises the inherent social components of IS. This has brought a major debate concerning the nature of social science in relation to natural science. Consequently, different positions have addressed the context of such relationship. *Imperialists, supremist* or *naturalists* argue that paradigms are contradictory and a unique paradigm is necessary to create a strong IS discipline; *contingencists* or *isolationists* assert that research should be developed separately within each paradigm while *pluralists* embrace different research methods or paradigms. More than a decade ago, Tashakkori & Teddlie (1998) started a debate with incipient arguments that challenge the monomethod approach. They see the epistemological foundations of mixed methodologies in pragmatism, focused on *what works*. A pluralist view[3] is then a choice that offers solutions to the nature of the questions that the research posed based on the selection of appropriate methods. From this practical perspective, pluralism is conceptually addressing real life problems over the monomethod position (Tashakkori & Teddlie, 1998; Creswell, 2003). Pluralism has been followed the persuasive argument that IS is conducted within social organizations. Thus, the pragmatic capabilities of IS put forward mixed methods as an research alternative in IS research (Lee, 1991; Avison, 2003; Galliers, 1993; Fitzgerald, 2003). From a holistic perspective, a mixed methods study "involves the collection or analysis of both quantitative and/or qualitative data in a single study in which the data are collected concurrently or sequentially, are given a priority, and involve the integration of the data at one or more stages in the process of research" (Creswell et al., 2003 p.165). Literature shows a number of arguments to consider the mixed method or multi-method[4] approach in IS. Tashakkori & Teddlie (1998) has indicated that multi-method increases

[3] The use of mixed methods appeals and have led to pragmatism as philosophical basis, thus for this research pluralism, pragmatism and mixed methods can be seen as equivalent terms.
[4] The terms multi-method or mixed method are used indistinctly in this dissertation even though some scholars suggest some differences in their meaning, e.g. (Creswell et al., 2003).

capabilities of triangulation, creativity and expansion. Pluralists, however, advocate different conceptions of plurality, which suggest the selection of a domain of discussion in order to approach any IS research. Creswell & Tashakkori (2007) identify four domains for mixed methods; 1) *methods perspective* which focuses on the process and outcomes of using both qualitative and quantitative methods, 2) *methodology perspective* which includes different methodologies to integrate the entire process of research, 3) *paradigm perspective* which considers different worldviews or paradigms to provide a philosophical foundation and 4) *practice perspective* which looks to how mixed methods research is being used, so there is set of means to use as they conduct the research design.

Relevance and rigour was the main criteria to concert the research approach in this study. Based on Rosemann & Vessey (2008)'s dimensions of research relevance, this research can be referred to as relevant by evaluating its *importance*, *accessibility* and *suitability*. By considering the *importance dimension*, this study addresses a real organisational problem where two main management concerns have been included. First, the IS/business alignment phenomena has been a recurrent management claim for over two decades but practical implications are still pending issues in its research agenda(Chan & Reich, 2007). Second, IT governance is seen as an emergent management tool that can impact positively the process of IS/business alignment but such impact is still unclear (De Haes & Van Grembergen, 2009; De Haes & Grembergen, 2008). Regarding the *accessibility dimension*, it was considered that the major goal for this study is to achieve pragmatic capabilities, particularly; findings are tended to recommend solutions in the form of management practices towards the improvement of IS/business alignment and IT governance. For the s*uitability dimension,* this study provides concrete recommendations that enhance the practice of both IS/business alignment and IT governance.

Rigour, in this research, was established by the selection and application of a sound research and according the aim and objectives. A philosophical perspective of this study was conceived following Allen & Varga (2006) and Benbya & McKelvey (2006). Allen & Varga (2006) states that organisations are complex systems but also complex systems are the processes that underpin the construction and development of IT systems. He also considers that IS co-evolves in organisations at different organizational levels. In a similar perspective, Benbya & McKelvey (2006) conceives and proposes theoretical argument to posit IS/Business alignment as a series of organizational levels adjustments that reflects its own co-evolutionary nature (Benbya & McKelvey, 2006). In terms of research methods, these positions encompass multi-paradigm perspectives, quantitative and qualitative methods, but also pragmatic implications whether considering management is itself an experimental process which is often judged from its

outcomes (Allen & Varga, 2006). By assuming these positions as well as the socio-technical and organizational aspects of this research, this research followed a design that fits into these philosophical assumptions. It is important to highlight that this thesis does not aim either to argue what the most appropriate research method is in the IS discipline or justify the discipline uniqueness based on research method assumptions. Nonetheless, it identifies in the current IS debate an opportunity to use mixed methods approach to further the aim of this research. Thus, the selected research approach can best be portrayed as pluralist where multiple paradigms and research methods are employed along the research process. It is expected that the research contribution would be significantly benefited by the selection of such approach and contributes towards the development of IS/business alignment and IT governance. The author of this research acknowledges the pragmatic nature of IS as well as its inherent social and organisational aspects. By defining research design as the arrangement of conditions for the collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure, Selltiz, Wrightsman & Cook (1976) in Gable (1994); this research assumes that research methods might have opposite views but also recognises their partnership upon a reciprocal relationship. Therefore, research methods, from this perspective, can work together in IS either in sequential, concurrent or combinations in research designs as suggested by Creswell et al. (2003) and Tashakkori & Teddlie (2003). It is also considered that this position will be congruent with a pluralist and pragmatic paradigm for consumable research and help to bring together contradictory worldviews such as positivism (quantitative) and interpretivism (qualitative). By considering the above arguments, it was selected and undertaken the most appropriate, and according available resources, research paradigms, methods and data analysis procedures in order to advocate relevance and rigour in this research. Further explanation about the adopted research design is detailed in the next section.

2.5 SUMMARY

This chapter addresses the following aspects:

- The research process of this research is conducted in four phases: exploratory, confirmatory, explanatory and evaluation.

- The research process of this research is described and graphically depicted by a flow diagram with outputs, inputs and activities.

- This research includes a multimethod approach that includes quantitative and qualitative methods in the form of an online survey and case research respectively to collect data.

- Theoretical and philosophical assumptions are briefly discussed in order to support the attained research process.

CHAPTER 3: Literature review

EXPLORATORY PHASE

3.1 CHAPTER OUTLINE

The first section presents an overview of IS/business alignment. This is followed by an analysis of different challenges, assumptions and conceptualisations in the area. Thereafter, a definition of IS/business alignment is selected from the literature and then discussed. An analysis of relevant underpinning arguments in the rationale of IS/business alignment is conducted to presume two main arguments in the IS/business alignment research. From there, the relationship between IS/business alignment and IT governance is outlined and discussed. Finally, influential management tools for the assessment of IS/business alignment and IT governance are presented and compared each other.

3.2 BACKGROUND OF IS/BUSINESS ALIGNMENT

The strategic use of IT has become a top management issue as a result of the strong dependence between organisational operations and IT. Aligning IT and business strategies, commonly referred to as IS/business alignment, seems to be a logical, sensible and necessary management practice that would enable IT with influencing abilities to manipulate the current changing business environment. Empirically, IS/business alignment would have the potential to face current organisational competitiveness and further initiatives of new business. Empirically, most organizations have showed the keen interest to attain IS/business alignment but most important capitalise business value out of it. IS/business alignment has been notably supported in the literature, mainly, due to the organisational benefits that it can generate. However, the achievement of IS/business alignment can be realised by means of the strategic formulation of IT projects and their correct implementation. Thus, the attention that organizations have given to advance managerial practices to get the most out of their IT investments has became a major managerial interest. Most organisations advocate for adequately managed IT investments in order to improve business performance and competitiveness out of them (Tallon, Kraemer & Gurbaxani, 2000).

The market competitiveness is one of many pressures that has propitiated to look for a better way to understand how IT projects should be implemented in order to boost business strategies (Weill & Broadbent, 1998). Tallon (2003) found that organisations with IT strategic goals show higher levels of IS/business strategic alignment and also higher perceptions of IT business value. Literature acknowledges that IS/business alignment practices further higher extent of IS business value (Melville, Kraemer & Gurbaxani, 2004a) and produce positive effects on organisational performance (Chan, Sabherwal & Thatcher, 2006; Chan, Sabherwal & Thatcher, 2006; Teo & King, 1996; Reich & Benbasat, 2000). By following these arguments, two main arguments can be assumed: the more IS/business alignment, the more IT value realisation. Similarly, the more IS/business alignment, the more positive business performance.

Several organisations have seen substantial benefits to achieving IS/business alignment however there is no agreement on the way to approach it. The disagreement is instanced by the wide variety of studies that have emerged proposing different alternatives. Understanding IS/business alignment is itself a challenge. Most practitioners might consider IS/business alignment as a noticeable practice to achieve nonetheless its own complexity might confuse its understanding. From a terminology perspective, IS/business alignment has been subjected to different interpretations which can see reflected on the variety of definitions. For example,

strategic alignment has adopted different pseudonyms like integration (Weill & Broadbent, 1998), fit (Porter, 1996), linkage (Henderson & Venkatraman, 1993), harmony (Luftman, 1996), bridge (Ciborra, 1997) and fusion (Smaczny, 2001). From an assessment perspective, IS/business alignment has been researched focusing on the IT-business relationship given by their strategies (Henderson & Venkatraman, 1993; Ciborra, 1997; Smaczny, 2001), plans (Reich & Benbasat, 2000; Cragg, King & Hussin, 2002; Kearns & Lederer, 2000), or structures (Weill & Ross, 2004) Even though the variety of approaches, all definitions consent to improve organisational business capabilities throughout getting the most of IT value.

IS/business alignment research is now extensive and with more mature knowledge however it is still interested on a wide debate to answer underlying questions such as *how organisations can start building organisational constructors to achieve and maintain IS/business alignment?*, *what are the organisational constructors that further IS/business alignment?* and, *how these constructors can help organisations to assess IS/business alignment?* To answer these type of questions, IS/business alignment research remains facing different fronts but perhaps still towards three main directions: 1) conceptualise its organisational impact, 2) improve its understanding and 3) generated robust practices to assess, achieve or maintain it. Based on the assumption that practitioners have an imminent interest in achieving IS/business alignment and there is a positive organisational impact as consequence of having IS/business alignment, the literature provided in this chapter is focused on studies that aim to further the understanding of alignment (2) and provide current practical implications towards assessing or pursuing IS/business alignment (3).

3.3 CONCEPTUALISING IS/BUSINESS ALIGNMENT

IS/business alignment is matter of aligning strategies, so the concept of strategy is of perennial discussion in this dissertation. According to De Wit & Meyer (2002) each strategic problem should be understood by the nature of three interacting dimensions possessing process, content and context characteristics. The *strategy process dimension* refers to the manner in which strategies come about and is concern with how the strategy is involved, who is involved and when the strategy is involved. The *strategy content* is the product of the strategy process and concerned with what is and should be the strategy. The *strategy context* includes the environment created by the process and content dimensions and where this environment happens. By integrating these three dimensions, the concept of strategy can be better understood and then implemented. However, each dimension itself is matter of depth study and understanding.

Table 3.1 Strategy dimensions and challenges in IS/business alignment research

Strategy dimensions	IS/business alignment challenges	Relation description
Process	Agreement of underlying constructors	The manner in which underlying constructors of IS/business alignment shape how the business and IT strategies are and should be analysed, formulated, implemented, changed and controlled. How?, who?, when of strategy?
Content	Definition of the organisational scope	The organisational structure or structure where the content and process of IT and business strategies are embedded Where of strategy?
Context	Practical implementation	The circumstances under which the content and process of the IT and business strategies are determined What the strategy?

IS/business alignment has been subject to different interpretations and according to the context behind the particular research attained. This research recognises that IS/business alignment might be advanced by exposing such different interpretations and integrating them towards a better understanding. Literature shows many studies that expose their differences against others by establishing their own boundaries and limitations. Without realising and identifying these differences, advancing the IS/business alignment research agenda might be unclear and more complex. In order to provide a holistic overview about the different concepts of IS/business alignment the following sections have been divided into three sets of challenges to provide a holistic context of IS/business alignment. Although these sections have been titled in terms of challenges, these challenges bring about the state of the art and indicate fundamental constructors in the IS/business alignment research. Three categories have been defined to list these main challenges: challenges; 1) challenges to agree the underlying constructors of IS/business alignment, 2) challenges to define the organisational scope of IS/business alignment and 3) challenges to improve the practical implications of IS/business alignment. These three sets of challenges can also be related to the three aforementioned fundamental distinctions of strategy. The reason of making this link aims to bring clarification around the complexity of IS/business alignment but also indicate the holistic strategic context that it

implies. In Table 3.1 the relationships between strategy domains and IS/business alignment challenges are presented.

3.3.1 Challenges to agree underlying constructors

There is not a unique approach to undertake IS/business alignment research and this can be evidenced by the diversity of studies available in the literature. In more than two decades, different approaches have revealed several loci research on IS/business alignment (Chan & Reich, 2007), hence their contributions have marginally subscribed the broad and complex understanding of IS/business alignment. To conceptualize IS/business alignment, literature shows different theoretical constructors to portray the IS/business alignment understanding. By reviewing some of the most cited articles it became apparent that these constructors have been indicated based on different interpretations. These different interpretations not only can clarify the foundations behind current studies but also provide insights into the research diversity. Moreover, these interpretations would allow comparing capabilities if they are taken as reference to benchmark other studies. To make such comparison, a classification scheme can help to realise their differences. Under this umbrella, four underlying constructors have been identified in the literature which also can help to benchmark studies. These constructors are 1) the type of strategy assumed, 2) the dimension undertaken, 3) the paradigm undertaken and 4) the interpretation of metrics (Gutierrez et al., 2008b). The summary of these constructors is presented in Table 3.2 and further discussion is below described.

1) ***Type of strategy assumed*** –Chan, Huff & Copeland (1998) use Mintzberg (1978) to classify common understandings of organisational IS strategies in order to indicate which strategy is undertaking their own research. The discussion is centred on two definitions: a) intended strategy, defined as not current, but the formal strategy susceptible to support future or past strategy; and b) realised strategy which reflects current and undertaken strategy.

2) ***IS/business alignment dimensions***- different dimensions have been traditionally isolated approaches to understand, approach and portray intellectually, strategically, operationally, politically, practically and culturally IS/business alignment. Although not exhaustive, five dimensions have been found representative: strategic/intellectual, structural, informal structural, social and cultural (Chan & Reich, 2007; Grant, Hackney & Edgar, 2009b). Reich & Benbasat (1996) argue that alignment research should consider the difference between social and intellectual dimensions. The *social*

dimension is "the content of information technology and business plans that are internally consistent and externally valid", so how well commitment does IT and business people in a collective understanding. The *intellectual* dimension occurs when "the information systems and business executives understand each other's objectives and plans". Reich & Benbasat (2000) extend the scope of social dimension by including the influence of four factors (shared domain knowledge between business and IT executives, IT implementation success, communication between business and IT executives, communication between business and IT planning process). This dimension reflects the state of business knowledge from IT people and IT knowledge from business people, hence objectives are consistent, valid and in harmony. The *structural dimension* relates to the degree of aligned structure on which the technology, business process and users of both business process and technology is standing (Chan, 2002). This dimension has strong influence of decision-making process, IT organisational structure, organisational levels of reporting and personnel deployment. According to Chan, Sabherwal & Thatcher (2006) and Chan (2001) the *informal structure dimension* refers to as "the relationship-based structures that transcend the formal division of labour and coordination of tasks". The difference of this dimension from the structural dimension lays on those human and soft relationships and those no formal ways to strength formal organisational structures (Chan, 2002). The *cultural dimension* concerns the degree to which organisational culture permeates the alignment between IT and business. Culture has been historically one of the most relevant factors in change management and it is a fundamental factor to pursue IS/business alignment (Chan, 2002). However, the cultural dimension has been received less attention in comparison with the other dimensions. In Figure 3.1 four of the aforementioned dimensions were mapped against strategic, tactical and operational organisational levels. From this illustration, it can be evidenced the scope of each dimension in terms of any organisation. At strategic and tactical level, inclusive, is where the strategic dimension takes significant relevance since at this level is where strategies and plans are designed and then pushed down to lower levels. However, social and informal structures link the integration of these plans or strategies with lower organisational levels. At operational and tactical levels are evident two main organisational components; structural and social which provide formal and informal interaction with upper levels. These two components refer to the structural, informal structural and social dimensions of IS/business alignment. For instance, the IS structure includes the formal rules that conditions the execution of operations based on formal positions. Benbya & McKelvey (2006) identify document formalisation, degree of

specialisation, hierarchy of authority, complexity of activities and centralisation of decisions as elements of this IS structure.

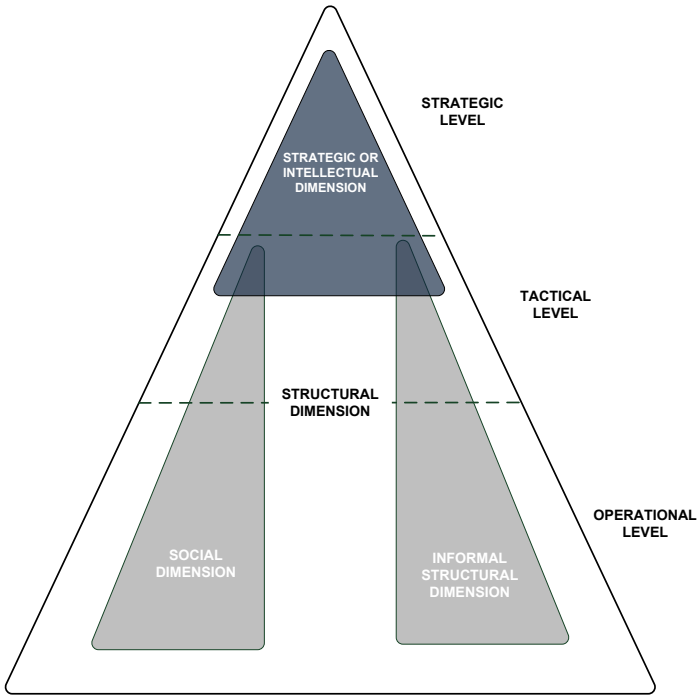


Figure 3.1 Organisational scope of IS/business alignment dimensions

3) ***IS/business alignment paradigms***- Reich & Benbasat (2000) suggest two paradigms as a consequence of the outcome of achieving alignment. These paradigms imply that the output of implementing alignment can be understood by either considering a "state" or a "process". A state view involves alignment as a fixed output and the effect of itself. A process view is centred on intangible but planned activities which are performed dynamically through the roundtrip process of achieving alignment. The process view has been permeating current research in IS/business alignment and seems to be the common emergent perspective (Luftman, Ben-Zvi & Dwivedi, 2010; Benbya & McKelvey, 2006).

4) ***Interpretation of IS/business alignment metrics***- Cragg, King & Hussin (2002) propose a instrument to assess alignment in small organisations based on the STROBE instrument developed by Venkatraman (1989) and the STROIS instrument developed by Chan (1992). To argue how these instruments could work simultaneously, they examine two ways of measuring alignment: a matching measure based on the difference between two measures and a moderation measure which reflects synergy between two different measures. To calculate the alignment degree, the selected measure gives an interpretation of the difference between the scores of two items, which consequently represents the IS-business strategy integration.

Table 3.2 Review of underlying constructors of IS/business alignment

UNDERLYING CONSTRUCTOR	DESCRIPTION	REFERENCES
Type of strategy assumed	**Intended strategy**: no current, but formal strategy susceptible to support future or past strategy	Chan, Huff & Copeland (1998)
	Realised strategy: reflects current and undertaken strategy	
Dimension	**Social dimension**: focuses on people or factors involved in creating alignment. This dimension includes mutual understanding and commitment to the business and IT mission, objectives and plans	Reich & Benbasat (1996)
	Strategic/intellectual dimension: focuses on content of planning approaches (methods and techniques).This dimension evaluates the content of IT and business plans if they are internally consistent and externally valid	
	Structural: degree of structural fit between IT and business.	Chan (2002)
	Informal structural: the relationship-based structures that transcend the formal division of labour and coordination of tasks	Chan, Sabherwal & Thatcher (2006) Chan (2001)
	Cultural: the degree to which organisational culture permeates the alignment between IT and business	Chan (2002) Pyburn (1983)
Paradigm	**Process perspective**: focuses on the integration of IT and business as a process	Luftman, Ben-Zvi & Dwivedi (2010) Benbya & McKelvey (2006); Reich & Benbasat (2000)
	State perspective: focuses on the integration of IT and business as cross-sectional data and analyses states of such integration	
Interpretation of metrics	**Matching measure**: based on the difference between two measures	Cragg, King & Hussin, (2002)
	Moderation measure: reflects a synergy between two measures	

3.3.2 Challenges defining the organisational scope

Managing IT also means meeting business objectives while targeting strategic, tactical and operational levels and handling a complex number of organizational assets and factors (Gutierrez et al., 2008a; Gutierrez, Orozco & Serrano, 2009). Strategically, IT would be able to meet competitive challenges. Tactically, IT would allocate information resources across the organization and, operationally, IT would bring effectively and efficiently support to different user requirements (Peak, Guynes & Kroon, 2005). Although IS/business alignment implies an holistic organisational scope in which different organisational levels should be assumed, researchers and practitioner have opted to target specific organisational levels to approach their research. From planning perspective, there is dichotomy to elaborate consistent plans. The information system plan should be aligned to the business plan (ISP-BP) and the business plan should be aligned to the information system plan (BP-ISP). In effect, these two-way actions happen at strategic levels but the implementation of such projects lies on operative levels. The recurrent approach that have been dominantly taken over IS/business alignment has been based on the collection of perceptions at strategic levels and assuming their effects along lower organisational levels. Specifically, current assessment studies have measured IS/business alignment following this approach and leaving a gap between strategy and operational levels (Lycett, Rassau & Danson, 2004; Srivannaboon & Milosevic, 2006). For instance, studies such as Luftman (2000), Cragg, King & Hussin (2002), Chan, Huff & Copeland (1998) and Avison et al. (2004) have been pursued and indicated similar arguments.

Efforts to achieve IS/business alignment are embedded in the strategic management process which assumes closer relationships between IT and business managers. However, this commitment has been difficult to achieve at higher management levels (Coughlan, Lycett & Macredie, 2005) and consequently it is difficult to transfer among lower organizational levels. To achieve IS/business alignment, it is expected a two-way commitment between IT and business managers to prioritize IT projects according business strategies (Luftman & Brier, 1999). Ideally, when an IT investment is conceived at strategic level, it should be aligned with business goals. However, when it starts being implemented and progresses down to lower organisational levels, the original conceived objectives may be lost. Commonly, practitioners are more concerned with technical issues and poor consideration is given to business goals (Lederer & Hannu, 1996). Although research has given little attention to this problem, managers must focus on IT project planning as a mediator to improve business-IS alignment (Kearns & Sabherwal, 2007). Thus, the definition and implementation of IS planning process would help to identify IT strategies, IT projects and technical requirements from each business unit and

creates links between the strategic and the operational levels (Peak, Guynes & Kroon, 2005). These arguments evidence the challenge that new research on IS/business alignment face to consolidate solutions in which organisations need to integrate different organisational actors and factors.

Another limitation of available tools to measure IS/business alignment is that most are designed for large organisations and little evidence exists to validate their applicability for small organisations. Small and medium enterprises are usually less strategically oriented than larger organisations, thus the strategic use of IT is also limited. Despite solutions of IT/business alignment seems to be more adequate for large organisations, studies have also provided theoretical and practical support for small organisations. For instance, Cragg, King & Hussin (2002) indicate measures to assess IS/business alignment in small firms. Their proposal is based on Venkatraman's instrument called STROBE which conceptualise the business strategy and Chan's STROIS instrument to conceptualize the IT strategy. For each dimension on these instruments the corresponding results are compared to assess the degree of mismatch between business and IT strategies. Low scores for dimensions indicate that the dimensions are receiving sufficient attention. A high score indicates an opportunity to improve IS/business alignment in that dimension. When STROBE score is high and the associated STROIS score is lower, firms should invest in that dimension as it is most likely to bring significant benefits.

3.3.3 Challenges of the practical implications

Practitioners have indentified IS/business alignment elusive with few pragmatic options (Avison et al., 2004; Chan & Benbasat, 2007). There are no formal mechanisms that advise the type of IS/business alignment approach that more adequately satisfy specific organizational needs (Gutierrez et al., 2008b). Despite IS/business alignment points to organisational practical solutions, much work remains at conceptual level and the integration of practical implications in these conceptual or theoretical studies are unclear differentiated. For instance, the organisational implementation of IS/business alignment might imply consecutive stages to answer how to assess, how to achieve and how to maintain IS/business alignment.. Nonetheless, research has been covered assessing, achieving and maintaining stages as a complete roundtrip process which involves them indistinctly (Luftman, 2000; Avison et al., 2004). Most research, though, does not identify any differences away from these stages even though each one might contribute independently to the field. As a consequence, some studies do not specifically advocate an adequate mean of measurement, whilst this is considered one of the steps towards achieving alignment. The different views make the comparison of insights more complex if

considered that an alignment approach should satisfy the organisational context by ad-hoc measures (Zee, 2001). In practice, this measuring process normally has to lay on the judgement of practitioners and researchers.

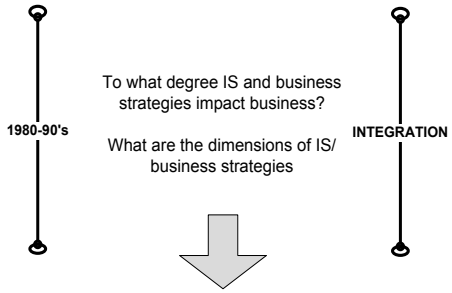
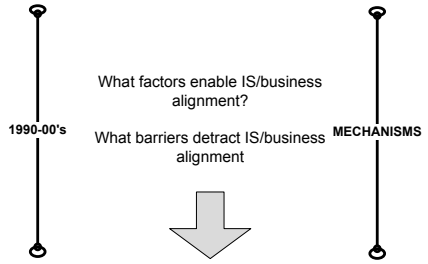
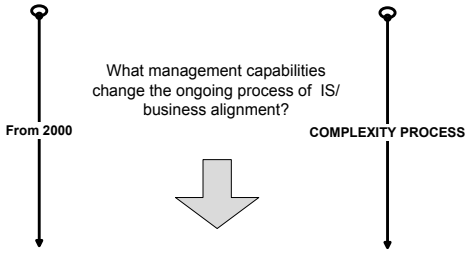
Despite the fact that most of the literature in IS/business alignment has room for improvement, there is little guidance on how to achieve alignment. Most current approaches are planning oriented (Smaczny 2001) and assume structured environments under full control (Ciborra, 1997; Maes, 2008) in contrast with the real environments where uncertainty, flexibility and changeability prevail (Tiernan & Peppard, 2004). Even informally, organisations have a planning process to develop a business direction (Reich & Benbasat, 2000). These actions are mainly management practices focused on the formulation and implementation of IT investments that initially would add business value. However, these mechanisms lacks of guidance and enablers. For instance, Mocker & Teubner (2006) justify the gap between theory and practice due to vague practical effects of IS/business alignment. Similarly, they suggest that current academic solutions are particularly theoretical which bring poor solutions to adopt and implement as IS/business alignment solutions.

3.4 SEARCHING FOR AN IS/BUSINESS ALIGNMENT DEFINITION

Due to the complexity and holistic perspective of IS/business alignment, a unique definition challenges the research IS/business alignment agenda itself. Each existing definition has been described around the boundaries of each independent research and based on philosophical constraints. However, to agree a definition, a review of prevailed research might clarify trends and delineate an up-to-date view of IS/business alignment since different views have continued evolving the notion of research. In the early works, IS/business alignment focused on developing strategic plans that integrate business and IT visions together (King, 1978; Nolan, 1973; Earl, 1989; Ein-Dor & Segev, 1978). Frameworks were also used by organisations to improve the information system strategic planning process. Examples of these are: Critical Success Factors, the value chain, the Strategic Option Generator and methodologies such as Business System Planning and Strategic System Planning. These perspectives considerably reflect a more static approach to understand IS/business alignment. Contrastingly, more recent research has been focused on management activities to achieve business and IT goals across the organisation which integrates a more dynamic and process-oriented approach to understand IS/business alignment (Luftman, 2000; Benbya & McKelvey, 2006; Peppard & Breu, 2003).

The different approaches among the years can chart the evolution and changes in IS/business alignment research. Although, the evolving transition has not been linear and distinctive eras might have unclear crossovers, the existence of four representative eras can be highlighted. Even though, this number is not exhaustive. Table 3.3 illustrates the main research questions in each era and the timeline that they might represent.

Table 3.3 IS/business alignment research eras

Era/Period	Proposition	Contribution	References
	IS business alignment is planning event	IS planning needs to be strategically formulated IS strategy should be aligned with business strategies	Ein-Dor & Segev (1978) King (1978) Pyburn, (1983)
	IS/business alignment is the alignment of IS and business structures	Higher IS/business alignment is associated with higher levels of business performance	Henderson & Venkatraman (1993) Reich & Benbasat, (1996) Porter (1996)
	IS/business alignment is not an event but a process	IS/business strategic alignment is function of factors (barriers and enablers) that are external or internal to the organisation.	Reich & Benbasat (2000) Chan (2002) Cragg, King & Hussin (2002) Luftman & Brier (1999) Luftman (2000)
	IS/business alignment is dynamic, adaptive and purposeful over time.	In current progress.	Peppard & Breu (2003) Benbya & McKelvey (2006) Sabherwal, Hirschheim & Goles (2001b)

Definition era: the dominant research question in this era is: what is strategy? (Ein-Dor & Segev, 1978). This era contributed to identify the strategic isolation of the IS function in relation to the organisation strategy. Conceptually, IS/business alignment was considered a top-down planning event where planning itself was rational and functional contextualised. Researchers suggested that IS brings competitive opportunities by the improvement of "IS support" and "IS services" (King, 1978). It was an emphasis in structural alignment (Ein-Dor & Segev, 1978) and researchers also worked on the idea that linking IS and business strategies would help organisational performance. For instance Pyburn (1983) suggested that an efficient and effective IS planning occurs when an IS and business shared strategy is the result of informal, formal and mixed processes. However, measuring the organisational performance out of IS/business alignment consolidated the end of this era and open the debate on proceeding periods.

Integration era: to know the impact of IS/business alignment over business performance was the main concern. IS, an emergent discipline, acquired additional management relevance as an effective source of information requirements for decision-making processes which influenced the relevance of IS/business alignment as highly desired management concern. Different models were proposed to indicate a positive IS/business alignment-business performance relationship (Henderson & Venkatraman, 1993; Porter, 1996). Particularly, the strategic alignment model (SAM) proposed by Henderson & Venkatraman (1993) has been one of the most influential models in IS/business alignment research. This model brought the novel contribution to addresses the necessity of aligning functional and strategic organisational components in order to assess the relationships of strategic choices that managers face. Given the relevance of SAM, IS/business alignment was assumed dynamic, process-based and enabler of adaptation and change. IS/business alignment factors (enabler and barriers) were beginning to be correlated with higher levels IS/business alignment (Reich & Benbasat, 1996).The main contribution of this era was the indication of the synergy between IS/business alignment and organisational performance; this was reflected by the argument that higher IS/business alignment is associated with higher levels of business performance.

Mechanisms era: an organisational perspective and the interaction of organisational groups were the main units of analysis in this era. Despite of mature research in IS/business alignment, it did not progress as it did in the preceding eras. Questions such as what are the barrier that detract IS/business alignment were typically formulated. Efforts were focused on deep understanding of previous contributions and still advocated on factors and barriers among the dynamics of IS/business alignment. Nonetheless, rather than finding additional factors or

barriers most research strengthened the connections and relationships between them. The identification and confirmation of factors such as shared domain knowledge, IT prior implementation success, communication between IT and business executives(Reich & Benbasat, 2000; Reich & Benbasat, 2000; Reich & Benbasat, 2000; Reich & Benbasat, 2000; Chan, 2002), top management commitment, IT sophistication(Cragg, King & Hussin, 2002; Reich & Benbasat, 2000) and communication between IS and business managers (Luftman & Brier, 1999), exemplify some contributions. Research was more related to business metrics but the same old empirical mechanisms were adopted. Base on the positive relationship between business performance and IS/business alignment, previously studied, the main contribution of this era laid on how to achieve IS/business alignment (Luftman, 2000). Most of these studies, however, still researched IS/business alignment as a process and assuming that IS and business should be kept separated. Hence, most research does not provide elements that enable how to achieve IS/business alignment over time.

Process complexity era: in this current era, there is a shift from researching on enablers and barriers towards an IS/business alignment concept that is dynamic, self-purposeful and adaptive that includes the element of time into it. This arguably new approach takes into account that the environment changes as so IS/business alignment does need to evolve over time (Benbya & McKelvey, 2006; Peppard & Breu, 2003; Sabherwal, Hirschheim & Goles, 2001b). Approaches share the idea that IS/business alignment evolves dynamically and changes over time. This particular perspective was borrowed from natural science but being adopted recently in IS research (Allen & Varga, 2006). Some researchers look into the alignment of IS-business strategies and IS-business structures. Specifically, IT governance, an emergent area focused on the IS making-decision processes and IS structures, has been tightly related to IS/business alignment (De Haes & Van Grembergen, 2009; De Haes & Van Grembergen, 2010) and converted in an incipient antecedent. Despite this era is still in definition, it tends to resolve how to sustain the dynamic and continuous process of adaptation and change of IS/business alignment (Peppard & Breu, 2003).

Three theoretical orientations can be identified in this era: *maturity*, *co-evolutional* and, recently, *punctuated equilibrium* theories. *Co-evolutional theories* are based on complexity science and assume that two or more units interact to cause an evolutionary response. In the IS context, IS are systems of knowledge driven by individuals at different organisational levels and reality is subject of a series of events caused by the use of IS (Allen & Varga, 2006; Benbya & McKelvey, 2006). Either organisations or processes are non-isolated socio-technical systems and IS/business alignment is an indeterminate process (Peppard & Breu, 2003). *Punctuated*

equilibrium theories focus on the context and velocity in which organisational changes occur. Thus, IS/business alignment should be understood in longitudinal terms. IS/business alignment does not change in short periods of time unless periods of gradual evolution (punctuated) allow revolutionary periods of change. *Maturity theories* considers that IS/business alignment improve as consequence of managers decisions and organisational practices to formalised IS planning to the point where IS and business strategies are aligned. The maturity level is determined by top management in terms of the degree between what is needed and what is provided. Two examples from this maturity theory are the Capability Maturity Model Integration (CMMI) developed by the US government and Carnegie Mellon Software Engineering Institute and the Strategic Alignment Maturity (SAMs[5]) assessment. The latter based on Luftman, 1996; Luftman & Brier (1999) which is subsequent work from the Strategic Alignment Model (SAM5) proposed by Henderson & Venkatraman (1993).

A current definition of IS/business alignment

Following the current research and trends of IS/business alignment research, this work considers unique the contribution of previous research and advocates for a view that positions IS/business alignment with organic and co-evolutional characteristics. It follows the idea that both organizations and business environment change continuously and assumes that IS/business alignment evolves over time with dynamic, adaptive and self-purposeful practices. Consequently, changes advice differentiated, innovative and self adjusted models in order to provide continuous organizational performance. In agreement with this position, this research follows the definition provided by Benbya & McKelvey (2006).

> Benbya & McKelvey (2006) propose an emergent nature that underpins IS/business alignment *"as a continuous co-evolutionary process that reconciles top-down 'rational design' and bottom-up 'emergent process' of consciously and coherently interrelating all components of the IS/business alignment at three levels of analysis [strategic, operational and individual]"*.

This definition assumes that IS/business alignment is the result of a series of adjustments at individual, operational and strategic levels. The dynamics of these levels enables organizational effectiveness as function of IS/business alignment. They justify causal dynamics rather than cause-effect logic of managerial actions to impact all organizational levels and their performance. Thus, to generate organizational impact; specific managerial actions need to

[5] In this document "*SAMs"* refers to the Strategic Alignment Maturity Assessment proposed by (Luftman, 2000) while "*SAM"* refer to the Strategic Alignment Model proposed by (Henderson & Venkatraman, 1993)

enable such dynamics. In addition, this perspective innovates the integration of different IS/business alignment dimensions to consolidate their new theory. At strategic level, the strategic or intellectual domain takes place when IS co-evolves with business strategies. Social, structural and informal structural dimensions are included in the operational dimension, this involves the operational level where the IS department coevolves with the business. In this context, the operational performance depends on structures and capabilities to establish making- decision mechanisms (Sabherwal, Hirschheim & Goles, 2001b) and these decisions depend on how capabilities should be arranged in order to realise IS/business value (Weill & Ross, 2004). At individual level, IS infrastructure coevolves with end user needs, which involves social, structural and informal structural dimensions.

3.5 TWO MAIN SUPPORTIVE ARGUMENTS OF IS/BUSINESS ALINGMENT RESEARCH

When reviewing historically the research among IS/business alignment, it becomes noticeable that particular outcomes have eventually supporting and advancing the current premises of IS/business alignment research. As the first eras show, foundational arguments have contextualised the current IS/business alignment research. These initial arguments have built propositions and assumptions which currently underpin the improvement and advance of today's IS/business alignment research. Given an up-to-date conceptualisation of IS/business alignment in section 3.3 as well as the overview of the different periods that underpin IS/business alignment progress in section 3.4; an analysis shows relevant foundational arguments, existing propositions and assumptions. Results are presented in Table 3.4. Arguably, in this table the dominant arguments that impact significantly IS/business alignment research are ***IS planning*** and ***management practices***. It becomes noticeable that IS/business alignment have evolved continuously by the notion of management processes which, in due course, establish strategic- business decisions and IS planning processes in order to keep a desired level of IS/business alignment. Thus, it seems sensible to advocate research efforts in those management processes ant their practices as their efforts discern mechanisms to realise and put in practice IS/business alignment. Although such indications are not incipient suggestions, there are still unclear arguments to know *what* mechanisms and *how* these can foster IS/business alignment. For instance, Yetton & Johnston (2001) suggested investigating the definition and identification of management practices and specific forms of management structures in order to advance IS/business alignment research. In a similar suggestion, Chan & Reich (2007) suggest novel research towards IS/business alignment antecedents and their relationships. They specifically call for disclosing antecedents at operational levels which in effect will give

practitioners valuable advantages in their actions to better integrate strategic and operational alignment levels. Thus, the formulation of IS strategic decisions would be advantageously integrated to IT implementations. There is an avid discussion to explain the strong effect in the relationship of management practices and IS planning on IS/business alignment as they are relevant supportive mechanisms to achieve and maintain IS/business alignment. Hence, this research advocates this notion and considers their deep understanding. In the following sections it is addressed the role that both IS planning and management practices play in IS/business alignment research.

Table 3.4 IS/business alignment supportive arguments

Foundational	Propositions	Assumptions
There are internal and external factors influencing the process of IS/business alignment There are formal (IS and business structures) and informal (social, intellectual, culture) organisational structures that influence the management process of IS/business alignment IS and business management have historically independent but competitive needs demands shared roles	IS/business alignment influence positively organisational performance. IS strategies and business strategies needs to be consistent, valid and aligned in order to generate business value. IS/business alignment is different in each organisation as well as organisational business process. The extent of IS/business alignment is a changing ongoing outcome	Strategic IS is a baseline to support and service organisational business requirements. Aligned organisational structures and strategies enable the effective IS planning Management practices enable the management process of IS/business alignment The management process of IS/business alignment crosses and influences organisational levels The evolving process of IS/business alignment is maintained and sustained by IS and business management

3.5.1 The role of Strategic IS Planning in IS/business alignment

Aligning the planning of IS and business, IT alignment planning or strategic IS planning (SISP) have been labels to address the management concern of having congruent business and IT plans. SISP[6] is a key strategic concern where mainly the coordination of IS and business functions take place. Literature evidences that most IS/business alignment approaches have

[6] The label strategic IS planning (SISP) will be used in this dissertation to discuss the similar research domains of aligning the planning of IS and business, IT alignment planning or strategic IS planning.

been planning-oriented (Smaczny, 2001). Arguably, SISP has been researched independently to IS/business alignment research, thus it is common to find ISSP either as substantial antecedent of IS/business alignment (Chan, Sabherwal & Thatcher, 2006; Reich & Benbasat, 2000; Newkirk, Lederer & Johnson, 2008) or as an important enabler of IS/business alignment (Luftman & Brier, 1999; Newkirk, Lederer & Johnson, 2008; Teo & King, 1997; Teo & Ang, 1999). Literature implicitly or explicitly assumes that the IS planning process is the crucial time when alignment is shaped (Reich & Benbasat, 2000) and suggest the relevance of IS/business alignment a function of SISP over other many variables. Despite effective SISP process presumes organisational benefits, it has not been a definitive formula to succeed IT project outcomes since the rate of IT investments failures is still high despite organisations claim higher levels of IS/business alignment. Different reasons have been indicated in order to clarify these issues. For instance, SISP assumes that organizations would be immersed in controlled business environments (Ciborra 1997, Maes 1999) and unpredictable business ways cannot be planned and IS plans will eventually changes along the implementation of IT projects.

A number of positive outcomes have been attributable to SISP (Teo & Ang, 2000). Teo & Ang, (1999) found that IS plans are perceived useful for supporting business objectives, improving systems integration, exploring IT for competitive advantage and prioritising IS development projects. However, they also found that IS plans are not useful for some functional activities such as clarifying the role of IS or evaluating IS performance in addition to unexpected events such as anticipating surprises & crisis or anticipating to unknown situations. These statements are somehow consistent with a more recent study performed by Newkirk, Lederer & Johnson (2008). They found that SISP predicts IS/business alignment at strategic levels (strategy awareness, strategy conception) but not at functional levels (strategy formulation and strategy implementation planning) according to the information systems planning phases and tasks proposed by Mentzas (1997). There is a disconnection that often lies between the objectives stated at the beginning of an IT project and the changing environment (Benbya & McKelvey, 2006). Grant, Hackney & Edgar (2009a p.105) reflect these assumptions in their definition which states SISP as “the organizational activity of developing an IS/IT strategy that balances the capacity and capability of information, systems and information systems and the goals, aspirations and objectives of the business”. This definition implies that the business and IS planning process consist of a multilevel scope which include the implementation of both operative and strategic management practices to be effective (Tarafdar & Qrunfleh, 2009). This, consequently, posits that IS planning should cover actions at formulation and execution levels in order to reach IS/business alignment. A congruent consideration of IS/business alignment between strategic, from one side, and tactical and operational organisational levels from the

other, suggest an inherent integration between the planning process and implementation of IT projects.

SISP seems to be an important variable within the function of IS/business alignment which allows the achievement of business objectives depending on the planning effectiveness. SIPS is a medullar component for IS/business alignment that bridges formulation and executions phases and, inherently, strategic and functional (tactical and operational) organisational levels. SISP implies the cooperative participation between IT and business managers as well as top management (Kearns & Sabherwal, 2007). Literature has indicated that this cooperative participation is enabled when shared knowledge exist between business and IT (Chan, Sabherwal & Thatcher, 2006; Reich & Benbasat, 2000; Luftman & Brier, 1999). Chan, Sabherwal & Thatcher (2006) highlights the influence of SISP on the development of share domain knowledge between IT and business, and consequently, on IS/business alignment. Thus, a logical assumption is to seek what relevant management practices (how shared knowledge is applied?) promote IS/business alignment by means of different existing SISP integrations.

3.5.2 The role of Management Practices in IS/business Alignment

Peppard & Ward (2004) propose a perspective on IT management that focused on operational IS/business alignment rather than on strategic IS/business alignment and considers how organisations can leverage IT value based on the concept of IS capability. In this notion, IS strategic management lays on developing managerial IS competencies which enhance managerial capabilities to play an important role to coordinate activities related to IT plans, organisations and controls. They define IS competency as the "ability to deploy combinations of firm specific resources to accomplish a given task" (Peppard & Ward, 2004 p.175) whereas IS capability is what the business can achieve through the deployment of these IS competencies. Organisations are then focused on the way they manage and use IS/IT since IS capabilities are the strategic application of IS competencies given organisational goals. This approach provides a starting point to examine IS competencies and capabilities in order to generate organisational business value. They aim for a new era of strategic IS management where the concept behind IS capability can be considered as a relevant antecedent of IS/business alignment research. This alternative conceptualisation of strategic IS management concentrates on sustainability and the achievement of continuous IT value based on a model that relates IS capabilities and competencies among different organisational levels. In their model, IS capabilities take action at strategic level whereas IS competencies do at tactical and operational levels. However, the actions of IS capability can be extended in order to enable interactions at either strategic or

tactical and operational levels. In following this understanding, the term IS capability can be congruent with the term *management practice* being use in this thesis. Thus, this thesis adheres the term of IS capability to define and conceptualise the scope of *management practices*. When the term management practice is referred in this thesis, the concept of IS capability provided by (Peppard & Ward, 2004) should be understood.

The discussion of management practices in IS/business alignment research has been of relevant interest. It could be assumed that this is due to the practical implications that practitioners and researchers attempt towards implementations of IS/business alignment. Among the years IS/business alignment research has advocated to propose alternative management solutions however their effect have been more at the conceptual level rather than with practical implications. For instance, Henderson & Venkatraman (1993) articulate the need to align internal and external domains of IT which once aligned can ensure the alignment of business domains. They developed the strategic alignment model (SAM) which conceptualised IS/business alignment in terms of two domains: strategic fit (internal and external domains) and functional fit (business and IT domains), and four components (business strategy, business, IT strategy and IT). This model suggests that effective management requires the balance of the four components in order to keep aligned vertically and horizontally both domains. In a subsequent study, Henderson, Venkatraman & Oldach (1996) suggest that alignment can be achieved through the selection of appropriate alignment perspectives which are key management mechanisms to assess short-term decisions and long-term planning. These perspectives are strategy execution, technology transformation, competitive potential and service level which, in managerial terms, depict the role of business and IT managers.

Following the progress of managerial practices to advance IS/business alignment, Luftman (1996) redefined the SAM model by providing eight perspectives instead of four. Luftman & Brier (1999) identified enablers and inhibitors of IS/business alignment. They found that the most frequent enablers are senior non-IT executives' support for IT, IT involvement in strategy development, IT understanding of the business, business–IT partnership, well-prioritized projects, IT demonstration of leadership. Whilst, the most frequent inhibitors are: lack of close relationship between IT and business, IT does not prioritize well, failure of IT to meet its commitments, IT lack of understanding of business, lack of senior executives' support of IT, IT management lacks leadership. They also conclude that achieving IS/business alignment is the arrangement of setting the goals and establishing a team, understanding the business linkage between IT and the business, analyzing and prioritising gaps, specifying the actions, and choosing and evaluating success criteria. Existing literature, however, does not provide wide

and further details for all the steps involved along achieving IS/business alignment. In an attempt to do so, Luftman & Brier (1999)'s six enablers and six inhibitors ground the Strategic Alignment Maturity Assessment framework (SAMs) proposed in Luftman (2000) and their harmony by six criteria: communication, value measurements, governance, partnership, technology scope and skills. In later studies these criteria are referred to as factors. Luftman (2000) provide one of the most influential frameworks in IS/business alignment either for academics or practitioners. This approach has been built consistently with previous research and uses the same background from preceding studies. Its implementation focuses on the process of assessing, achieving and maintaining IS/business alignment and holds practical implications based on management practices. Other existing assessments are either theoretical conceptualizations or particular studies that cannot be generically applied in several organizations (Gutierrez et al., 2008b). SAMs, conversely, has been tested in more than 50 global 2000 companies (Luftman, 2003) and aims to assess the organisational maturity level of IS/business alignment by providing practical implications. For instance, even though studies such as Reich and Benbasat (2000), Chan et al. (2006) and Hussin et al. (2002) asses IS/business alignment and consider relevant antecedents, some in the form of management practices, they lack of practical mechanisms of implementation in contrast to Luftman (2000) research.

SAMs assumes that management practices and IT choices can facilitate IS/business alignment. It provides a practical method for analyzing organizational IS/business alignment maturity by means of ranking management practices within five conceptual levels of maturity [*initial, committed process, established focused, improved and optimized process*] modelled after the capability maturity model (CMM) developed by the Software Engineering Institute at Carnegie Mellon. SAMs includes management practices and IT choices at each of the five conceptual levels. Maturity levels are composed by six factors [*communication, value, governance, partnership, scope & architecture, and skills*] and each factor groups a set of attributes or capabilities (management practices) which collectively measure the achievement of IS/business alignment maturity. The list of these management practices from an earlier version of SAMs (Luftman & Rajkumar, 2007) is listed in Table 3.5.

Table 3.5 Factors and attributes affecting IS/business alignment maturity (Luftman & Rajkumar, 2007)

Factors	Attributes/Capabilities/Management Practices
Communication: measure the effectiveness of the exchange of ideas, knowledge and information between IT and business organizations, enabling both to clearly understand the company's strategies, plans, business and IT environments, risks, priorities and how to achieve them.	1. Understanding of business by IT 2. Understanding of IT by business 3. Inter/Intra-organizational learning 4. Protocol rigidity 5. Knowledge sharing 6. Liaison(s) effectiveness
Value: uses balanced measurements to demonstrate the contributions of information technology and the IY organization to the business sin terms that both the business and IT understand and accept.	7. IT metrics 8. Business metrics 9. Balanced metrics 10. Service level agreements 11. Benchmarking 12. Formal assessment reviews 13. Continuous improvement
Governance: defines who has the authority to make IT decisions and what process IT and business managers use at strategic, tactical and operational levels to set IT priorities to allocate IT resources.	14. Business strategic planning 15. IT strategic planning 16. Organization structure 17. IT investment management 18. Steering committee(s) 19. Prioritization process
Partnership: gauges the relationship between a business and IT organization, including IT's role in defining the business's strategies the degree of trust between the two organizations, and how each perceives the other's contribution.	20. Business perception of IT value 21. Role of IT in strategic business planning 22. Shared goals, risks, rewards/penalties 23. IT program management 24. Relationship/trust style 25. Business sponsor/champion
***Scope & architecture*: measures:** IT's prevision of a flexible infrastructure, its evaluation and application of emerging technologies, its enabling or driving business process changes, and its delivery of valuable customized solutions to internal business units and external customer or partners.	26. Traditional, enables/driver, external 27. Standards articulation 28. Architectural integration 29. Architectural transparency 30. Flexibility 31. Managing emerging technology
Skills: measures human resources practices, such as hiring, retention, training, performance, feedback, encouraging innovation and career opportunities, and developing the skills of individuals. It also measures the organization's readiness for change, capability for learning, and ability to leverage new ideas.	32. Innovation, entrepreneurship 33. Cultural locus of power 34. Management style 35. Change readiness 36. Career crossover 37. Hiring and retaining 38. Social, political, trusting environment

SAMs has demonstrated to be a reliable diagnostic tool to improve the maturity levels which has been validated (Sledgianowski, Luftman & Reilly, 2006) and empirically tested (Sledgianowski & Luftman, 2005). Gutierrez, Orozco & Serrano (2009) analyze the significance of the six factors against organization size and indicate that the six factors are significant for either large, medium or small organizations. In addition, SAMs, originally based on the strategic alignment model (SAM), covers additional intangible business activities such as value, value creation, creativity and innovation in comparison to SAM. SAMs has enriched IS/business alignment research and is still generating research interest (Luftman, Ben-Zvi & Dwivedi, 2010; Luftman & Brier, 1999; Luftman, 2003; Sledgianowski, Luftman & Reilly, 2006; Sledgianowski & Luftman, 2005; Luftman, Kempaiah & Nash, 2005). The original framework was published in Luftman (2000) but has been suffering slightly modifications along the years. For this research, the version of the SAMs framework provided in Luftman & Rajkumar (2007) will be used since it seems to be the updated version with prevalent names and descriptions.

3.6 IT GOVERNANCE & IT/BUSINESS ALIGNMENT

IT governance, similarly with IS/business alignment, is an emerging management concern that has been recognised relevant to realise business value out of adequate IT investments; inclusive it has been considered the most important factor in generating business value from IT (Weill & Ross, 2004 p.7). Empirical studies evidence that higher organizational performance can be the result of tight IS/business alignment (Kearns & Lederer, 2003) but also consequence of effective implementations of IT governance practices (Weill & Ross, 2004). Although both IT governance and IS/business alignment disciplines seem to pursue similar goals, their foundations have been differently discussed in the literature. IT governance, in comparison to IS/business alignment, appears to have more practical arguments that have been prompted by recent corporate scandals such as Enron, Arthur Andersen and WorldCom. Particularly, new regulations such as Sarbanes-Oxley in U.S and Bassel II in Europe urged mechanism to provide compliant initiatives, performance measurements and risk management goals which nowadays are highly dependent on IT. These new regulations highlight that IT strategic decisions are not anymore only dependent on the IT function instead they are the main responsibility of the corporate board. Thus, from this understanding, IT governance solutions should, aim to develop a corporate system in order to bridge IS and business goals and establish connections between IT and business management. IT governance research, in similarity to IS/business alignment, has considered IS planning and management practices as main rationale arguments. Luftman, Ben-Zvi & Dwivedi (2010) evidence the relevance of both elements over others as part of IT governance practices to achieve IS/business alignment.

Table 3.6 Review of IT Governance tools (Larsen et al., 2006)

Process Type	Organisational Entity			
	Procedure	Activity	Business Unit	Business System
Decision-Making processes	SAS70	COBIT		Weill & Ross, (2004) Peterson (2004)
Core Business Processes	ITIL/BS15000 ISO/IEC 38500-2008	CMM/CMMI IT Audit IT Due Diligence	Six Sigma	IT Service CMM
Support Processes	ISO 17799/BS7799 Systrust	ASL PRINCE2		SOX

A variety of frameworks, standards, models and guidelines have been available for organisations in order to achieve effective and efficient IT governance. Larsen (2006) reviewed seventeen different alternatives among IT Governance and classify them based on their scope and process; see Table 3.6 for their classification. This review also reveals two schools of thoughts that have been drawn particular perspectives to approach corporate solutions in IT governance. Although, both schools of thoughts sound contradictory, they address more similarities in the construction of core management mechanisms to achieve IT governance designs. One school views IT governance as a management system of sets of controls and risks. This view has been mainly supported by empirical research but widely adopted in the industry (ITGI, 2003). An alternative view seeks IT governance as business system of making-decision processes which has considerably adopted in the academia and holds more theoretical support. Under this perspective, it is noticeable the proposals of Peterson (2004) and Weill & Ross (2004) due to their organisational scope, undertaken process type and stronger theoretical support. There are different definitions of IT governance however a predominant explicit or implicit understanding lays on the conceptualisation of having a governance system to manage two main elements: making-decision processes and shared understanding between IT and business managerial levels. A common aim among these different conceptualisations is the effect of IT governance towards business organisational performance by means of aligning IS and business strategies through managerial mechanisms (Brown & Grant, 2005). In Table 3.7 relevant definitions of IT governance are listed where this can be evidenced. Since the two elements aforementioned discussed are explicitly considered in Peterson (2004)'s definition, this research assumes that IT governance is "the system by which an organization's IT portfolio is directed and controlled. It (a) describes the distribution of IT decision-making rights and responsibilities among different stakeholders in the organization, and (b) the rules and procedures for making and monitoring decisions on strategic IT concerns" (Peterson, 2004 p. 8).

Table 3.7 IT governance definitions

IT Governance definitions	Reference
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.	Webb, Pollard & Ridley, (2006)
Organisational capacity exercised by the board, executive management and IT management to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT	Van Grembergen (2000)
The responsibility of executives and the board of directors, and consists of the leadership, organisational structures and process than ensure that the enterprise's IT sustains and extends the organisation's strategy and objectives	ITGI (2003)
IS/IT Governance concentrates on 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.	Korac-Kakabadse & Kakabadse (2001)
The system by which an organization's IT portfolio is directed and controlled. It (a) describes the distribution of IT decision-making rights and responsibilities among different stakeholders in the organization, and (b) the rules and procedures for making and monitoring decisions on strategic IT concerns	Peterson (2004)
The degree to which the authority for making IT decisions is defined and shared among management, and the processes managers in both IT and business organizations apply in setting IT priorities and the allocation of IT resources.	Luftman & Brier (1999)
The framework for decision rights and accountabilities to encourage desirable behaviour in the use of IT	Weill & Ross (2004)

Studies show that one of the most important organisational components to improve or achieve IS/business alignment is the identification of IT governance practices (De Haes & Van Grembergen, 2009; Luftman, Ben-Zvi & Dwivedi, 2010). Effective implementations of IT Governance are expected to play an important role in the organisational decision making processes. Before an IT invest is made, a decision –making process is followed which ends with the formal authorisation and the specific commitment. This consideration implies managerial actions at strategic, tactical and operational levels, and the definition of whom makes them. These arguments have been indicated by Luftman, Ben-Zvi & Dwivedi (2010). This study aim to

evidence the relevance of IS planning process and management practices in the form of IT governance practices to achieve IS/business alignment. The evident tight relationship between IS planning and IT governance posits it with conditions to support and enable business and IS planning processes along organisations. However, such processes need work at different organisational levels which include the implementation of both operative and strategic management practices to be effective (Tarafdar & Qrunfleh, 2009). This multilevel implementation implies structural mechanism associated with communications and control management systems (e.g. IT governance) which are needed to build IT-line partnership for technological innovation (Zmud, 1988). This assumes that IT governance, if effective implemented, can provide formal and informal mechanisms to enable and further partnership or shared knowledge between business and IT.

Both IS/business alignment and IT governance areas have been researched independently and few studies indicate mechanisms that link their consequences or antecedents. However, what appears to be in both is the positive effect to further organisational performance. This notion of strong relationship has suggested seeking to the relationships between IT/business value, IS/business alignment and IT governance. However, few attempts seem to be undertaken so far. Although some studies anticipate that IT governance is an antecedent and enabler for achieving IS/business alignment (De Haes & Van Grembergen, 2009; Schlosser et al., 2010), literature disagrees how both areas are related. For instance, the IT Governance Institute (ITGI) considers IS/business alignment as one out of five areas [*strategic alignment, value delivery, risk management, resource management and performance management*] within IT governance. Alternatively, Luftman (2003) includes IT governance as one out of six IS/business alignment maturity factors [*communication, value measurement, IT governance, partnership, scope & architecture and skills*] to assess IS/business alignment maturity. Despite these and other incipient differences might be evidenced in the literature, IT governance seems to provide more practical implications in comparison to the complexity of IS/business alignment. So, organisations have seen in IT governance a managerial mechanism to succeed IS/business alignment levels and better organisational performance. The availability of tools of IT governance such as COBIT and ISO/IEC 38500-2008 are examples of well-adopted de facto standards by the industry.

In practice, the implementation of IT governance practices drives mechanisms to build up a baseline of processes, structures and relational capabilities (Weill & Ross, 2004; Peterson, 2004; Van Grembergen, De Haes & Guldentops, 2003). These capabilities, or managerial abilities, enable people to execute their responsibilities in support of IS/business alignment and the

creation of IT/business value (Peterson, 2004). To achieve higher organizational performance, those capabilities need to be indentified and then amalgamate an enterprise management system that facilitates controls along different information systems (Peterson, 2004; Beimborn, 2009). This thesis coincides with this notion but includes IS/business alignment as an effect of effective IT governance practices. However, the evident relationship between IS/business alignment and IT governance has been poorly researched and additional research is needed to clarify such relationship. It is the aim of this research to contribute in this effort.

3.7 SUMMARY

- Challenges in IS/business alignment were identified such as:
    - IS/business alignment has been tackled from different dimensions such as strategic/intellectual, structural, social, informal structural and cultural, which have been made complex its unified conceptualisation and understanding.
    - Research in IS/business alignment provides few pragmatic options and most of this approaches are limited to assess perceptions at strategic levels which leaves a gap for operational and tactical IS/business alignment arguments.
    - The integration of strategic, tactical and operational IS/business alignment perspectives have been barely addressed
- This review helped to configure philosophical assumptions and a conceptual understanding of IS/business alignment among this research such as:
    - IS/business alignment can be conceptualise as an organic and evolutionary process-based approach.
    - IS/business alignment is the result of a series of adjustments at operational, tactical and strategic levels.
- Findings indicate that:
    - Two main arguments; *management practices* and *IS-business planning process*, have been underpinning the rationale towards IS/business alignment research.
    - There is a positive relationship between IS/business alignment and IT governance but research has failed to provide how such relationship can be assumed.

CHAPTER 4: Evaluating the relationship between IT Governance and IT/Business alignment

CONFIRMATORY PHASE

4.1 CHAPTER OUTLINE

This chapter includes the results and analysis of an international survey study. To present this study and results, this chapter is organized in five sections. Firstly, an overview of the study is presented. Secondly, the rationale for the selection of the management practices in IS/business alignment to be evaluated is discussed. Thirdly, the method to analyse the data collected from the survey is described. Fourthly, analysis and results are discussed. Finally, conclusions of the study are presented.

4.2 CONFIRMATORY PHASE OVERVIEW

In Chapter 3 was indicated the relevance of *IS planning* and *management practices* as arguments in the rationale of IS/business alignment. Additionally, it was also discussed their grounded relevance to realise and put in practice IS/business alignment. In this chapter, both arguments are examined to confirm their practical implications and indicate their incipient relationships towards IS/business alignment. To do so, IS/business alignment was considered the product of a well-established IS planning process and a set of effective management practices. The study proposed in this chapter attempts to identify *what* relevant management practices enable tight alignment between IS and business given an adopted IS planning integration strategy. The argument behind this rationale is discussed in the following section.

4.2.1 Study background

IS plans can be perceived to be useful for supporting business objectives, improving systems integration, exploiting information technology for competitive advantage, and prioritizing IS development projects (Teo and Ang 2000). However, unpredictable business ways cannot be planned and IS plans will eventually changes along the implementation of an IT project. There is a disconnection that often lies between formulation and implementation of IT projects (Benbya & McKelvey, 2006). Conversely to IS plans, the process of IT planning, commonly called Strategic information system planning (SISP)[7], has a broader and multilevel organisational impact. This process has mainly positioned at the strategic level as consequence of integrating strategic plans to IS and business strategies but assuming the conciliation of bottom-up and top-down organisational levels (Grant 2005). It is also assumed that this process should influence the organization at strategic, tactical and operational levels which consequently will provide uniform and consistent decisions towards IT investments (Peaks et al. 2005). Therefore, either particular solutions at strategic or operational dimensions cannot in solely circumstances achieve IS/business alignment (Benbya & Mckelvey 2006). Management is then an important driver to transform strategy into daily business which should ensure a thorough interaction between formal and informal IS and business structures at both strategic and tactical levels (Tarafdar & Qrunfleh, 2009). Nonetheless, the literature has failed to examine this evident interaction between strategic and lower levels which the dynamics of IS/business alignment demands. Solutions lay on management which needs to enable practices to create formal an informal structure for effective making-decision process and effective IS planning.

[7]The adopted definition of Strategic Information Systems Planning (SISP) in this thesis is cited in section 3.5.1.

In Chapter 2 was discussed the relevant role of the SISP process in achieving IS/business alignment. Particularly, the role of SISP process as a main variable in the function of IS/business alignment was indicated. To understand this function, it is important to recognise that IS/business alignment can occur at multiple organisational levels (Chan & Reich, 2007; Benbya & McKelvey, 2006) so as to the SISP process does. This has been indicated by Gutierrez et al. (2005) testing the six factors by Luftman (2000) at strategic, tactical and operational levels. The IS/business alignment at strategic level is about planning for and choosing to IT that is appropriate for the business strategies. This happens linking IS and business plans and ensuring vertical relationships between top management and functional management. IS/business alignment at tactical level, conversely, is accomplished when IT plans are implemented and business value is realised. This happens ensuring horizontal relationships between functional business and IS managers (Tarafdar & Qrunfleh, 2009). So, to enable those vertical and horizontal managerial relationships, there is the need to know what management practices ensure the dynamics of IS/business alignment. There is literature that has suggested and followed this claim. For instance, Weill and Ross (2004) have found that effective practices of IS structures has been positioned as a powerful management tool to impact positively the degree of IS/business alignment and leverage business value perceptions of IT. Tallon (2003) suggests investigating the relationships between IS/business alignment and organizational flexibility as well as those management practices that maximise IS/business alignment. Yetton & Johnson (2001) also recommend investigating forms of management structures and process that are required in the process of IS/business alignment.

4.3 CONFIRMATORY STUDY

4.3.1 Objective and approach

Given the influence that the SISP process made towards either IS/business alignment at strategic or tactical levels and having discussed that management practices are needed to make this impact effective, this validation phase aims to identify what management practices of IS/business alignment are relevant towards the process of IS/business alignment given an adopted IS-business planning integration strategy. To implement this validation study, relevant management practices of IS/business alignment were selected from the literature review. To collect data, a survey was designed based on these management practices and conducted to collect organisational perceptions about their relevance. Although the analysis does not discern what specific management practices work at what particular levels, it aims to identify relevant management practices for all levels given the support from an earlier study that indicate the

relevance of Luftman's factors at all organisational levels (Gutierrez et al., 2005). In this study's design, the IS-business planning integration strategy was considered an independent variable in the function of IS/business alignment. The analysis examines the organisational relevance of the management practices and provides a discussion from the results of the study and arguments from the literature. The results provide an initial and confirmatory assessment of specific and relevant IS/business alignment management practices against the IS-business planning integration strategy adopted by different organisations. To follow-up this quantitative study, a subsequent post-survey fieldwork, a qualitative study, will extracts more in-depth results to understand how these management practices are being related. This study is described in Chapter 6.

4.3.2 Method to select management practices

In proposing which management practices to concentrate on fist, it seems reasonably to find an IS/business alignment approach that suggest a number of management practices influencing the IS/business alignment process. Therefore, a selection process was undertaken to select a study in which relevant management practices are considered towards the process of IS/business alignment. This selection took into account two main criteria: 1) studies with robustness in practical implications and 2) studies with relevant research impact. The process aimed to evaluate their differences and distinguish their underpinning constructors, so specifically attention was given to evaluate their antecedents. Emphasis was given to studies that assess IS/business alignment since these often define units of analysis which commonly are either factors, antecedents, inhibitors or enablers of IS/business alignment. To perform the comparative analysis, the taxonomy proposed by Gutierrez et al. (2008) was used as the main instrument to benchmark the studies and review their theoretical and practical constructors.

Table 4.1 Selection of assessment articles and their research details

Research criteria		Avison et al. (2004)	Chan, Sabherwal & Thatcher (2006)	Cragg, King & Hussin (2002)	Luftman (2000); Luftman (2003)	Reich & Benbasat (2000)
Rationale		Develop a practical assessment tool	Demonstrate that antecedents and relationships vary by industry and business strategy	Develop measures for SMEs	Develop a practical assessment tool	Identify social factors
Antecedents		*Organisational perspectives:* Technology implementation Technology leverage Organisational requirements	Shared domain knowledge Planning sophistication Prior IS success Organisational size Environmental	IT sophistication CEO commitment to IT External IT expertise	Communication Competency/Value Governance Partnership Technology scope Skills	Shared domain knowledge between business and IT executives IT implementation success Communication between business and IT executives Connections between business and IT planning processes
Assessing objective	Theoretical	X	X	X		X
	Practical	X		X	X	
Background Model	SAM	X			X	
	Non-SAM		X	X		X
Organisational Scope of analysis	Strategic	X		X	X	X
	Tactical	X	X	X		X
	Operational	X				
Research Method	Survey		X	X	X	
	Case study	X				X

E-resources were used as the primary means of searching. Different databases linked to "web of science", part of "ISI web of knowledge service for UK education", and its associated database "science citation index expanded" provided most searching resources. This database indexes 5900 major journals across 150 scientific disciplines (ISIknowledge, 2006) and permits a review of wider selection of databases. This source of data was used during the first two weeks of July 2006 to collect relevant literature whose title or abstract contained the keyword "strategic alignment". Fifty-three articles were found and then ranked according their research impact (the number of times a study has been cited). These articles were searched according three criteria: a) articles proposing tools or instruments of assessment, b) articles with

empirically implementation of their instruments or tools and c) articles with relevant keywords such as "measure", "measurement", "measuring", "assessing" or "assessment" in their abstract or title. After the abstract revision, of thirty-one articles were compiled whose references and citations allowed drill down other relevant articles. New articles were added according to whether their keywords in abstracts and titles included "alignment", "strategic information systems planning" or "information systems planning"; and their impact would agree with the aforementioned criteria. After detailed revision, the articles were classified into two groups. The first group included studies focused on the impact and relevance of IS/business alignment (business performance, financial benefits or business IT value). The second group included articles focused on assessing but also studies that aim to better understand IS/business alignment were considered.

After an exhaustive revision, twenty-two articles in the first group and eight articles in the second group were identified. However, only five articles were considered in the latter group since two of them were subsequent research of previous articles, so only earlier versions were kept. See Table 4.1 which includes the selection of articles and their research details. An exhaustive revision was undertaken in order to select an approach that fulfil the criteria adopted and Luftman (2003)-Luftman (2000)[8] was the selected approach. The rationale behind this selection is below described.

4.3.3 Rationale of the management practices selected

Two main arguments support the selection of the strategic alignment maturity assessment framework model (SAMs) by Luftman (2003): *1) the study holds relevant practical implications* and *2) the study is current and subject of further interest*. Even though studies such as Reich and Benbasat (2000), Chan et al. (2006) and Hussin et al. (2002) asses IS/business alignment and consider relevant factors, they lack of practical mechanisms of implementation. Existing IS/business alignment assessments are either theoretical conceptualizations or particular studies that cannot be applied generically in several organizations (Gutierrez et al. 2008). It was found that only few studies include the identification and the management practices that affect IS/business alignment. Luftman's SAMs framework, on the contrary, is a practical method for analyzing organizational maturity of IS/business alignment by means of ranking management practices within five levels of maturity [initial, committed process, established focused, improved and optimized process]. Each of these levels is subdivided into six factors

[8] Both Luftman(2003) and Luftman (2000) guided the development of the survey. From here the use of these two studies can be cited indistinctly when referring to this survey.

[communication, value, governance, partnership, scope & architecture, and skills] and each factor groups different management practices related to the factor. These management practices are also called attributes in SAMs. The Luftman's SAMs has recently been tested and validated by Sledgianowski et al. (2006) which findings show that this framework can be used as reliable diagnostic tool to improve the maturity levels of IS/business alignment. In other study, Gutierrez et al. (2009) also validates SAMs's reliability. They analyze the significance of its factors against organization's sizes and indicate that the six factors are significant for either large, medium or small organizations. SAMs was originally based on the strategic alignment model (SAM) by Henderson & Venkatraman (1993) but, in comparison to the latter, it covers additional factors such as organizational value creation. Its practical implications have been subjected of current and still generating interest for either academics or practitioners (Luftman, Ben-Zvi & Dwivedi, 2010; Luftman & Brier, 1999; Luftman, 2003; Sledgianowski, Luftman & Reilly, 2006; Sledgianowski & Luftman, 2005; Luftman, Kempaiah & Nash, 2005). From this benchmarking analysis it was found that the SAMs framework is pragmatic tool but its implications have been mainly applied at strategic levels and leaving a gap to investigate how its constructors can be assessed at either tactical or operational levels. In addition, SAMs framework considers that all factors are equally important in order to achieve alignment. Although this research does not aim to contradict this, it aims to identify how specific practices can enhance the IS/business alignment process in comparison to others. So, practitioners can concentrate efforts in those more impacting practices.

4.3.4 IS-business planning integration strategies

The governance factor included in Luftman's SAMs framework groups management practices related to the IS planning process but their scope is limited in relation to the SISP concept discussed in this research. Therefore, it was decided to include the strategic IS-business planning integration as a variable to examine its impact in the IS/business alignment process. In section 3.5.1 was discussed that when sharing knowledge between IS and business stakeholders exists better plans can be achieved and consequently enhanced IS/business alignment. A simplified approach about how sharing knowledge can be achieved in organisations has been indicated by Teo & King (1997). Teo & King 1997) draw an evolutionary pattern in terms of movement to four types of integration: administrative, sequential, reciprocal and full integration. This approach exemplifies a topology of IS-business planning that can easily categorise the type of integration performed. Despite Teo & King (1997) include four integrations, this research only uses three stages of them. The full-integrated pattern was discarded since in practice this integration is rarely indicated. The independent stage

[independent integration planning] refers to independent planning which implies only administrative integration. This pattern is characterised by minimum interaction of top business management in the IS planning process. The sequential stage [sequential integration planning] considers a one-way linked planning with sequential integration, hence IS planning follows business planning. This pattern is characterised by formal participation of IS to support business requirements so business is involved and participate in in the development of IS plans. However, IS plans are only the result of the business. For the synchronous stage [simultaneous integration planning], planning is two-way linked with synchronous IS-business integration. This pattern is characterised by s a two-way commitment that enable the formulation of IT investments between business and IS roles, so it is expected that business strategies and IS influence reciprocally each other.

Table 4.2 Online survey based on Luftman (2000)

Factors	Attributes/Management Practices	Variables
Communication	1. Understanding of business strategies by the IT department	COMM1
	2. Understanding of IT capabilities by the business department	COMM2
	3. Knowledge sharing between organisational levels from strategic to operational and with business partners (e.g. other commercial entities such as suppliers, customers, etc)	COMM3
	4. Creating a communication environment that promotes freedom to express opinions about business and IT strategies in a flexible and informal way	COMM4
	5. Conducting regular meetings between IT and business departments to discuss IT priorities, requirements and implementation	COMM5
Value	6. Selection of appropriate metrics for the organisation	VALUE1
	7. Balancing of metrics by linking Business and IT metrics	VALUE2
	8. Application of metrics at different organisational levels	VALUE3
	9. Making effective use of measurements obtained from the metrics application	VALUE4
	10. Using selected metrics on a regular basis plan	VALUE5
Governance	11. Integrating the enterprise's business plan and IT	GOV1
	12. Linking IT projects with the integrated business-IT plan	GOV2
	13. Reviewing business priorities before adopting any IT project	GOV3
	14. Conducting steering committees to prioritise IT projects	GOV4
	15. Evaluating IT investments before and after implementation	GOV5
Partnership	16. Involving IT department in developing business strategies	PART1
	17. Sharing of risk and rewards by IT and business management in relation to IT projects	PART2
	18. Using IT to enable and drive business strategies	PART3
	19. Considering IT to be a significant part of business, not just a cost centre for doing business	PART4
	20. Sharing a long-term relationship between IT and business that enables trust	PART5
Scope & architecture	21. IT is able to provide integrated information systems across the organisation and with business partners	ARCH1
	22. IT is able to provide a flexible infrastructure that enables fast response to changes	ARCH2
	23. IT is able to evaluate and apply emerging technologies effectively	ARCH3
	24. IT is able to enable or drive business processes and strategies with a broad scope of information systems	ARCH4
	25. IT is able to provide information security	ARCH5
Skills	26. Providing formal opportunities to learn both IT and business skills	SKILL1
	27. Providing formal training before implementing a new IT project	SKILL2
	28. Providing career crossover opportunities among business departments	SKILL3
	29. Willingness or readiness to adopt technological changes	SKILL4
	30. Trusting social and political culture	SKILL5

4.4 METHOD

A survey was found to be the most appropriate tool for data collection since questions can be interpreted in the same way by respondents (Saunders et al. 2003). The online survey technique was chosen since it is easier to access a large audience and also provides an efficient way of collecting responses from different geographical locations. The survey was targeted to top level and middle managerial positions. CEO's perceptions and attitudes towards IT have been strongly associated with the extent of the use of IT (Tallon 2000). In addition, top managerial perceptions have been reported as key to understanding how IT affects organisation's performance. The online survey was administrated and sent using e-resources provided by QuestionPro. QuestionPro is an online web-based software (www.questionpro.com) that deliver advance features to conduct online research and also provide analytical tools.

4.4.1 Survey implementation design

A pilot test was conducted previous the final survey. Managers at tactical and strategic positions were invited to conduct the pilot and 22 responses were collected. This initial attempt helped to assess the audience's understanding of the questionnaire and improve its application. As a result of this preparation phase, some questions were reworded in order to simplify their understanding. The final survey was structure in two main sections: background details and factor's relevance. The first section, background details, collects details of the participants' organization. This section consists of five questions which include organization size, type of business unit, location, business sector and level of planning integration. In the second section, factor's relevance, questions related to each management practice were included. There was one question for each management practice but a description for each factor (set of related management practices) was added at the beginning of each set in order to provide additional context. A five-point likert scale (1 was the least relevant and 5 was the most relevant) was used to rank each management practice. Hence, respondents rank their relevance according their organizations. The ranked items are listed in Table 4.2 and the complete survey is included at Appendix A.1.

4.4.2 Data collection

The length of the survey was kept short in order to increase its response (Kitchenham & Pfleeger). The survey was sent online to various organizations around the world. Associations such as ISACA (London Chapter of Information Systems Audit and Control Association) and LACAIS (Latin American and the Caribbean Chapter of Association for Information Systems)

helped to invite participants. ISACA, particularly, extended the invitation to their worldwide members. These associations were targeted as they affiliate IT-related and non-IT related professionals mainly at strategic and tactical level positions. In addition, by targeting these associations, it was assumed bigger awareness of the participants regarding IS/business alignment. ISACA, for instance, holds seminars and events that include the discussion of IS/business alignment as part of their agenda. From January to March 2007 data was collected and a total number of 161 responses were received from respondents of organisations all over the globe. However, only 103 complete surveys were included since only completed surveys were considered in the final analysis. The sample included participants from Europe, North and South America, Oceania/Asia and Africa.

4.5 ANALYSIS AND RESULTS

4.5.1 Descriptive analysis

Results from the data collected were validated with parametric assumptions of independence of samples, normal distribution, and homogeneity of variance (as the analysis of variance (ANOVA) assumes) The reliability test shows confidence among the results from the six factors since the range of the Cronbach's Alpha's values were bigger than 0.8 (see Table 4.3), thus acceptable internal consistency is reached according recommendations (Field, 2009). All statistics are included in Appendix A.2.

Table 4.3 Reliability test

Factor	Cronbach's Alpha	Cronbach's Alpha (Based on Standardised Items)
Communication	0.845	0.846
Value	0.923	0.923
Governance	0.881	0.884
Partnership	0.875	0.878
Scope & architecture	0.872	0.873
Skills	0.845	0.846

Results from the descriptive statistics indicate that management practices related to *governance* and *partnership* were ranked with higher values over other practices. *Communication* also shown high ranking, including the second highest average value after *governance*. However, most of its individual management practices are below partnership and governance. Overall, the average value of management practices related to *governance* reached the highest score and scores from different participants show low dispersion which evidence the agreement's

response in these practices. The details of these results are shown in Table 4.4 and values are charted in Figure 4.1. In this chart, the values of *partnership* and *governance* have been highlighted as their values show substantial differences against others. From Table 4.4 higher values can be identified by colours and arrow directions; most of these higher values belong to *governance* and *partnership*. These are: *understanding of business strategies by the IT department, integrating the enterprise's business plan and IT, linking IT projects with the integrated business-IT plan, reviewing business priorities before adopting any IT project, using IT to enable and drive business strategies, considering IT to be a significant part of business, not just a cost centre for doing business* and *sharing a long-term relationship between IT and business that enables trust*, were the highest. From this list, managerial assumptions can be done to design managerial actions towards those identified concerns.

Table 4.4 Descriptive statistics

Management Practices (Variables)		Minimum	Maximum	Mean	Std. Deviation	Average
Communication	IT Business environment	2.00	5.00	4.1068	1.02816	**3.8155**
	Business IT environment	1.00	5.00	3.7379	0.96975	
	Organisational education/learning	1.00	5.00	3.7379	0.98976	
	Knowledge sharing	1.00	5.00	3.8058	1.12073	
	Liaisons	1.00	5.00	3.6893	1.08492	
Value	IT metrics	1.00	5.00	3.5049	1.14510	**3.5379**
	Business metrics	1.00	5.00	3.4854	1.13642	
	Balance metrics	1.00	5.00	3.3786	1.06749	
	Assessment and review of IT investments	1.00	5.00	3.7184	1.16667	
	Strategic IT function contribution	1.00	5.00	3.6019	1.09670	
Governance	Business planning with IT	2.00	5.00	4.1262	0.99685	**3.8757**
	IT planning with business	2.00	5.00	3.9806	0.95979	
	IT budgeting	1.00	5.00	3.9612	1.04715	
	IT investment decisions	1.00	5.00	3.6699	1.11486	
	IT function business reactiveness	1.00	5.00	3.6408	1.17034	
Partnership	Business perception of IT Value	1.00	5.00	3.5243	1.16185	**3.7282**
	Sharing of goals, risks and rewards	1.00	5.00	3.3883	1.14817	
	Managing the IT business relationship	2.00	5.00	3.8932	0.91729	
	IT-business trust relationship	1.00	5.00	3.9709	1.10663	
	Business sponsors/champions	1.00	5.00	3.8641	1.04833	
Scope & architecture	IT standards	1.00	5.00	3.9223	1.01643	**3.7165**
	Scope of architectural integration	1.00	5.00	3.7282	1.07734	
	Business & IT changes disruption	1.00	5.00	3.4466	1.12658	
	Organisational change	1.00	5.00	3.4951	1.11912	
	Scope of architectural integration	1.00	5.00	3.9903	1.08912	
Skills	Innovation & Entrepreneurship	1.00	5.00	3.6602	1.05304	**3.4835**
	Cultural locus of power	1.00	5.00	3.6602	1.12506	
	Change readiness	1.00	5.00	3.1748	1.07034	
	Attract & retain talent	1.00	5.00	3.6602	1.00541	
	Interpersonal interaction	1.00	5.00	3.2621	1.11988	

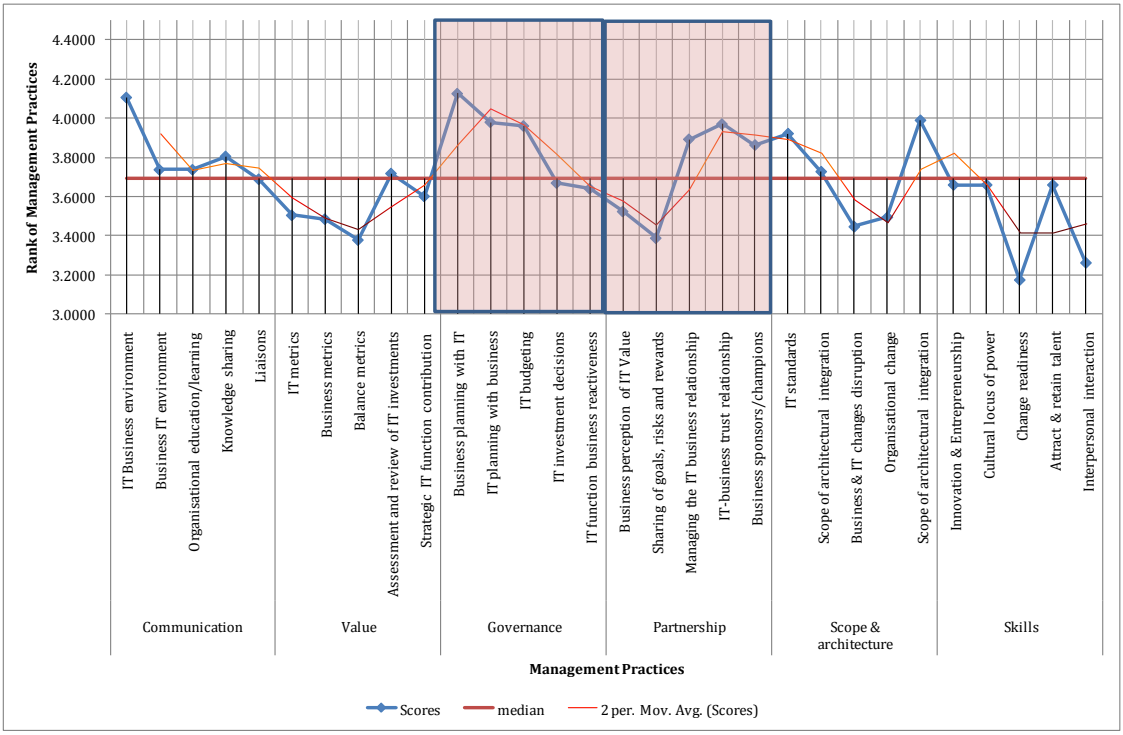


Figure 4.1 Chart of management practices values

Cross tabulation was performed to analyse the association between IS-business planning integration and each of the six factors. Results show that the p-value value of *governance* (chi-square as large as 51 for 30 degrees of freedom would be expected by chance fewer than 9 time in 1000) is substantially lower than the level of significant defined ($\alpha = 0.05$) which show a significant relationship between governance and IS-business planning integration. Values of Pearson chi-square of all six factors are shown in Table 4.5.

Table 4.5 Values of Pearson Chi-Square by factor

Factor	Value	df	Asymp. Sig. (2-sided)
Communication	46.324[a]	30	.029
Value	57.088[a]	38	.024
Governance	**51.269[a]**	**30**	**.009**
Partnership	47.290[a]	32	.040
Scope & architecture	41.310[a]	34	.182
Skills	37.236[a]	38	.505

4.5.2 The relevance of management practices by planning integration strategy

The survey results report that the sequential IS-business planning integration predominates in most organisations however the sample also reports a small difference against the other planning integrations. These results are reported in Table 4.6.

Table 4.6 Distribution of planning integration strategies and respondents

Planning integration strategies	Respondents	Respondents (%)
Independent (IS strategy formulation and business strategy formulation are separate, unrelated processes)	25	24.27%
Sequential (IS strategy formulation follows and supports business strategy formulation	45	43.69%
Simultaneous (IS strategy formulation and business strategy formulation are done concurrently)	33	32.04%
TOTAL	**103**	**100%**

ANOVA was chosen as the inferential statistical test to analyse the relationships between *factors* and *strategic planning integration*. In this case, the independent variables are numerically represented by the mean of management practices related to each factor. The dependent variable is *IS-business planning integration* which holds three possible values depending on the type of integration. Thus, the analysis assumes comparing the *six factors* means against *IS-business planning integrations* in terms of variance with reference to normal distribution. A level of significance $\alpha = 0.05$ was defined and *post-hoc* analysis with the conservative Dunnett test was specified to execute multiple comparisons. In addition, the assumption of homogeneity of variance test and means plots to chart the means of the conditions were included.

Table 4.7 ANOVA test results (ρ value by factor)

Maturity Factors	F	*Sig (ρ* value)
Communication	5.321	0.006
Value Measurement	4.565	0.013
Governance	8.106	**0.001**
Partnership	5.601	**0.005**
Scope and Architecture	2.678	0.074
Skill	3.792	0.026

The one-way between-subjects analysis of variance reveals a reliable effect of all factors, excepting *scope & architecture,* on *IS-business planning integration*. The ρ values of the six factors are reported in Table 4.7. However, the values of *governance* and *partnership* reported the highest computed values; F(2,100)=8.11, p=0.001, MS_{error}=0.667, α=0.05 for *governance* and F(2,100)=5.60, p=0.005, MS_{error}=0.717, α=0.05 for *partnership*. Since the F ratio was found statistically significant in most factors, the multiple comparisons output was reviewed (post-hoc test). Part of this output is depicted in Table 4.8 which includes a separate row for each *planning integration* of the independent variable (factors). Only the comparative values from *communication*, *governance* and *partnership* are shown since their ρ value which compares the different *IS-business planning integrations* against each *factor* is considerably less than 0.05. It means that it is likely that these means are different and rejects the null hypothesis. It is also important to note that only these factors confirm the evolutionary pattern through the three types of integration (independent integration to sequential integration to simultaneous integration) since the significance of the ρ value is consistent in all evolutionary *planning integrations*. Thus, results support the relevance of *communication*, *governance* and *partnership* towards a more integrated IS-business planning process but also a considerable positive impact on IS/business alignment.

Table 4.8 Multiple comparison (post-hoc test)

Dependent Variable		(I) Planning integration	(J) Planning integration	Sig.
COMMUNICATION MEAN	Games-Howell	Independent	Sequential	.018
			Simultaneous	.050
	Dunnett t (2-sided)[a]	Sequential	Independent	.004
		Simultaneous	Independent	.026
GOVERNANCE MEAN	Games-Howell	Independent	Sequential	.010
			Simultaneous	.002
	Dunnett t (2-sided)[a]	Sequential	Independent	.001
		Simultaneous	Independent	.001
PARTNERSHIP MEAN	Games-Howell	Independent	Sequential	.031
			Simultaneous	.040
	Dunnett t (2-sided)[a]	Sequential	Independent	.004
		Simultaneous	Independent	.012

In Figure 4.2, the values of *partnership* and *governance* factors show an increasing significance among more sophisticated *IS-business planning integrations,* thus there is a positive significance between *partnership* & *governance* and the evolutionary planning pattern. In addition, these results also show that both *governance* and *partnership* impact significantly the process of IS/business alignment regardless of any type of IS planning integration. The implementation of

both factors and related management practices assumes actions should look at and include structural as well as social organizational components if organisations desire to improve their IS/business alignment.

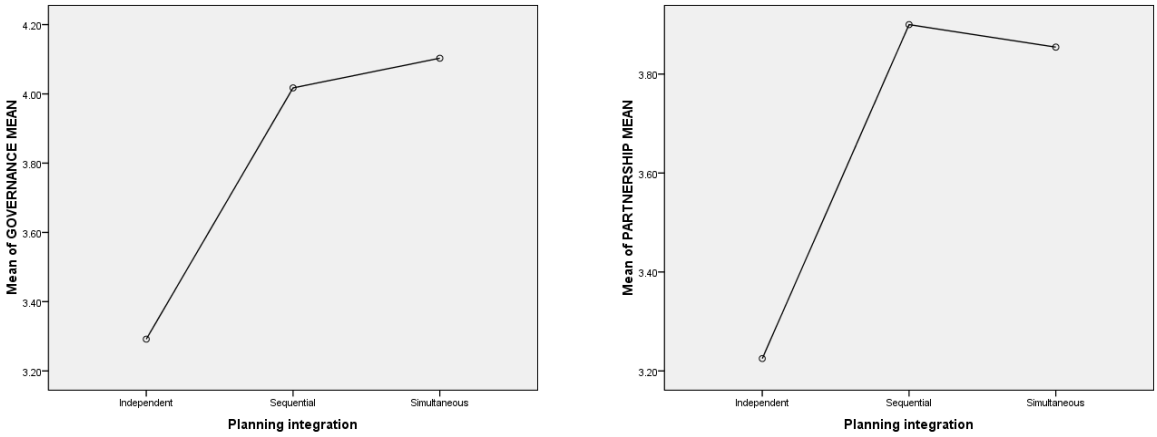


Figure 4.2 IS-business planning integration growth vs factor's maturity

Gutierrez et al. (2009) found that IS/alignment maturity factors by Luftman (2003) does not show significant differences among either large or SMEs organizations. So, these results suggest that although small and medium organisations might have limited resources and IS expertise than large organisations, the six factors are valid to assess large as well as small and medium organisations. These results are consisted with the findings of these research which assert that five factors [communication, partnership, value, governance and skills] are also related significantly towards the IS/business alignment. However, management practices related to *governance* and *partnership* report the highest and more evident relationship towards IS/business alignment but also regardless of any IS-business planning integration.

4.6 CONCLUSIONS

The practice's relevance of 30 management practices grouped in six IS/business alignment maturity factors [governance, partnership, scope & architecture, communication, value and skills] were collected worldwide. A significance analysis was performed between these factors and three evolutionary IS-business planning integrations [independent, sequential & synchronous] adopted by 103 respondents. Even though according to Luftman (2000), the factors are equally relevant, results suggest that some factors and related practices may be more relevant than others. Results confirm that *governance* and *partnership* factors are significantly related to the process of IS/business alignment but also regardless of any type of IS-business

planning integration. As organisations evolve over sophisticated planning integrations (independent-sequential-simultaneous) the ranking in the factors are seen higher. For instance, rankings of *governance*, *communication* and *partnership* were higher when a more sophisticated IS-business planning integration was given. Therefore, additional research is need to identify how they are related in the IS/business alignment dynamics. Specially, *governance* seems to be the most important factor in comparison to the other factors and with relevant characteristics to affect the process of IS/business alignment. These results, somehow, supports the idea that the IS/business alignment process is supported and enhanced by the implementation of management actions focused on *governance* and *partnership* objectives. Despite management practices related to *communication* were also reported relevant, these practices are commonly understood in terms of *partnership*, then, we assumed that *partnership* can enclose *communication* aims. The overall highest individual management practices might suggest the idea that formalizing a program management process, improving support of hierarchies of authority, and integrating collaboration values can advance the process of IS/business alignment. However, to ensure such indications, additional research would provide more insights.

Due to the analysis design, the results cannot provide evidence that *governance* and *partnership* lead to better IS/business alignment but only association between them. Once specific management practices (those included in *partnership* and *governance* factors) has been indicated, what seems to be interesting is to study how these management practices are interacting given the dynamics of IS/business alignment. An additional study can provide in-depth understanding to clarify how these interactions take place in modern organisations. Thus, in chapter 5, a subsequent post-survey fieldwork approximates to a more qualitative means. This qualitative work extracts more in-depth understanding of why *governance* and *partnership* hold relevant management practices towards IS/business alignment but most important *how* they are assumed and related.

4.7 SUMMARY

- The strategic alignment maturity (SAMs) framework by Luftman (2000) was adopted to conduct an international survey with participation of 103 respondents.

- Empirical evidence shows that among 30 management practices, management practices related to *governance* and *partnership* are the most related to the process of IS/business alignment whatever the type of planning strategy integration is.

- Results confirm the relevance of formal structures and process such as *IT governance* and informal process and structures such as *IT governance* and *partnership* in the dynamics of IS/business alignment.

CHAPTER 5: Organisational assessment of management practices in the IS/business alignment process

EXPLANATORY PHASE

5.1 CHAPTER OUTLINE

This chapter first contextualises the objectives of the explanatory phase and explains the three-level alignment assessment process that was carried out in two large organisations. It then moves on to introduce the two case studies with their analysis and results. Having discussed the results based on the context of each organisation, aggregated results and conclusions are then presented. The conclusions and results are integrated in the interpretation phase.

5.2 EXPLANATORY PHASE OVERVIEW

In support of the literature, Chapter 4 confirmed the strong relationship between *IT governance*[9] (governance in Luftman's framework) and the IS/business alignment process. Additionally, management practices related to the *partnership* were also identified with significant relevance in such relationship. More interestingly, both *IT governance* and *partnership* are significant related to IS/business alignment regardless of any IS-business planning integration. Nonetheless, the way specific management practices of both *IT governance* and partnership interact in the dynamics of IS/business alignment remains unclear particularly at strategic and tactical levels. Thus, the case research presented in this chapter aims to confirm empirically that *IT governance* and *partnership* practices are being considered relevant in real-life organizational situations but, most important; add clarification to *how* they are being assumed. The analysis of two cases is mainly based on qualitative data and pretends to complement the quantitative study presented of Chapter 4 however the three-level assessment performed include quantitative analysis. Findings and results of this phase will feed the interpretation phase with conceptual constructors to develop the proposed framework.

As discussed in Chapter 3 and Chapter 4, researchers have indicated that there is different IS/business alignment either at strategic, tactical or operational levels and conceptually IS/business alignment is the result of a series of adjustments at these levels. Nevertheless, the attention that tactical and operational IS/business alignment has had in comparison to strategic IS/business alignment is considerable less. Despite these facts, recent studies have focused on the interactions between strategic, operational and tactical IS/business alignment. Tarafdar & Qrunfleh (2009) consider that the dynamics of IS/business alignment process happens at tactical and operational levels and place the tactical level as the calibrator of operational deliverables and strategic business objectives. From this understanding, they identified four

[9] In Chapter 4, the term governance was used to be consistent with Luftman's framework. However, from Chapter 5 this term will be substituted by IT governance. In this thesis both terms are used as synonyms.

types of IS/business alignment states resulting from strategic and tactical levels and propose managerial actions appropriate for each type. Jenkin & Chan (2010) recognise that the alignment between IT projects objectives and IS strategy, and project deliverables is needed for the realisation of IS/business alignment. They indicate that tactical levels are the responsible to bring those strategies into IT projects instances and ensure that these deliver expected objectives. The case research presented in this chapter follows this idea and considers that the assessment of IT projects can bring insights to tactical and operational extents of IS/business alignment. However, it does not discard the relevance of IS/business alignment at strategic levels. A three-level and cross-sectional assessment of IS/business alignment was conducted in three different organisations, one small and two large organisations. The process to perform this assessment and the data collection methods are detailed in the following sections.

5.2.1 Three-level IS/business alignment assessment process

The assessment process follows three consecutive work packages: 1) *strategic assessment*, 2) *tactical and operational assessment* and 3) *analysis of the IS/business alignment assessment*, and include two main data collection methods: questionnaires and interviews. Participants involved in interviews and questionnaires should be holding executive, senior, middle or operational managerial positions. These participants are categorised by their strategic, tactical and operational roles.

The (1) *strategic assessment* includes two activities, Firstly, *(1.a) gather concise business information of the organisation* which include organisation's history, size, organisational and management structure, IT principles, IT architecture, IT infrastructure, business application needs, IT investment and prioritization, business and IS objectives, core business process and reputation. Although part of this data can be gathered through public resources, semi-structure interviews at strategic levels positions were the main data source. Appendix A.6 includes the guideline for these interviews. Most of this data was provided by strategic positions however interviews with lower level positions confirmed and also extended this data. Secondly, *(1.b) assess the organisation in terms of IS/business alignment maturity.* This activity is focused on collecting data from the assessment of organisational IS/business alignment maturity, thus the whole organisation is the focus of the assessment. The applied questionnaire also helps to guide the semi-structure interviews since the discussion of each item serves to contextualise each answer.

The (2) *tactical and operational assessment* is focused on collecting data from the assessment of IS/business alignment maturity of selected strategic IT projects, thus IT projects are the units of analysis in the assessment. Both middle and operational managerial positions related to the project(s) are the targeted questionnaire's respondents. In similar circumstances, the questionnaire helps to guide the semi-structure interview since the discussion of each item serves to contextualise each answer.

The (3) *analysis of the IS/business alignment assessment* involves the data processing of all questionnaires and incorporates the results of the interviews in order to bring additional contextualisation to the findings. Since this research is more concern on the relevance of management practices that contribute towards IS/business alignment, those management practices that show more agreement and disagreement between participants at different organisational levels or holding different roles are the main part of the analysis. Questionnaires are analysed with inferential statistics. Interviews are processed and analysed with help of qualitative data analysis software in order to perform content analysis. The relationship between coding criteria is examined in order to develop explanations and consequences of the questionnaire's results. For the final findings and results, both questionnaires and interviews are integrated and aggregated.

Figure 5.1Work packages of the IS/business alignment assessment process

5.2.2 Case research structure

The case research presented in this chapter follows the assessment process explained in section 5.2.1 and was achieved in three phases:

The first phase included a pilot case in a small organisation. Within this organisation, a highly-dependant IT project was selected to perform the analysis. Even though the results of this study have not been totally included in this chapter, their results have been already published (Gutierrez et al., 2008a). In particular, this pilot test provided theoretical and pragmatic insights that improved the collection of data and analysis of this explanatory phase. Theoretically, it confirmed SAMs as management tool to assess IS/business alignment at different organisational levels and provided additional mechanism to reduce the gap between strategic planning and IT implementation. It also guided to test a procedural mechanism (the three-level IS/business alignment assessment process) that assess IS/business alignment at tactical and operational levels. It also helped to redefine guidelines for the implementation of the two case studies presented in this chapter. Finally, it contributed to identify possible areas of concern between managers which were considered as preconditions in the analysis of this case research; for instance, 1) lower organisational positions tend to assigned lower rankings of IS/business alignment maturity, 2) management practices related to *IT governance* and *partnership* remains relevant towards the process of IS/business alignment.

The second phase involved studying five IT-dependent business projects within the same organisation. Each project was analysed as an individual case. Each project held relevant strategic concerns in different business units and teamwork, so it was assumed varying project IS/business alignment. Overall, the selected projects aimed to innovate customer services and improve business and infrastructure support. To collect data, *questionnaire* and *interviews* were the two selected methods.

The third phase of the study served to replicate with an extension the approach of the second phase. This phase involved studying two IT-dependent business projects within the same organisation. Each project was analysed as an individual case. Projects with high strategic concerns were selected in the same business unit but different teamwork so it was assumed varying project IS/business alignment. Overall, the selected two projects aimed to improve customer services. To collect data, *questionnaire* and *interviews* were the two selected methods.

The design of both *questionnaires* and *interviews* is further explained in Sections 5.2.3 and 5.2.4. Both data collection methods were applied in phase 2 and 3 according the organisational level position of each participant and purposes.

5.2.3 Analysis design in questionnaires

Considering that the SAMs framework has been proved to be a reliable tool to assess IS/business alignment and includes considerable practical implications, as discussed in Chapter 3 and Chapter 4; this tool was selected to perform the three-level IS/business alignment assessment. However, the way this tool was used differs from the SAMs's author. The original version of the SAM's questionnaire[10] by Luftman & Rajkumar (2007) was used to collect data from top management level positions (executives and top senior managerial positions) but a slightly changed version of the original was used to collect data from lower management level positions (middle and operational managers). The adapted version included a rewording of the questions in order to bring IT projects as the focus of the analysis instead of the organisational as happens in the original version. In both versions, respondents select one of five maturity levels (where 5 is the highest maturity) to assigned the maturity perceived in different management practices categorised by six factors. These two questionnaires, the strategic one and the adapted version for the tactical and operational assessment are included in Appendix A.5 and Appendix A.6 respectively.

5.2.4 Analysis design in interviews

Nvivo 8.0, qualitative data analysis software, was used to perform the content analysis of all interviews. Interviews were recorded and transcribed. Coding criteria was established before the transcriptions were uploaded into Nvivo and based on the management practices listed in Luftman & Rajkumar (2007). To transfer these coding criteria into Nvivo, a hierarchical structure of nodes was designed. All interview's transcripts were uploaded and saved into Nvivo as content sources. Each *interviewee* became a case node. Each management practice became a tree node which was arranged into coding hierarchies so a factor heads the structure of their related management practices. Then, a tree node structure was achieved which hierarchically categorizes each management as a sub-three-node of one factor. Relevant content in each interview was then coded with one of the management practices or factors. Therefore, qualitative results in this chapter mainly refer to resulted coding from management practices by Luftman & Rajkumar (2007).

[10] The original version of the (Luftman & Rajkumar, 2007)'s questionnaire was shared by the author in order to support this research.

5.3 CASE STUDY 1: PHASE 2

5.3.1 Case organisation background

CompB Group is a multinational group and leader in financial protection and has major representation in Europe, North America and Asia/Pacific. CompB is a subsidiary that operates in the UK and Ireland employing around 15,000 people in the UK and 1000 in Ireland, and has approximately 10 million UK customers. At the moment, CompB has been focused on three key areas of growth: wealth management, insurance and healthcare. CompB has been recently efforts to improve IS alignment and agreed to participate in the study involving two business units. Five strategic IT projects were selected in order to carry out the assessment. The study was conducted over a period of six months.

1. **Project 1b** is a financial business proposition that includes a technological solution and was assessed at an early stage of its implementation.

2. **Project 2b** is a high technical simplification and improvement of IT infrastructure and was assessed at an early stage of its implementation.

3. **Project 3b** includes the implementation of a new application for an innovative financial product and was assessed at an early stage of its implementation.

4. **Project 4b** addresses the development of interfaces between an old legacy system and a front-end system to improve the processing of customer's claims. The implementation of this project was finished and the system in use by the time the assessment was performed.

5. **Project 5b** involves the development of a front-end system for service's quotations and was assessed quite recent the project was launched.

5.3.2 Interview and questionnaire development

In total, twenty-eight face-to-face semi- structured interviews were conducted with a length of approximately one hour. All interviewed participants were at managerial levels and holding executive, senior, middle and operational managerial positions (see Table 5.1). Executive positions included those participants that have strategic roles and hold either head or director positions at corporate level. Senior positions involved strategic roles that hold either director or head positions at business unit level. Tactical managers included participants in charge of

tactical implementations such as intra-organizational or inter-organizational projects at business unit level. Operational managers grouped managerial positions closer to the execution of operational activities or implementation of subsets of strategic projects. In addition, a balanced representation between IT and business roles was considered (see Table 5.2).

Table 5.1 Sample of data collected in Phase 2

Upper managerial positions	Strategic Assessment		Lower managerial positions	Tactical and Organisational Assessment	
	Semi-structured interviews	Questionnaire		Semi-structured interviews	Questionnaire
Executive	7	7	Middle managers	8	8
Senior Manager	7	7	Operational Managers	6	6
TOTAL	**14**	**14**	**TOTAL**	**14**	**14**

Fourteen interviews were performed at upper level managerial positions and at lower managerial positions. In all interviews, the Luftman's questionnaire helped to conduct the interview and collect the IT project alignment maturity of two different IT projects. The coding criteria explained in 5.2.4 were applied for all interviews.

Table 5.2 Role of organisational positions in Phase 2

Organizational role	Interviews	Questionnaires
IT	13	13
Business	15	15
TOTAL	**28**	**28**

Formal data analysis was undertaken using two methods in order to provide a cross check in the perspectives of the factors affecting business-IT alignment and finding root causes. First, an analysis was perform based on Luftman's questionnaire. Second, a qualitative analysis was performed based on the semi-structure interviews using Nvivo. The results from both analyses were then triangulated to root causes and support final results. The following sections discuss the analysis of both methods.

5.3.3 Case study results (questionnaire)

The analysis of questionnaires' results was based on descriptive statistics. The overall IS/business alignment maturity achieved by CompB was 3.3 which is 0.15 points above the average of 3.2 in the insurance industry according to Luftman & Rajkumar (2007). The benchmarking scores in Table 5.3 can help the organisation to identify which factors and

management practices have the lower scores and improve their implementation. Despite this fact, the value might differ from the sector average since the collection of data was concern only on five different IT projects. Overall, this organisations show that the traditional gap between IT and business has been reduced since values assigned between IT and business does not show substantial variation (total average of 0.08). However, the coordination across the three managerial levels is still a challenge (total average of 0.31).

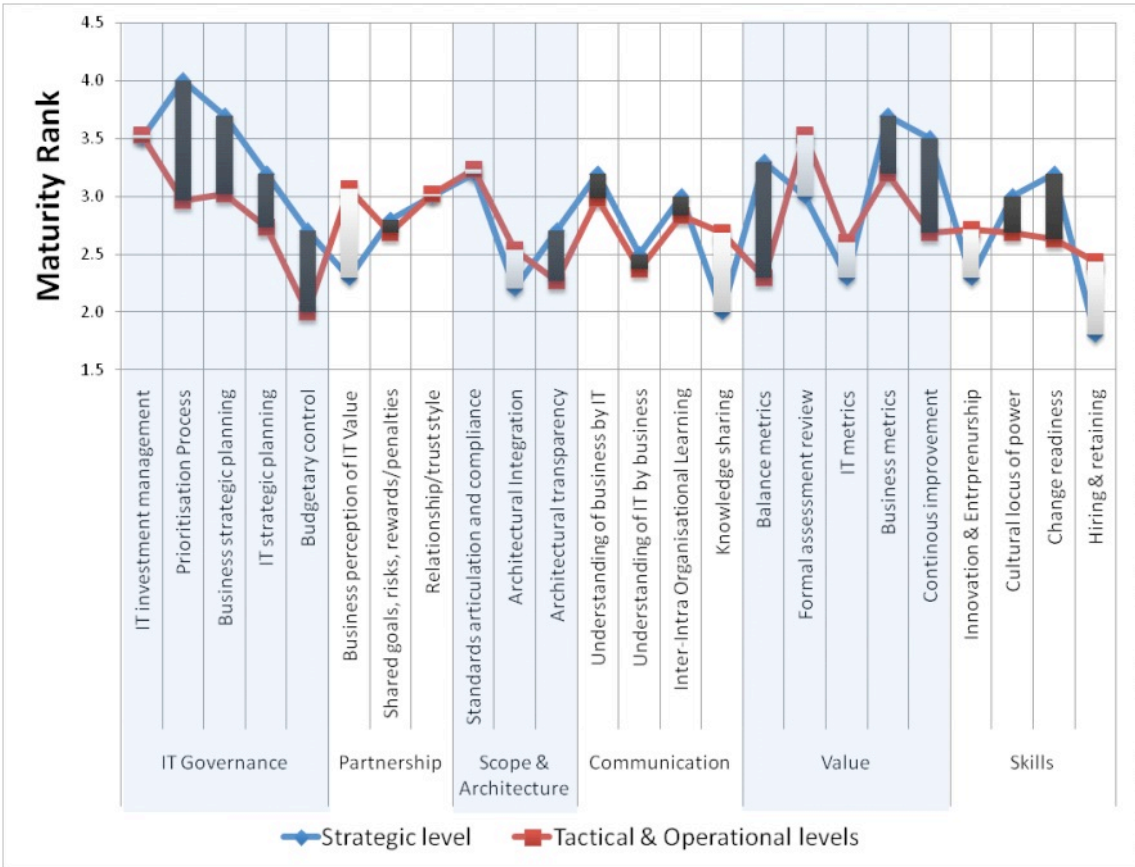


Figure 5.2 Variance comparison (Projects)

Results indicate that *IT governance* factor reached the highest scored along the six factors which assume well-established *IT governance* practices throughout the organisation. In addition, *IT investment management* is the highest ranked management practice and most participants agree this perception. However, it is also the factor that depicts consistently more variability between the strategic and tactical & organisational levels. Participants at strategic levels assigned higher values than those at tactical & operation level do which assumes that *IT governance* practices might not be operationally effective as strategic levels perceive them. Other practices associated to this factor show noticeable differences in how participants assign maturity scores. Particularly, there is a large variance when participants assess the process of

prioritising IT investments. In addition, most participants show no consensus to agree the maturity of measuring IT and business metrics together. Conversely, most participants agree a fair communication between the vertical organisational settings (along the three organisational levels) with 3.0 points of maturity. More than half of the participants recognised that there are limitations to understand IT by business and scarce mechanisms to share risks and rewards between IT and business. There is low consistency to develop and applied balance metrics across the organisation and few mechanisms to establish formal knowledge sharing even considering the large amount of information generated in large organisations. More interesting, IT function is still thought to be a cost of doing business but an emerging asset. Despite CompB is a high-tech company, the IT function is arguably not seen as a partner within the organisation. The support of this analysis is pictured by two charts (Figure 5.3 and Figure 5.2) that show the scores and variances between different organisational levels. To triangulate the results of this analysis, the qualitative analysis of interviews in the following section discusses some of the root causes of these results.

Figure 5.3 Maturity assessment by organisational levels

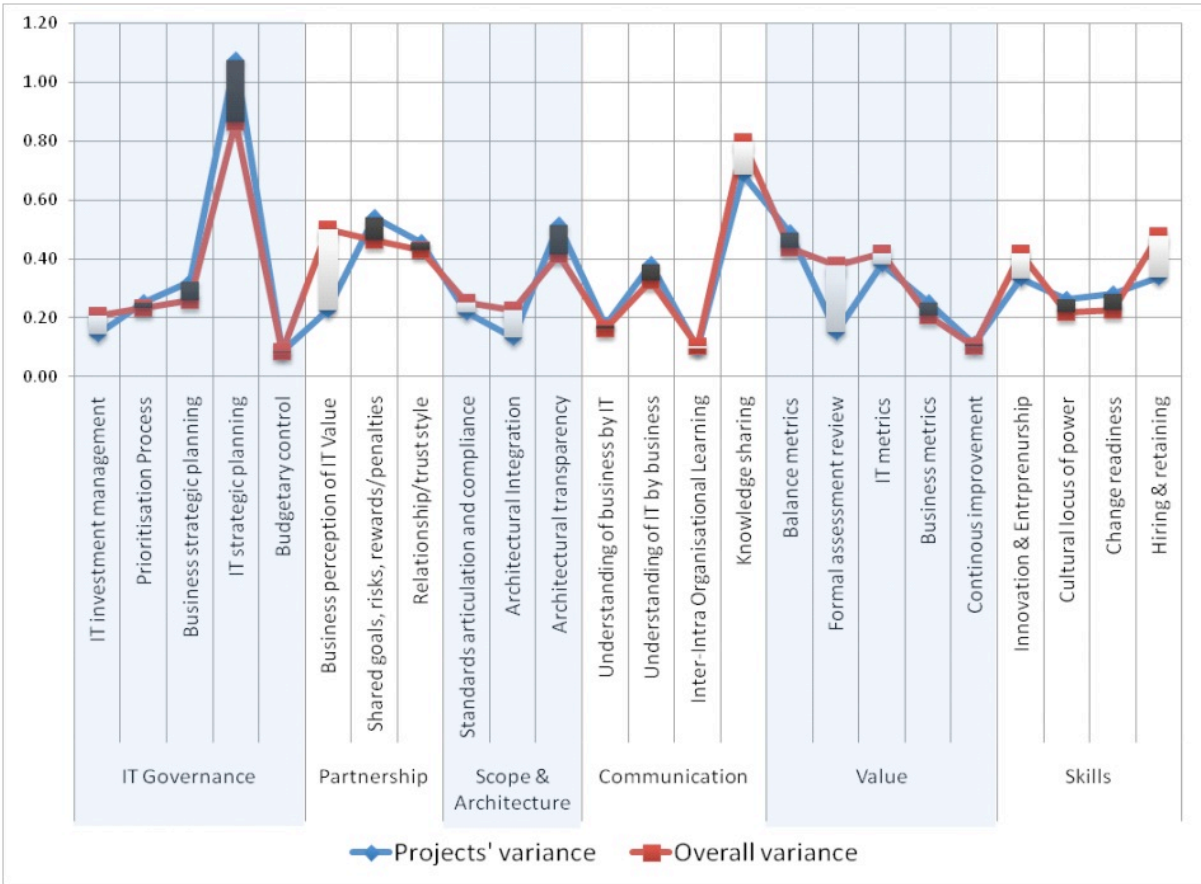


Table 5.3 IS/business alignment maturity results in Phase 2

Factor	Management Practice	Strategic Assessment		Tactical & Operational Assessment										Overall	
				Project1b		Project 2b		Project 3b		Project 4b		Project 5b		*All Projects*			
		By Practice	*By Factor*	By Practice	By Factor	By Practice	By Factor	By Practice	By Factor	By Practice	By Factor	By Practice	By Factor	*By Practice*	*By Factor*	Bty practice	By Factor
IT Governance	IT investment management	3.5	3.4	4.8	4.0	4.1	3.7	4.4	3.0	3.8	2.9	4.1	3.6	3.5	2.9	4.1	3.4
	Prioritisation Process	4.0		4.3		3.4		3.0		3.8		3.3		3.0		3.6	
	Business strategic planning	3.7		4.1		4.0		3.0		3.0		4.0		3.0		3.6	
	IT strategic planning	3.2		4.1		4.0		2.3		2.0		4.0		2.7		3.3	
	Budgetary control	2.7		2.5		2.8		2.3		2.0		2.4		2.0		2.5	
Partnership	Business perception of IT Value	2.3	2.7	4.4	4.2	3.5	3.6	3.6	3.0	3.8	3.7	3.1	3.1	3.1	2.9	3.5	3.4
	Shared goals, risks, rewards/penalties	2.8		4.2		3.8		2.5		2.8		2.8		2.7		3.2	
	Relationship/trust style	3.0		4.1		3.4		2.8		4.5		3.3		3.0		3.5	
Scope & Architecture	Standards articulation and compliance	3.2	2.7	4.1	3.4	4.2	3.3	4.2	3.5	3.8	3.2	3.1	2.6	3.2	2.7	3.8	3.1
	Architectural Integration	2.2		3.5		3.3		2.6		3.0		2.8		2.5		2.9	
	Architectural transparency	2.7		2.7		2.5		3.8		2.8		1.8		2.3		2.7	
Communication	Understanding of business by IT	3.2	2.7	4.3	4.0	3.3	3.2	3.5	3.3	3.3	3.0	3.5	2.8	3.0	2.7	3.5	3.2
	Understanding of IT by business	2.5		3.7		3.3		2.4		2.4		2.4		2.4		2.8	
	Inter-Intra Organisational	3.0		3.6		3.0		3.8		3.3		3.3		2.8		3.3	
	Knowledge sharing	2.0		4.3		3.3		3.6		2.8		2.1		2.7		3.0	
Value	Balance metrics	3.3	3.2	3.5	3.8	3.5	3.6	2.3	3.2	2.5	3.5	2.0	3.2	2.3	2.9	2.9	3.4
	Formal assessment review	3.0		4.9		4.0		4.3		4.0		4.0		3.5		4.0	
	IT metrics	2.3		2.9		4.0		2.5		3.5		2.7		2.6		3.0	
	Business metrics	3.7		4.5		3.2		4.0		3.5		4.0		3.2		3.8	
	Continous improvement	3.5		3.0		3.2		3.0		3.8		3.1		2.7		3.3	
Skills	Innovation & Entrprenurship	2.3	2.6	3.9	3.7	3.5	3.4	3.5	3.1	2.4	2.9	3.0	2.7	2.7	2.6	3.1	3.0
	Cultural locus of power	3.0		3.6		3.8		3.3		2.8		2.6		2.7		3.2	
	Change readiness	3.2		3.9		2.8		2.6		3.5		3.0		2.6		3.2	
	Hiring & retaining	1.8		3.5		3.3		2.8		3.0		2.0		2.4		2.7	
TOTAL		2.9		3.9		3.5		3.2		3.2		3.0		2.8		3.3	

5.3.4 Case study results (interviews)

The content analysis technique helped to provide structured means to coding the relationships from the arguments employed in describing each situation within management practices discussion. The analysis was focused on the identification of the relevance of each management practice along making-decision processes in IT investments or the execution of the five strategic IT projects. The results from the interviews helped to corroborate the results from the questionnaire and provided additional insights. A checking process to ensure that possible missing content was not included in the final codification was also performed. To carry out the analysis, the identification of relevant coded nodes was performed assessing the number of coding references and using query functionalities in Nvivo. The queries were defined and executed taking into account the organizational role and positions of participants. Based on these results additional explanations and root causes were examined in order to bring new insights to the questionnaire's results.

The common causes that bring low maturity seem to be the setup of *organisational structures* and *the varying perceptions of IT business value.* Most integration between IT and business is driven by the assignment of budget and how it needs to be controlled. Apart from this issue, the organisation still is seeing the IT function as a cost of doing business. Although most participants agree that IT investments drive improved business performance and create competitive advantage, management practices seem to be contradictory. There are constant perceptions that point out the high costs that IT investment implies which conflicts the *partnership* between IT and business. Investments are being supported by a robust *planning process* which assumes the integration of business demands and IT supplies. However, the organisation's mindset suggests that the IT function should be focused on gathering requirements and technical issues. Thus, the main business contribution of IT is arguably limited to the execution and the administration of *budgetary controls*. The actual practices to *share risks and rewards* were related to the implementation of metrics between IT and business. Business units and the IT function are working as independent units within CompB. Hence, the IT team generally works separated from the shared services and assumes IT as a business provider. Business units are then entitled to require IT services when an IT projects is formulated. Business units pay for IT requirements that were agreed in the service agreement. Consequently, business units take all the risk and rewards but also benefits when these are executed. Thus, as a result there are conflicts to generate *balance metrics* than can ensure similar mechanisms between IT and business perspectives. Business and IT have their own mechanisms to measure their performance. Most high managerial level participants agree to

recognise good *understanding of IT by business* and *vice versa*. However, *business understanding by IT* does not seem to be recognised in lower managerial levels. This might be caused by the barely involvement of business in IT issues. For instance, business mangers recognise the relevance of IT but are not keen interested to know how IT should be implemented. The two following charts (Figure 5.4 and Figure 5.5) show the frequency in which IS/business alignment management practices are being mentioned in the interviews. Although these figures might be affected by the number of participants, number of participants with specific roles or number of participants with associated organisational levels, these charts aim to provide evidence about the concerns in the whole organisation.

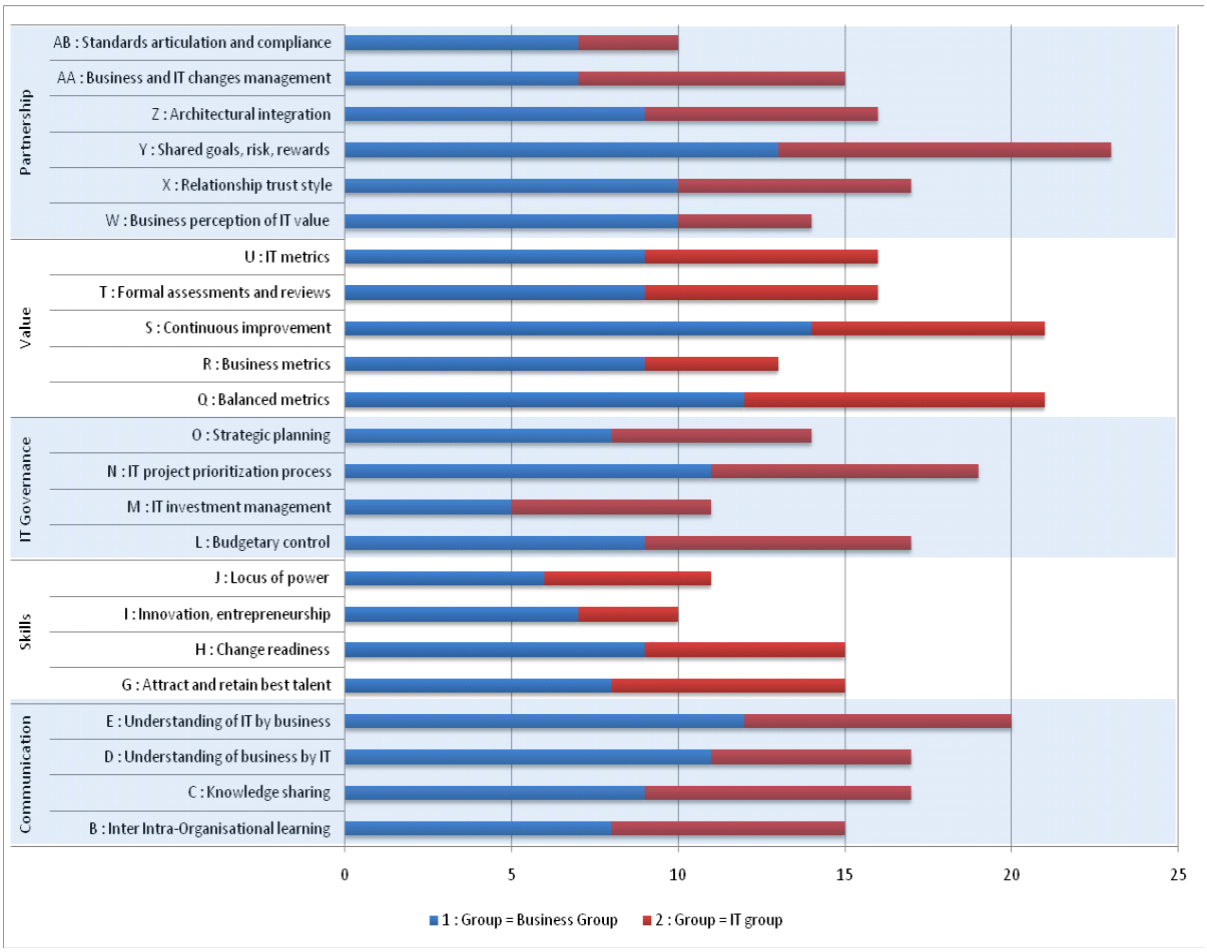


Figure 5.4 Coding frequency by roles in phase 2

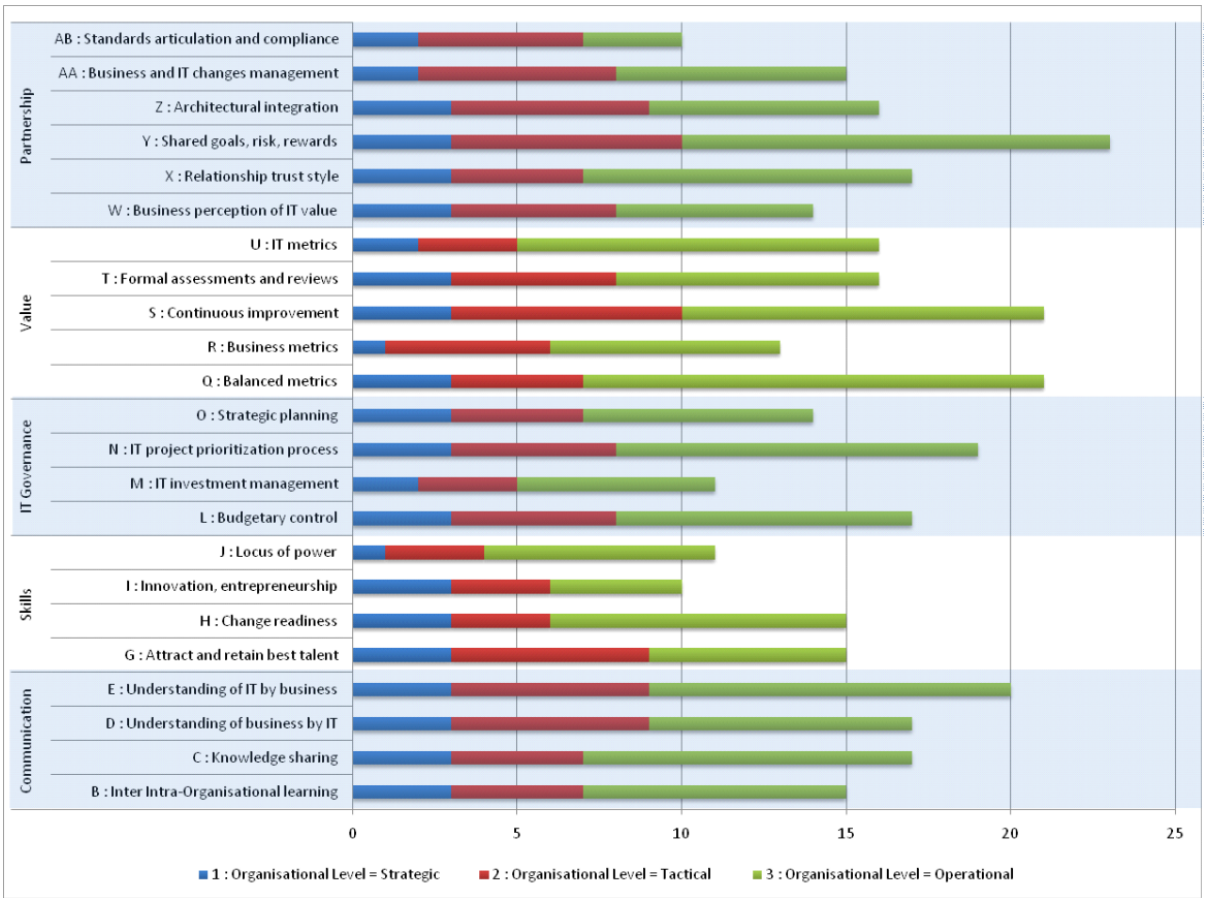


Figure 5.5 Coding frequency by organisational levels in phase 3

5.4 CASE STUDY 2: PHASE 3

5.4.1 Case organisation background

CompA is headquartered in Mexico City and is a leader in the Mexican snack food market. CompA is part of an international business group in the sector of beverages and food but in Mexico CompA serves as umbrella to commercialize international as well as local snack brands. CompA is renowned for the quality, variety and flavours of its products. Locally, CompA controls around 80% of the Mexican snacks market and hold a respectable brand along their clients. Due to a recent organizational restructuration and operational reduction costs, some management positions and functional areas share services for different business units; this is the case between CompA and CompAA. ComAA is the largest manufacturer of cookies and market leader in Mexico. CompAA holds well-known brands and offers a wide variety of pastries, oats, cereals and biscuits. Traditionally, all business units have been independent and autonomous as management identifies noticeable differences in their business rationale. However, the implementation of shared services has been the cause of structural and functional changes over the past two years. All business units have been facing several functional and infrastructural changes in the last four years due business objectives that aim to convert a traditionally

functional-based organisation into a new process-oriented organisation. Eventually, this will be enhanced by the implementation of an ERP system (SAP), the largest IT project in the last 5 years. Both CompA and CompAA are facing this implementation in addition to several structural and operative changes, mainly as consequence of a strategy based on high-productivity and cost-reduction. Due to all these changes in the whole organisation, and particularly in the IT department, the CIO of both CompA and CompAA was interested on knowing their effect in the alignment of business requirement and the IT function. He personally invited the author of this thesis to perform the assessment. Despite this case study is exclusively in collecting data from CompA, some participants in the cases research provided shared services in both CompAA and CompA.

Two IT projects were selected in order to carry out the assesment. These projects were suggested by the IT director of CompA based on the importance and strategic objectives they should bring to the company. Both projects were being implemented at the time this assessment was conducted. The study was conducted over a period of six months.

1. **Project 1a** initially involved migrating an old version of a business application to an earlier version. However, the scope of the project changed over the past year since it was realised that impact in business process as result of the migration.

2. **Project 2a** was designed to improve the supply chain planning across the organisation. This project includes the redesign of business processes, new planning algorithms and the integration of different functional areas.

5.4.2 Interview and questionnaire development

In total, twenty-one face-to-face semi- structured interviews were conducted with a length of approximately one hour. All interviewed participants were at managerial levels and holding executive, senior, middle and operational managerial positions (see Table 5.4). Executive positions included those participants that have strategic roles and hold either head or director positions at corporate level. Senior positions involved strategic roles that hold either director or head positions at business unit level. Tactical managers include participants in charge of tactical implementations such as intra-organizational or inter-organizational projects at business unit level. Operational managers grouped managerial positions closer to the execution of operational activities or implementation of subsets of strategic projects. In addition, a balanced representation between IT and business roles was considered (see Table 5.5).

Table 5.4 Sample of data collected in Phase 3

Upper managerial positions	Strategic Assessment		Lower managerial positions	Tactical and Organisational Assessment	
	Semi-structured interviews	Questionnaire		Semi-structured interviews	Questionnaire
Executive	6		Middle managers	7	2
Senior Manager	5	2	Operational Managers	3	3
TOTAL	**11**	**2**	**TOTAL**	**10**	**5**

Eleven interviews were performed at upper level managerial positions and ten at lower managerial positions. In seven of these twenty-one interviews, the Luftman's questionnaire helped to conduct the interview and collect the IT project alignment maturity of two different IT projects. For the remaining fifteen interviews the guideline included in Appendix A.6 was used. However, the coding criteria explained in 5.2.4 were applied for all twenty-one interviews. Different questionnaires were considered in order to triangulate the data collected. Moreover, the additional data supplied by the fifteen interviews helped to discern the relationships and associations between coding criteria. The way these interviews were conducted is an improvement from the results of phase 2.

Table 5.5 Role of organisational positions in Phase 3

Organizational role	Interviews	Questionnaires
IT	5	3
Business	14	4
Both	2	1
TOTAL	**21**	**8**

5.4.3 Case study analysis and results (questionnaire)

The analysis of questionnaires' results was based on descriptive statistics. The overall IS/business alignment maturity achieved by CompA was 2.9 which is three points below the average of 3.2 in the retail industry according to Luftman & Rajkumar (2007). These benchmarking scores can help the organisation to identify which factors and management practices have the lower scores and improve their implementation. Despite this fact, the value might differ from the sector average since the collection of data was concern on two different IT projects. CompA shows that participants being at different roles (IT or business) evaluate more consistently the maturity of management practices (avg var 0.37) than participants being at different organisational levels (avg var 0.56). Overall, results show that *IT governance* and *partnership* are the highest ranked factors as illustrated in Table 5.6. More interesting,

governance includes the highest ranked management practices: *business strategic planning, IT strategic planning and prioritisation process.*

IT governance was the highest ranked factor but there are considerable differences in how participants from the three organisational levels ranked its related management practices. For instance, the comparative assessment of these levels shows noticeable variance when ranking the way IT is strategically planned. In addition, the *communication* across levels seems be affected by deficient processes that *transfer knowledge* from up-bottom and bottom-up directions and different *understandings of IT by business*. These results can be verified in Figure 5.6. In the horizontal business–IT setting, business positions evaluated *partnership* and *value* with higher scores than IT positions. The main differences in these two roles lay on the management of resources and investments, for instance, practices such as *IT budgeting, IT investment management* and *prioritisation process* depict substantial variance in their rankings. More interestingly, participants indicated differences in the *understanding of business by IT* which differs from the vertical organisational setting across the three levels. These variances in the horizontal IS-business setting are depicted in Figure 5.7.

When comparing the average maturity of the two projects against the overall maturity, the largest difference is shown by the scores of the *IT strategic planning* practice and followed by *understanding of IT by business, knowledge sharing* and *cultural locus of power.* From these results, the *cultural locus of power* perhaps draws the biggest attention, which could evidence strong hierarchal structures in the implementation of IT projects. A comparison of variances between the project's scores and overall scores is shown in Figure 5.8. Overall, *IT strategic planning* shows the largest variance which evidence that upper management conceived a more mature IT planning process than lower managerial positions do. *IT investment management* conversely shows the small variance in *IT governance* which might suggest the relevance of this practice in the whole organisation. This could confirm the awareness that the whole organisation has about the strategy of cost reduction.

Table 5.6 IS/business alignment maturity results in Phase 3

Factor	Management Practice	Strategic Assessment		Tactical & Operational Assessment						Overall	
				Project1a		Project 2a		*All projects*			
		By Practice	*By Factor*	By Practice	By Factor	By Practice	By Factor	*By Practice*	*By Factor*	*By Practice*	*By Factor*
IT Governance	Business Strategic Planning	4	3.4		2.4		2.8		2.7	4.00	3.34
	IT Strategic Planning	5		2		2.5		2.3		3.63	
	IT budgeting	2.5		1.7		2.5		2.1		2.30	
	IT investment management	3		3		3.3		3.2		3.08	
	Prioritisation Process	4		3.7		3		3.4		3.68	
Partnership	Business perception of IT Value	3	3.0	3	2.8	3	3.6	3.0	3.2	3.00	3.11
	Shared goals, risks, rewards/penalties	3		3		3.7		3.4		3.18	
	Relationship/trust style	2.5		2.7		4		3.4		2.93	
	IT program management	3.5		2.7		3.7		3.2		3.35	
Scope & Architecture	Standards articulation and compliance	4	2.4	2.7	2.2	3.3	2.5	3.0	2.3	3.50	2.50
	Architectural Integration	2		2.3		2		2.2		2.08	
	Architectural transparency	2		1.7		2		1.9		1.93	
Communication	Understanding of business by IT	3.5	2.3	3	2.3	3.3	2.8	3.2	2.5	3.33	2.39
	Understanding of IT by business	3		1.7		1.7		1.7		2.35	
	Inter-Intra Organisational Learning	1.5		2		3.3		2.7		2.08	
	Knowledge sharing	1		2.3		3		2.7		1.83	
Value	IT metrics	2	3.0	2.3	2.5	2	2.8	2.2	2.6	2.08	2.75
	Business metrics	3		3.3		3.7		3.5		3.25	
	Balance metrics	3		2.7		2.7		2.7		2.85	
	Formal assessment review	3.5		1.5		3		2.3		2.88	
	Continuous improvement	3		2.3		2.5		2.4		2.70	
Skills	Innovation & Entreprenurship	2.5	2.8	2.7	2.8	4.3	3.2	3.5	3.0	3.00	2.86
	Cultural locus of power	3		2		4		3.0		3.00	
	Change readiness	3		2.7		1.7		2.2		2.60	
	Hiring & retaining	2.5		3.7		2.7		3.2		2.85	
TOTAL		**2.8**		**2.5**		**2.9**		**2.7**		**2.9**	

Despite *IT governance* has been identified with the highest maturity, it is also the factor which depicts more ranking variances in its practices. This suggests additional management actions to formalise and designed better mechanism to enhance practices related to *IT governance*. In essence, these efforts should include improvements in the assignment of resources and better mechanisms to prioritise them. *Partnership* pictures the smallest variance between factors which supports the idea of consensus in the importance of informal structures throughout the organisation. *Standards articulation and compliance* also shows noticeable variance when comparing the vertical and horizontal settings of the organisation as illustrated in Figure 5.9. As aforementioned explained, the organisation is facing infrastructural and structural changes that include the standardisation of process and procedures. Thus, it could affect the high variance in this practice.

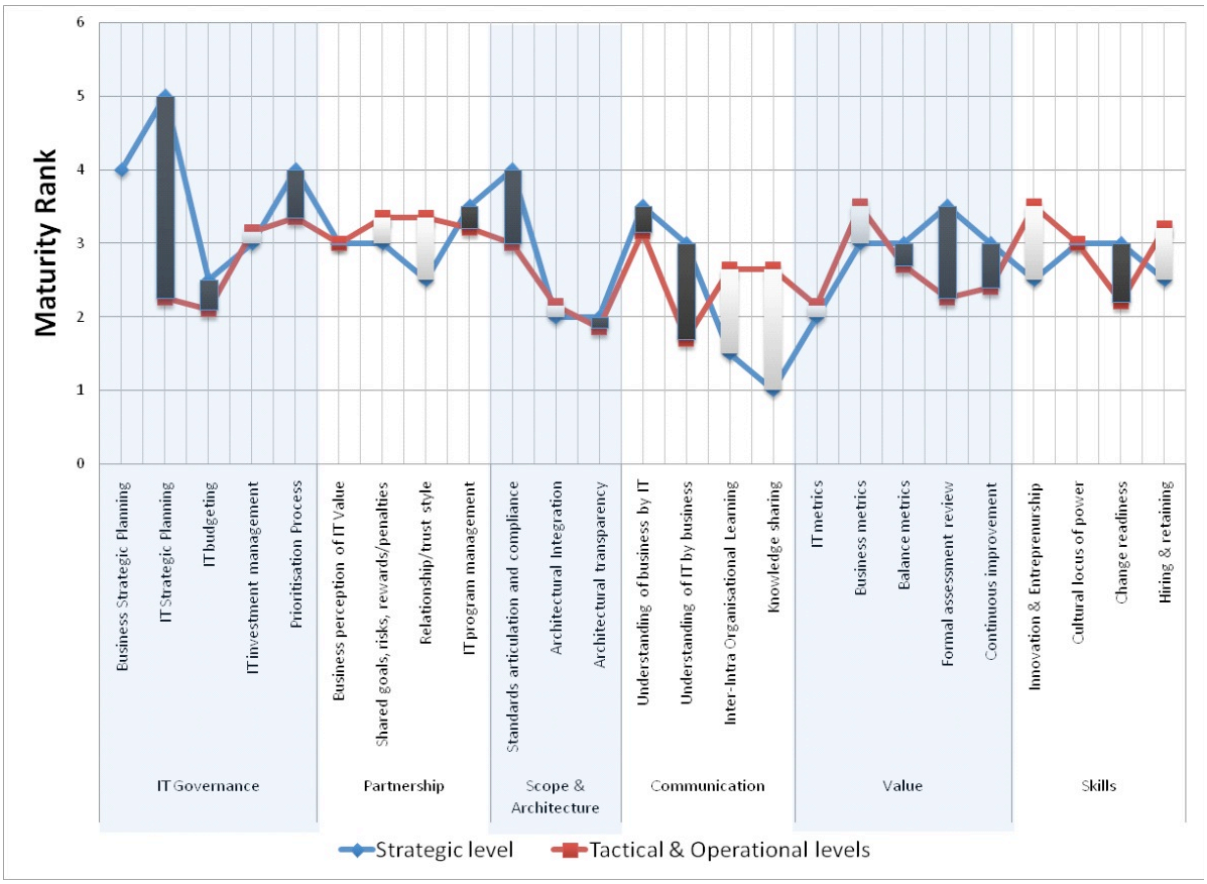


Figure 5.6 Maturity assessment by organisational levels

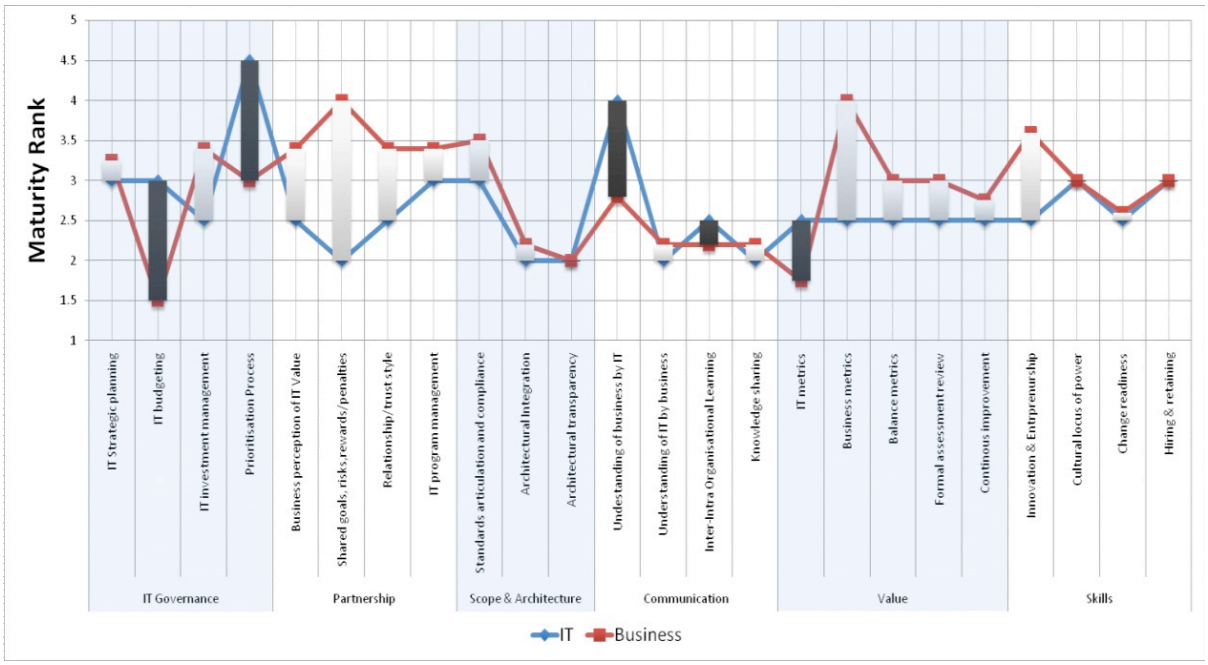


Figure 5.7 Maturity assessment by organisational roles

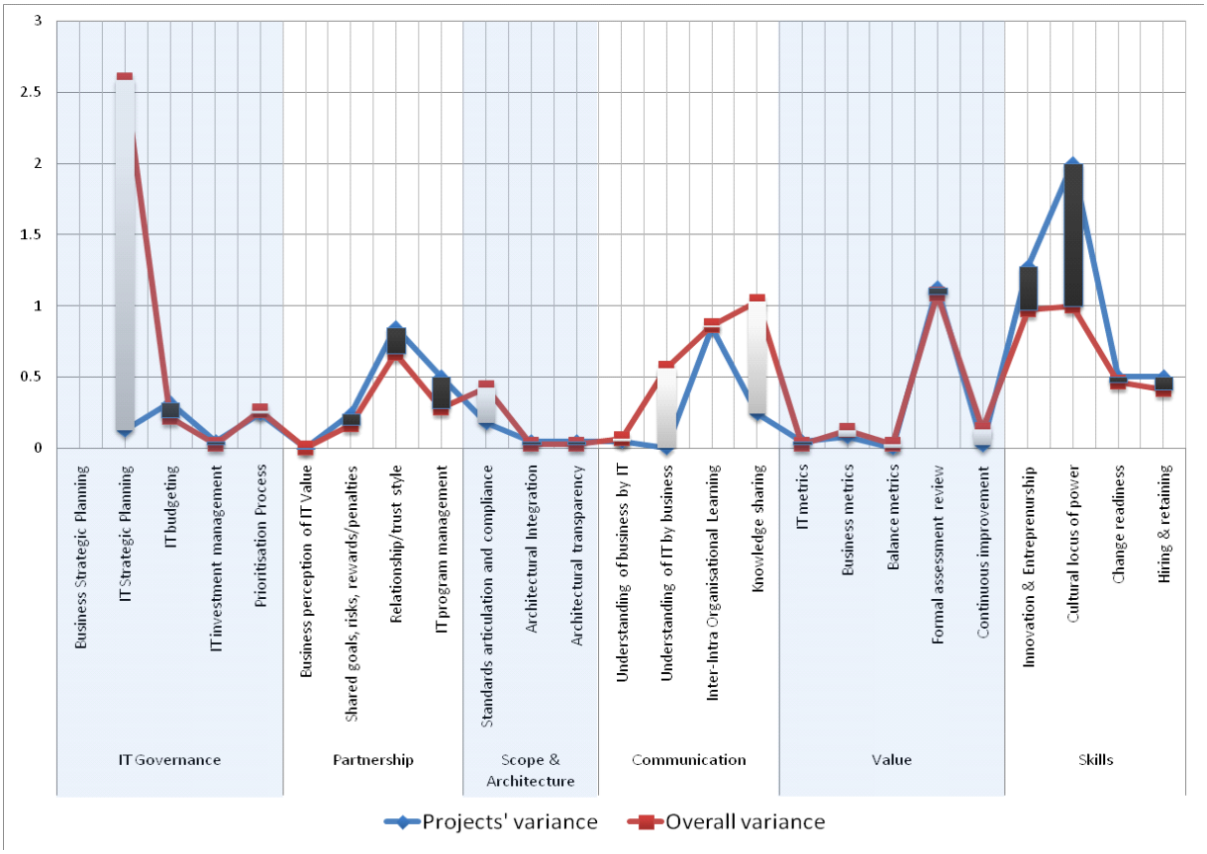


Figure 5.8 Variance comparison (Projects)

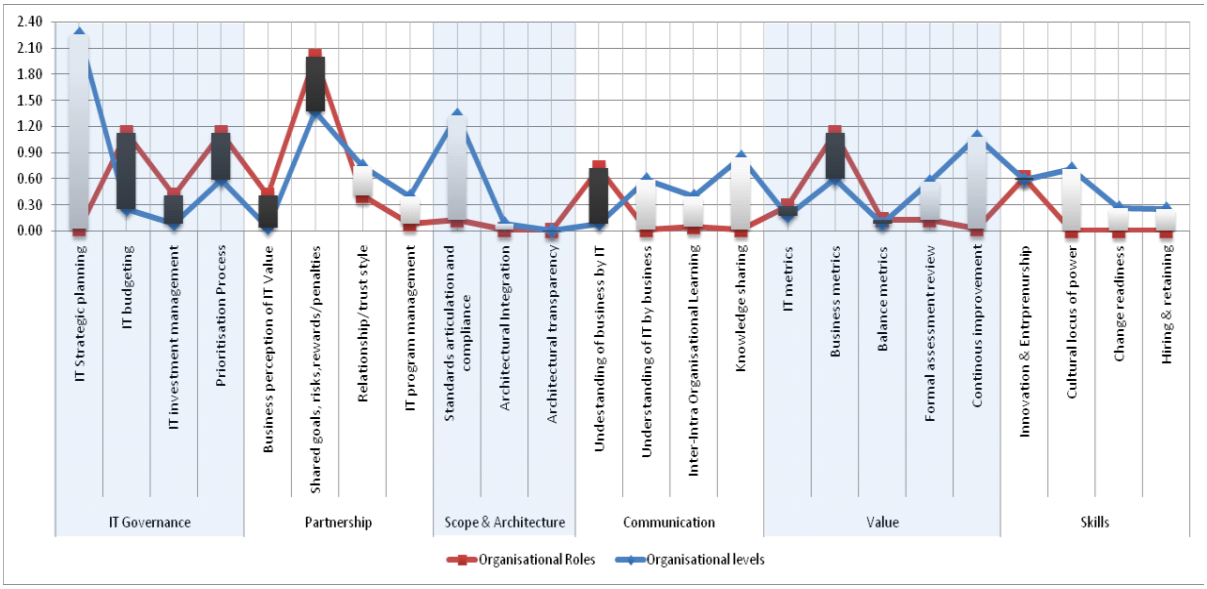


Figure 5.9 Variance comparison (roles & levels)

5.4.4 Case study analysis and results (interviews)

The analysis was focused on the identification of the relevance of each management practice along making-decision processes in IT investments or the execution of strategic IT projects. The results from the interviews helped to corroborate the results from the questionnaire and provided additional insights. When potential new constructors were identified free nodes were created in Nvivo coding criteria however these new nodes only helped to outline characteristics, similarities and differences between CompA and CompAA business units. It was also performed a checking process to ensure that possible missing content was not included in the final codification. The identification of relevant coded nodes was performed assessing the number of coding references and using query functionalities in Nvivo. The queries were defined and executed taking into account the organizational role and positions of participants.

Qualitative results show that the main problems the organisations face lay on *IT governance.* This topic is being frequent cited by most participants. Particularly, *IT investment management* drove much of the discussion in the interviews and seems to be an important issue throughout the organisation. There is also similar interest on *budgetary control.* Both topics suggest that the administration and assignment of IT resources drives the relationships between participants and might be a cause of conflicts. In particular, concerns about current strategies in cost-reduction, productivity and operational efficiency are addressed in several interviews. Participants either with different roles or at different organisational levels are concerned about

the way the relationships between business and IT should be measured. Particularly, how to implement or design effective *business metrics* that deals with the new business requirements are part of substantial discussion. Due to the implementation of new IT projects and, specifically, the implementation of SAP, participants are uncertain about the business value of such implementation. Management expects several benefits out of SAP but also faces resistance to accomplish standard procedures and processes. Consequently, there are considerable expectations about the integration that SAP might achieve but there is less awareness about changes in core business processes as consequence of such integration. This is one of the main reasons because *IT organisation architecture integration* shows large number of coded references. Despite CompA is moving towards into a more IT-dependent company and management is putting efforts to change the cultural settings in this respect, there are indicators that people is still reluctant to use IT extensively. For instance, the use of a business data warehouse helps to calculate important planning forecast of raw materials. Its reports can be stored and accessed directly in the business warehouse tool for additional processing and later requests. However, its outputs are being exported and locally processed in files which eventually are used to create reports for other functional units. This practice creates confusion as local reports are having miscalculations due to different versions and consequently incorrect figures may be used along the demand planning process. These issues have impacted the *business perceptions of IT value* and the way business assumes technology in the day-to-day work. Some figures have been charted in Figure 5.10 and Figure 5.11. Both charts show the frequency in which IS/business alignment management practices are being mentioned as part of the interviews. Although these figures might be affected by the number of participants, number of participants with specific roles or number of participants with associated organisational levels.

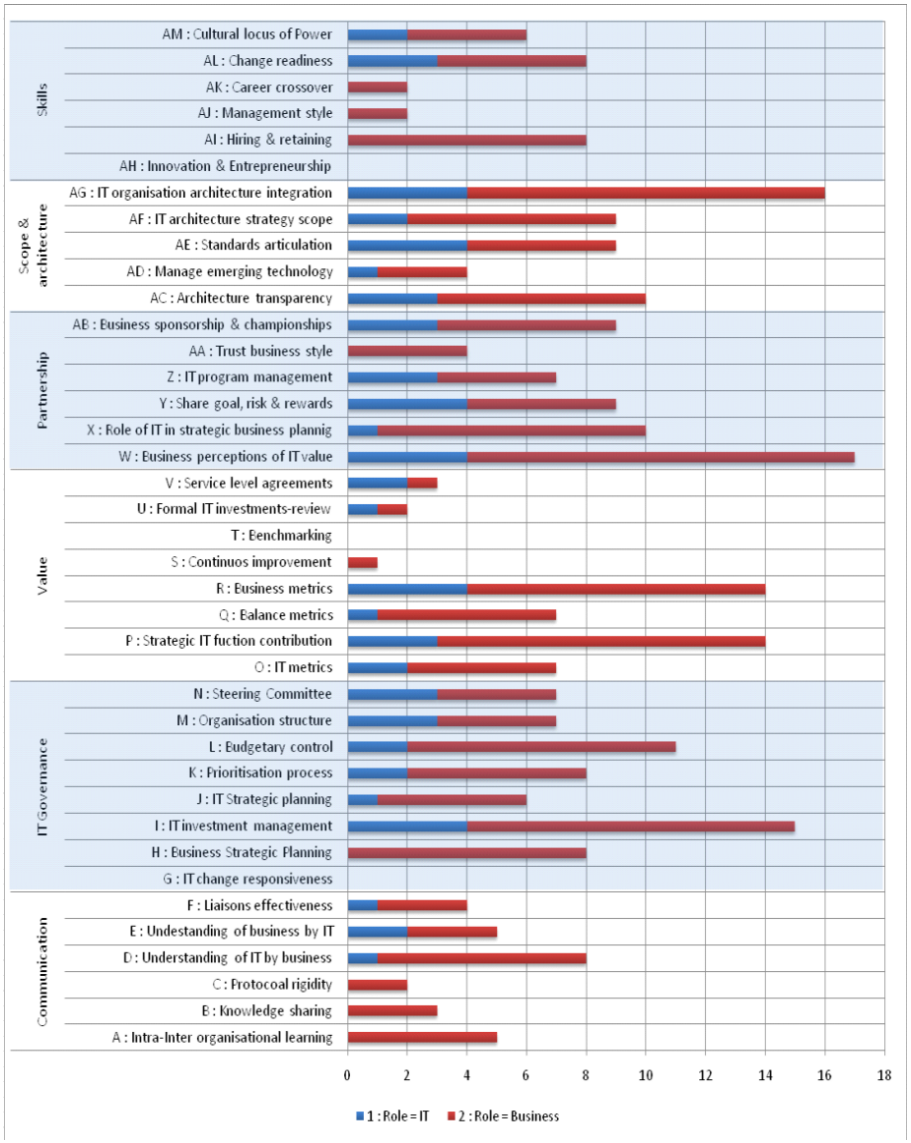


Figure 5.10 Coding frequency by roles in Phase 3

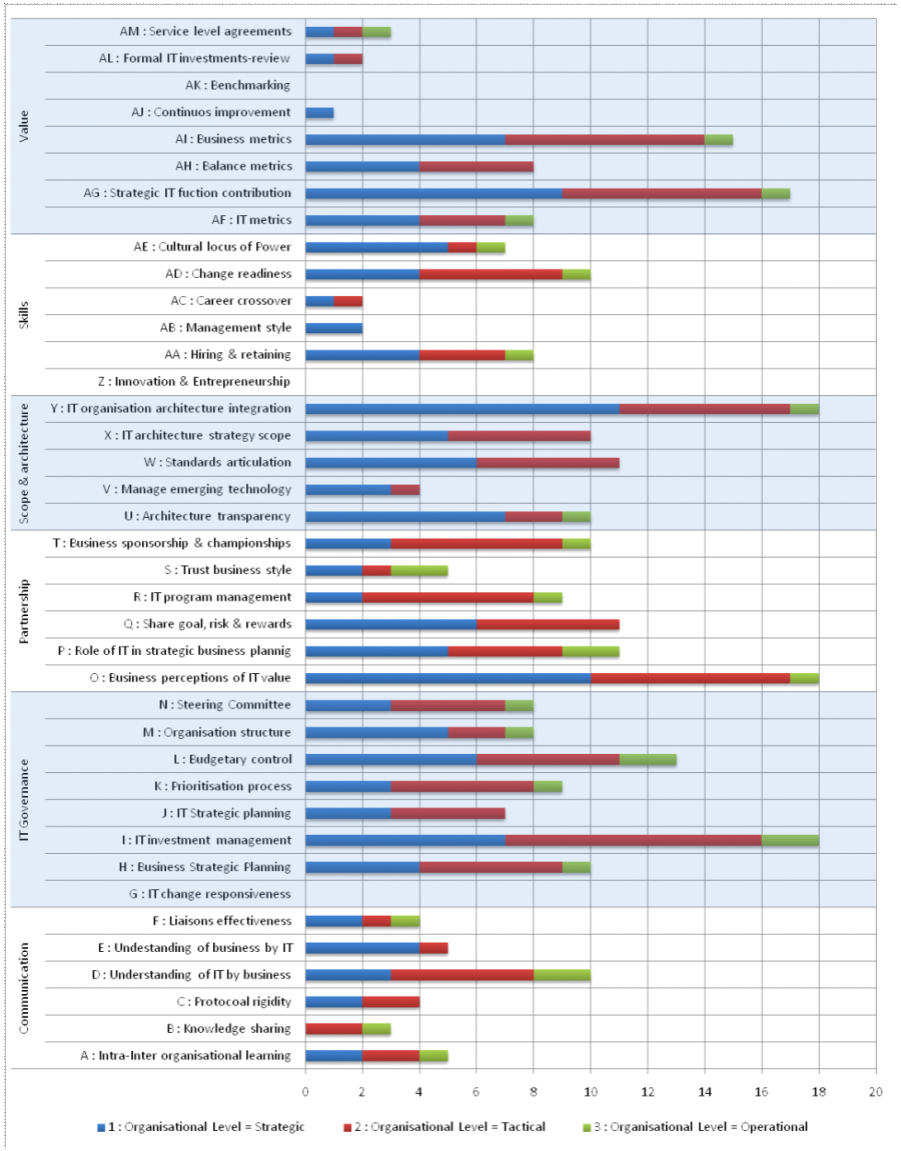


Figure 5.11 Coding frequency by organisational levels in Phase 3

5.5 CONCLUSIONS

Results from this case research confirms the strong relationship between IS/business alignment and *IT governance*. *IT governance* was in both studies the highest ranked factor but also shows significant variances in the values of its related management practices. Results evidence substantial disagreements in the assessment of IT governance when participants were holding different roles (business or IT) but there are mode disagreements when participates were at different organisational levels (strategic, tactical or operational). Both contrasting results anticipate the relevance of *IT governance* which also achieves higher scores over other practices however its effects are being differently perceived among organisational levels. Two management practices related to *IT governance* seem to be of highest IS/business alignment impact, *IT investment management* and *budgetary control.* These two practices imply the assignment, allocation and administration of IT resources drives much of the IT/business alignment dynamics. Results also confirm the relevance of *partnership* in the strategic business-IT relationship. Apart from the process and structures that *IT governance* underpins in order to succeed IS/business alignment, management practices associated to improve IS-business *partnership* are also proven to be relevant. Luftman's research makes evident the distinction between *partnership and IT governance* however other researchers merge both into IT governance (Peterson, 2004;Weill & Ross, 2004)

Despite substantial business recognition about the importance of the IT-business relationship, both case studies show that business and IT people struggle to understand each other. Interestingly, participants being at different roles evaluate more consistently the maturity of management practices than participants being at different organisational levels (strategic, tactical or organisational). This finding suggests that management face the challenge to develop partnership mechanisms for coordination, collaboration and connection that bring closer the understanding between IT and business management at different organisational levels. Such effort can be related to SAMs framework as *program management* which includes formal processes focused on enhancing the partnership relationships between IT and business (Luftman, 2000).

Bringing clarification to the idea that both *IT governance* and *partnership* interact in the dynamics of IS/business alignment at strategic, tactical land operational levels, some of their managerial mechanisms such as *IT investment management, budgetary control, understanding of IT by business* and *understanding of business by IT* show higher impact in the IS/business alignment dynamics. This finding supports the multilevel organizational effect of *IT governance*

and *partnership* when assuming that IS/business alignment is a series of adjustments at different organizational levels and the entire IS-business planning process also affects these levels. These findings provide conceptual constructors to underlay the framework proposed in Chapter 6.

5.5.1 Limitations and implications

Two large organisations were considered to run this case research. However, no other assumption was undertaken but the higher interest that IS/business alignment generates in these type of organisations (Cragg, King & Hussin, 2002). Although the organisational settings might be different in order to improve this research such as opting for organisations in specific sectors or seeking to similar IT projects, the difficulties associated to access more organisations was a considerable limitation in this case research.

5.6 SUMMARY

- A case research that include the data of two large organisations, a large food company and a subsidiary of a multinational insurance company, was examined in order to bring clarification into the interactions of relevant management practices in the dynamics of IS/business alignment.

- Results confirm the relevance of *IT governance* and *partnership* in the dynamics of IS/business alignment at strategic, tactical and operational levels.

- Management practices such as *IT investment management, budgetary control, IS planning, program management, understanding of IT by business* and *understanding of business by IT* seem to influence significantly the dynamics of IS/business alignment. Moreover, IT investment management

CHAPTER 6: Analysis, discussion and development of ALIS-G

INTERPRETATION PHASE

6.1 CHAPTER OUTLINE

The *interpretation phase*, explained in this chapter, evaluates and extends the analysis on the results of the validation and exploratory phases in order to develop the ALIS-G framework. This chapter then elaborates on the management practices of *IT investment management, budgetary control, understanding of IT by business* and *understanding of business by IT* to underpin the conceptual constructors of the proposed ALIS-G framework. This analytical exercise is mainly based on qualitative data and enriched with supplementary literature in order to find association between these management practices. The results of this analysis underpinned the design of the proposed ALIS-G framework.

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6.2 CONTEXT OF RESEARCH FINDINGS AND RESULTS

Each phase have contribute with insights to explore, confirm and explain the strong relationship between IS/business alignment and IT governance. An overview each phase is below described to help in the analysis later performed in this interpretative phase.

***Exploratory Phase (Chapter 3)*:** the relevance of *IS planning* and *management practices* was indicated as main arguments in the rationale of IS/business alignment. Additionally, it was also indicated their grounded relevance to realise and put in practice IS/business alignment. Current literature that recognises the strong relationship between IS/business alignment and IT governance was also discussed.

***Validity phase (Chapter 4)*:** both arguments IS planning and management practices were examined to confirm their practical implications and indicate their foundational relationship towards IS/business alignment. To do so, an international survey was conducted. The design of this questionnaire considered that well-established IS planning process and effective management practices underpinned the dynamics of IS/business alignment. Given these assumptions, the analysis was focused on knowing *what* relevant management practices enable tight alignment between IS and business given an adopted IS planning integration strategy. Results confirmed that *IT governance* and *partnership* factors are significantly related to the process of IS/business alignment, also supported by current literature (Chan, Sabherwal & Thatcher, 2006;Luftman, Ben-Zvi & Dwivedi, 2010; Chan, Sabherwal & Thatcher, 2006; Chan, 2001), but most important regardless of any type of IS-business planning integration. Interestingly, when organisations evolve over more sophisticated planning integrations (independent-sequential-simultaneous), they tend to rank higher IS/business alignment maturity. Results show that, particularly, *governance*, *communication* and *partnership* become higher over other factors when a more sophisticated IS-business planning integration is perceived.

Explanatory phase (Chapter 5): a case research which included two independent leading large companies was conducted to examine the relationship and the effect between *IT governance* & *partnership* and IS/business alignment. Having argued in the exploratory phase that IS/business alignment is the product of both IS and business coevolving together and its materialisation becomes when the integration of IS and business occurs at strategic, tactical and operational levels; the investigation included data from strategic, tactical and organisational managerial levels. Although focus was given to management practices related to *partnership* and *IT*

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governance, the assessment included six factors by Luftman & Rajkumar (2007), communication, skills, value, scope & architecture, IT governance and partnership. Results from this exploratory phase support the multilevel organisational effect of *IT governance* and *partnership.* Management practices related to these two factors were examined and results indicated that *IT investment management, budgetary control, understanding of IT by business* and *understanding of business by IT* are significantly related to the IS/business alignment dynamics. According to these results, management should develop effective mechanisms over these four management practices that allow coordination and collaboration between strategic, tactical and operational managerial levels.

Given the strong relationship of IS/business alignment and IT governance, this chapter elaborates an integrated analysis to bring clarification in the associations of four IS/business alignment management practices. The analysis is then centred on *IT investment management, budgetary control, understanding of IT by business* and *understanding of business by IT*. To do so, an additional analytical method is designed and later implemented to evaluate qualitative data from the case research presented in the evaluation phase. This analytical method merges the features and capabilities of two management tools, the SAMs framework by Luftman & Rajkumar (2007) and ITGAP model by Peterson (2004). Although both have been previously discussed in this dissertation, the ITGAP model justifies additional insights in terms of the intended analysis. In the following sections, firstly, the development of the analytical method is explained in Section 6.3. Secondly, the implementation of this analytical method is presented in Section 6.4.

6.3 DESING OF THE ANALYTICAL METHOD

Two management tools, ITGAP model and SAMs, have been discussed in different sections of this dissertation. For instance, in Chapter 2, the approach provided by Luftman (2000), Luftman (2003) and Luftman & Rajkumar (2007) was discussed since this perspective seem to be a relevant source of management practices for the attainment of IS/business alignment. An overview of different IT governance tools of IT governance was outlined in Chapter 2 as well. Based in this revision, it was found that the undertaken perspective by Peterson (2004) seems to provide a counterpart source for classifying management practices of *IT governance*. The IT governance assessment process (ITGAP) model by Peterson (2004) integrates a holistic view in which the integration level of structural, process and relational capabilities assesses the effectiveness of *IT governance* design. The justification of this model is centred not only on individual solutions but also in the process in which IT and business develop a shared view

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which is consistent with the idea of operational and strategic IS/business alignment followed by this research.

Peterson (2004) conceives *IT governance* as a horizontal and vertical integration of strategies and tactics. Vertically, IT governance serves to coordinate formal and informal IT decision-making process across multilevel relationships of IT and business. This conceptualisation is relevant for this research since, from this perspective, IT governance management practices consolidate mechanisms across organisational levels in order to coordinate the arrangements of IT governance. Such integration is then formal, tangible and often mandatory. Horizontally, IT governance integrates relationships which include the participation and collaboration of stakeholders; hence this integration is informal, intangible and often voluntary. Peterson operates the integration between strategic and tactic organisational levels categorising management practices according their capabilities and provide three types (see Table 6.1)

1. *Formal integration structures [FIS]* include formal mechanisms and devices for connecting and enabling horizontal, or liaison, contacts between business and IT management functions.
2. Formal integration processes [FIP] focus on the integration of business and IT decisions, or the alignment of strategic IT investments with strategic goals and objectives in the firm
3. *Relational integration (structures[RIS] & processes[RIP])* include the active participation of, and collaborative relationships among corporate executives, IT management, and business management

Peterson makes a distinction between *strategic integration* and *tactic integration;* the term strategic integration refers to a set of *capabilities* and tactics apply to a set of *mechanisms.* This differentiation implies that capability includes one or many mechanisms, so a mechanism is the practical instance of a capability. According to Peterson (2004 p.14), IT governance capabilities are defined as "managerial abilities that directly coordinate the multifaceted activities associated with the planning, organisation and control of IT". In analogue, this definition is congruent with the definition already deemed to conceptualise management practices (see section 3.5.2), so in this dissertation the term capability is equivalent to management practice.

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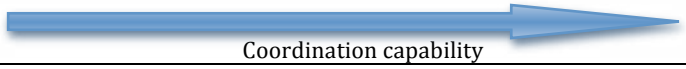
Table 6.1 Operationalisation of integration strategies and tactics for *IT governance* (Peterson, 2000).

<table>
<tr><th rowspan="2">Integration Strategies</th><th rowspan="2">Structures</th><th rowspan="2">Processes</th><th colspan="2">Relational structures & processes</th></tr>
<tr><th>Structure</th><th>Process</th></tr>
<tr><td rowspan="4">Integration Tactics</td><td>1. Positions and roles
2. Organizational structures</td><td>3. Strategic IT decision-making
4. IT Monitoring</td><td>5. Business and IT partnerships</td><td>6. Strategic dialogue
7. Business and IT shared learning</td></tr>
<tr><td colspan="4">Mechanisms</td></tr>
<tr><td>Operationalisation of structural mechanisms</td><td>Operationalisation of Process mechanisms</td><td colspan="2">Operationalisation of Relational mechanisms</td></tr>
<tr><td colspan="4">(-)  (+)
Coordination capability</td></tr>
</table>

ITGAP model includes two axes, vertical and horizontal, in which criteria of management practices are considered to assess IT governance; see Figure 6.1. Vertically, this model focuses on the business value realisation which considers the effect of value drivers towards the contribution of business performance. Horizontally, it focuses on the integration of formal and informal decision-making authorities (structures, processes, relationships) which bring integration among (vertical integration) and across (horizontal integration) the organisation. This axe is the focus of this dissertation.

The vertical integration deems the effect of coordinating IT making-decision processes (what is done?) in order to realise the complexity of an *IT governance* architecture (who is doing?). The horizontal integration has particular relevance in the effectiveness of *IT governance* implementations since it provides elements to allocate formal IT decision-making authority and coordinate informal IT decision-making authority processes (IT decision-making experience and influence). Both integrations imply an interaction that happens at different organisational levels within an organisation. A top-down interaction occurs by means of the use of formal rules and procedures (coordination by plan and hierarchies) whereas across levels the interaction takes place when management practices coordinate and integrate formal and informal decision-making authorities (structural, process and relational management practices) for both IT and business functions. In summary, the horizontal axe of the ITGAP model assess IT governance in terms of management practices which are grouped according their capable criteria..

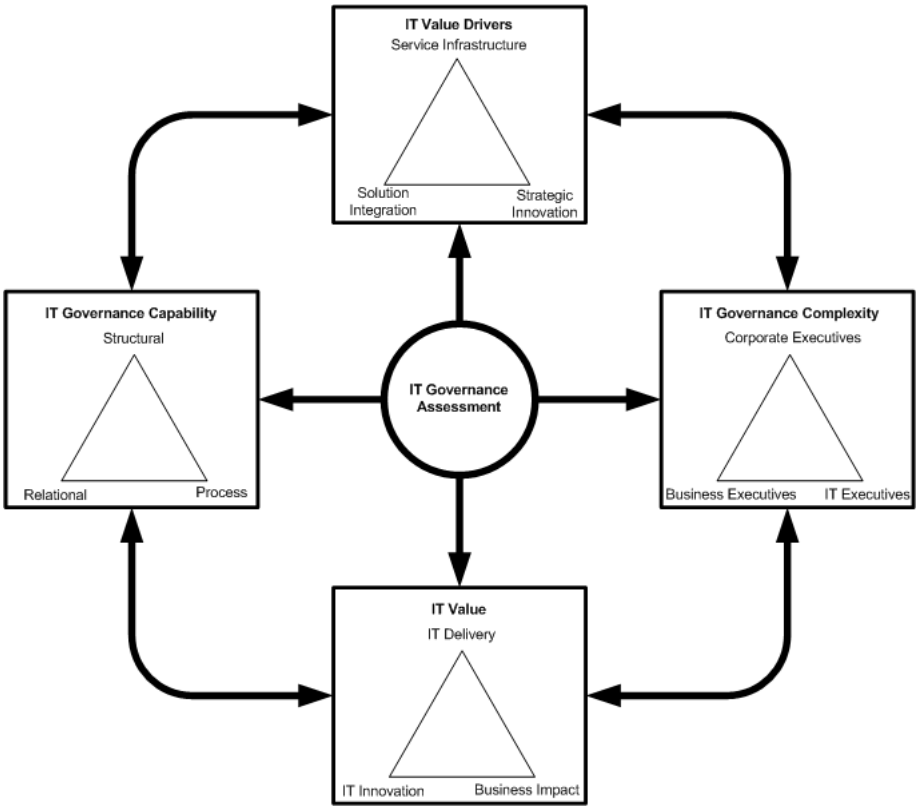


Figure 6.1 IT Governance Assessment Process (ITGAP) model (Peterson, 2004)

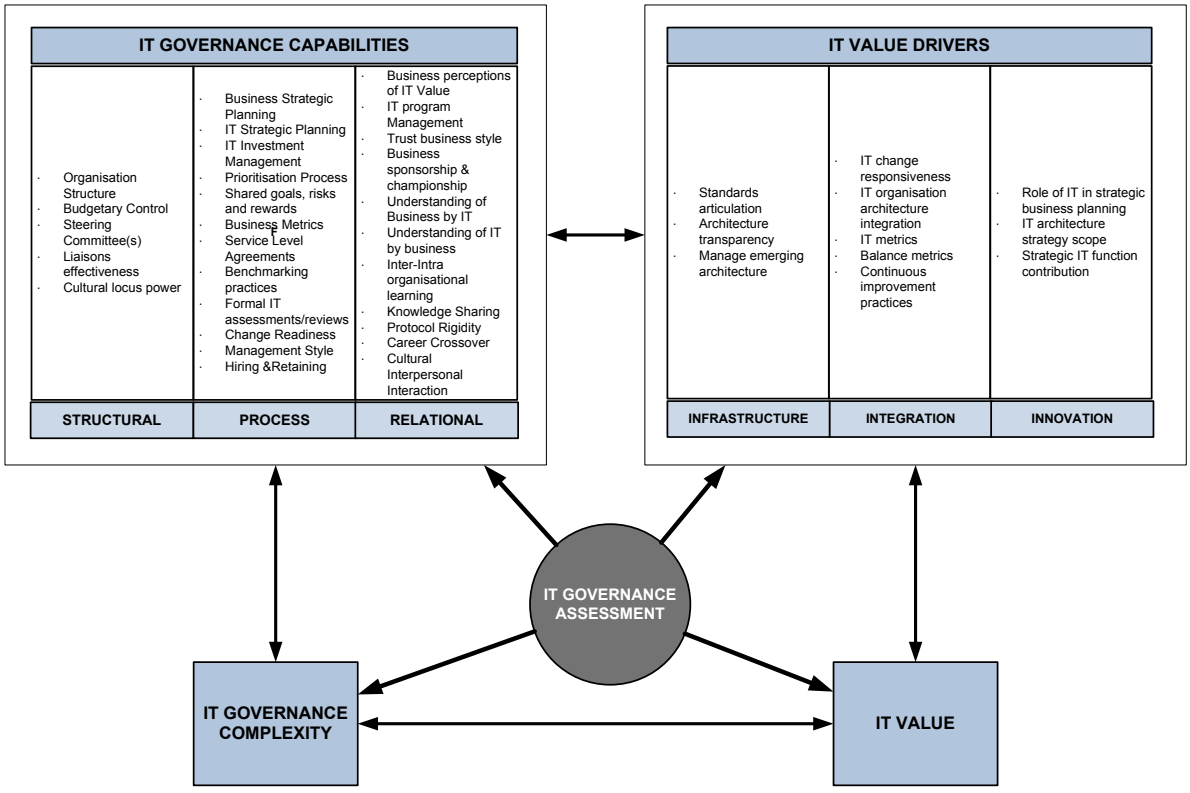


Figure 6.2 Mapping of SAMs management practices into ITGAP model

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A relationship focused on management practices is evident in both ITGAP model by Peterson (2004) and SAMs by Luftman & Rajkumar (2007). Both are strongly related by means of management practices to pursue practical implications and affect positively organisational performance. These arguments are relevant for this research since the relationship between both tools is drawn in terms of their practical implications; either ITGAP or SAMs provide organisational solutions by means of evaluating the effect of management practices.

Having identified that both SAMs and ITGAP model show related structures in terms of management practices, both references were used in this research. These two tools were mapped to help the analysis of this research. SAMs is a source of validated management practices (Sledgianowski, Luftman & Reilly, 2006) and ITGAP model offers references to categorise management practices. The description of the three key mechanisms (process, relationships and structures) by Peterson (2004) helped to categorise each management practice in SAMs framework. This allowed categorising each management practice according its capable *IT governance* objectives (process, relational or structural). The resulted mapping is illustrated in Figure 6.2. This diagram depicts how the IS/business alignment management practices by Luftman & Rajkumar (2007) can be used as references to elaborate the assessment of IT governance. In Figure 6.3 all management practices were allocated according their associated IS/business alignment factor and the IT governance capability criterion. Each management practice follows this classification and is surrounded by a small box which belongs to one of the three IT governance capability's criteria. Bigger boxes enclose the management practices belonging to one of the six factors defined in SAMs.

In this dissertation, the resulted mapping of ITGAP and SAMs is used for two purposes: 1) aggregate additional structure and coding criteria in Nvivo to analyse qualitative data collected in the explanatory phase and 2) provide categorisation criteria in terms of IT governance to each of the four relevant IS/business alignment management practices.

1) Coding criteria was added into Nivo and arranged into hierarchies following the horizontal (IT governance management practices criteria: process, structure & relational) and vertical (IT value drivers criteria: infrastructure, innovation & integration) structure of the ITGAP model as aforementioned explained. This was achieved by a tree node structure which hierarchically categorizes each management practice as a sub-three-node of one of the three capability's nodes or sub-tree-node of one of the three IT value driver's nodes. The final structure for this coding schema is included in Appendix A.7.

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2) The analysis of each relevant management practice and association is further discussed in Section 6.4. The extended qualitative analysis of examining four IS/business alignment management practices focused on understanding how, organisationally speaking, they are assumed and understood. This helped to create a reference of their associations and relationships for the ALIS-G framework. Hence, these four management practices and their associations underpin the constructors of the proposed framework.

6.4 IMPLEMENTATION OF THE ANALYTICAL METHOD

This analysis if centred on the association between four management practices, *IT investment management, budgetary control, understanding of the IT-business relationship* and *program management*. Since effective IT implementations of IT governance are expected to play an important role in the organisational decision-making processes, the examination of qualitative data was focused on those IT making-decision processes. To do so, coding qualitative data of the case research presented in the evaluation phase was re-examined to unclose such relationships. In the following sections details of their associations are discussed and illustrated through diagrams.

6.4.1 IT investment management and its associations

According to Luftman, 2000; Luftman & Rajkumar (2007), IT investment management is the ability to do IT investment decisions which can be based on different strategies such as cost-reduction, productivity, efficiency, competitive advantage, increase profit or improve partnerships value. Moreover, making-decisions about IT investment is a process that includes the development, evaluation and implementation to maximise IT payoff (Sherer, 2007). Before an IT invest is made, a decision–making process is followed which ends with the formal authorisation and the specific commitment. So, mechanisms associated to program management are expected to be in charge of enhancing the partnership relationship that exists between IT and business by providing rules and standard procedures along the IT investment management process. This consideration implies managerial actions at strategic, tactical and operational levels but, most important defining, whom make them. Sherer (2007) delineates five key management choices to characterise a formal IT investment management process: *idea generation, business case generation, investment selection, project implementation and achieving benefits*. By following these assumptions, a formal IT investment management process should include both *IT-business planning* and *prioritisation of IT projects* processes as key management choices. The theoretical assumption of Sherer (2007) supports the idea that the three processes are strongly associated and perhaps there are crossovers in their scopes. Therefore, part of the analysis was focused on finding the relationships and associations around *IT investment management.*

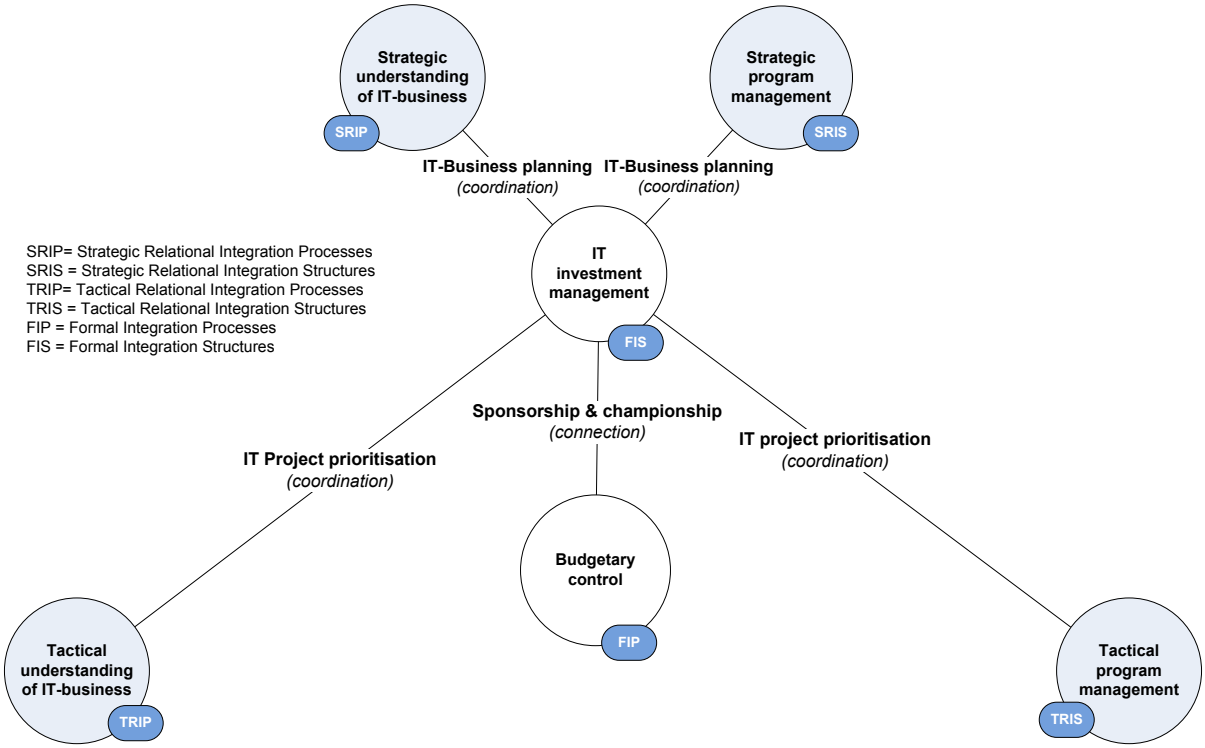

Figure 6.4 IT investment management process and ITG associations

IT investment management process was one of the highest ranked management practices in both validation and explanatory phases and consequently one of the practices that substantially contributed to achieve higher *IT governance* maturity, therefore IS/business alignment maturity. In addition to *IT management investment,* both *prioritisation of IT projects* and *strategic planning* are also practices within IT governance that were reported relevant in the dynamics of IT/business alignment.

In the case research, both large organisations reported the existence of a formal IT investment management processes based on formal program management relationships. Hence, mechanisms associated to program management were expected to be in charge of enhancing the partnership relationship that exists between IT and business by providing rules and standard procedures. In fact, a participant from CompB briefly provided an overview of the investment management process in his organisation:

> *"In our organisation, particularly for projects like this, we have a programme review board which, with input from IT senior management, provides budgets as well as make decisions on how budgets should be spend based on our business strategy. Then, a business case is developed, estimation is produced and the budget is allocated to projects which then are managed by change control."*

Similarly, a tactical manager from CompA explained their *IT investment management process:*

> *Every year, we conduct a strategic plan which includes our vision for the following three years. This is carried out by the executive board. The president of each BU and vice-presidents elaborate on their strategies, these are presented to the board and then approved. This is our strategic vision for the next three years. Then, we (tactical levels) generate action plans; plans for projects that will help the strategic vision. There is no one strategy for sales, when we do our planning we have in mind what products are going to be launched, how we need to distribute them or what we need to do with the different sales channels.*

However, the mechanisms that an IT investment management process should have, in practice, seem to be unclear. Both companies recognised the relevance of having a robust *IT management investment process* but its formalization and effectiveness seem to be compromised by budgets constraints. A business executive expressed the effectiveness its IT investment management as follows:

> *"I would think that we don't have a process (IT investment management). From my perspective, there is a process that understands business needs in the business side and groups requirements and generates quotations. However, this happens at the top level. But, we cannot ensure that these requirements are being effective from the top to the bottom and based on priorities because decisions are based in terms of budget.*

The above argument indirectly refers to the coordination of *IT investment management*, and *IT-business planning* which eventually operate the *prioritisation of IT projects*. Although formal processes are assumed, they are not systematically and exhaustively addressed as consequence of limited resources, in this case budget. The above argument assumes an existing disconnection between the formulation and execution of IT projects, also indicated by Benbya & McKelvey, (2006), which diminishes the systematic and formal effect of *IT investment management* and emphasizes informal relational processes. Interestingly, *IT-business planning* has been indicated as a medullar component for IS/business alignment that bridges formulation and execution phases which inherently involves the integrated collaboration between strategic and functional (tactical & operational) levels (Tarafdar & Qrunfleh, 2009). However, both organisations recognise the challenge to match IT supply and business demand across all organisational levels. Consequently, challenges to establish collaborative mechanisms in the form of program management (bottom-up and top-down) were identified by some participants. Interestingly, several discussions ended up arguing exhaustively the relevance of budgets over the IT

investment management, IT project prioritisation and IT-business planning processes. A business executive commented in this respect:

> *"When we have a new project, it is difficult to match bottom-up and top-down needs. We need to be clear, large projects are executed if budget is available at corporate level. For instance, if we consider our one-year planning process, macro-budgets! From there, our budget is prioritised and assigned... At the end, we can only invest money that has been assigned in this way. We cannot effectively administrate what we need and the budget of the corporation. I would say that 70% of the IT projects are formulated top-down and 30% are coming from bottom-up."*

Figure 6.4 illustrates the aforementioned arguments graphically around the *IT investment management process* and disclosea its association with organisational structures and processes. In terms of IT governance capabilities, IT investment management is a formal integration processes (FIP). Each dark circle refers to either a relational process or structure whereas white circles represent formal processes or structures. *IT investment management* addresses collaborative associations with two processes *IT projects prioritisation* and *IT-business planning*. It also addresses connectivity associations with *budgetary control* structures. Apparently, *IT investment management* brings associations in the social, structural, intellectual and informal structural dimensions of IS/business alignment.

6.4.2 Strategic and tactic program management and their associations

Luftman & Rajkumar (2007) addresses the term of program management by including formal processes focussed on enhancing partnership relationships that exist between IT and business. Due to its formal conceptualisation, *program management* is a *relational integration structure* which provides formal active participation and collaborative relationships between IT and business. Having considered that management faces the challenge to bring closer the gap between formulation and execution of IT projects, modern organisations should enable relational structures to keep the collaboration between top management and functional management when business changes. This multilevel implementation implies structural mechanism associated with communications and control management systems (e.g. IT governance) which are needed to build IT-line partnership for technological innovation (Zmud, 1988). In both companies, it was identified *program management* mechanisms that enhance this relational integration structures. For instance the manufacturing director in CompB mentioned:

> *"In this area we had a project management office. We recently had an organisational restructuration but we are working on that. The idea is to have this PMO not only to manage new projects but also to coordinate their prioritisation, KPIs and objectives. In addition, we are going to have the SAP PMO which will be the main contact with other PMOs already dedicated to implement SAP."*

However, this multilevel relationship between strategic and tactical management is not completely transparent. There are organisational structures and process that mediate but also complicate this relationship. It was indentified that this multilevel relationship is configured by *IT-business planning* processes and how IT investments are being prioritised. For instance, a business technological leader argued:

> *"We have teams that collect IT requirement but we often have a problem. When they have all requirements, a new prioritisation process starts which is function of the available budget so we then start reviewing requirements, again and again. After all, we then start renegotiating again and deciding what stuff can go and what stuff can wait..."*

Both organisations recognised the challenge to match IT supply and business demands across all organisational levels but also claim for effective mechanisms to know how to transfer needs across the organisation along both top-bottom and bottom-up directions. It was identified that not only excessive procedures and formal relational structures make this transference unclear but most important financial constraints that the organisation might face. In this respect, an executive went over the following argument:

> *"When we have a new project, it is difficult to match bottom-up and top-down needs. We need to be clear, large projects are executed if budget is available at corporate level. For instance, if we consider our one-year planning process, macro-budgets! From there, our budget is prioritised and assigned... At the end, we can only invest money that has been assigned in this way. We cannot effectively administrate what we need and the budget of the corporation. I would say that 70% of the IT projects are formulated top-down and 30% are coming from bottom-up."*

> *I understand that, in the big picture, IT is one of those accounts which budget is cut if we are out of money. IT is very vulnerable and subject of cuts. That is really bad; I would like to see the opposite way around. So, I would like to hear people telling me what we need in IT; these are the objectives and needs. Then, IT budget cannot be touch. Right, this is a business and I need to be flexible but I think we need to be clear what we want from IT and then fight for its budget.*

Figure 6.6, similar to Figure 6.4, shows graphically the aforementioned arguments around *strategic and tactical management programs* and discloses coordination integration with three

formal integration processes: *IT investment management, IT prioritisation process* and *IT-business planning*. Moreover, this figure exhibits formal collaborative integration between strategic program management and tactical program management. In terms of IT governance capabilities, both are relational integration structures however in the figure differentiates strategic and tactical relational integration structures. Each dark circle refers to either a relational process or structure whereas white circles represent formal processes or structures.

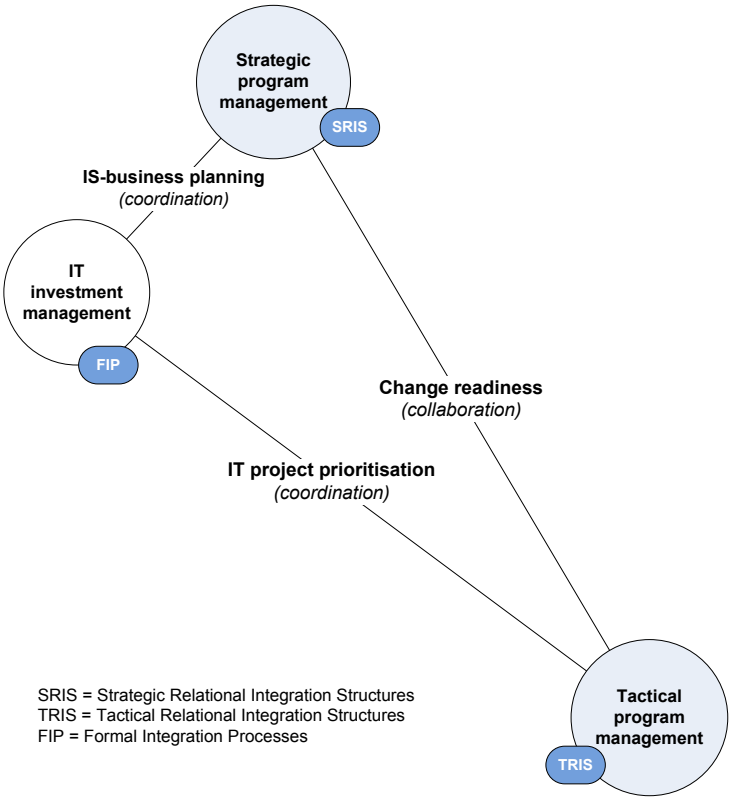

Figure 6.5 Strategic and tactical program management and ITG associations

6.4.3 Budgetary control and its associations

Budgetary control refers to how the IT function is budged and can be categorised as a *formal integration structure* and can be categorise as a formal integration structure according the IT governance capability's criteria. In our analysis, several participants contextualised this budgetary control practices based on their current role and position, including their function when dealing with an IT project. At tactical level, participants distinguished budgetary controls like "buckets" from where they can spend the assigned budget or part of it in order to perform activities related to their projects. Operative managers exhibited less knowledge regarding how this practice is performed and deemed that this practice is responsibility of the corporation. Both operative and tactical levels claimed limitations to change or inclusive improve budgetary controls. Strategic managers, conversely, justified the relevance of budgetary controls based on

its impact on business performance. The different knowledge exhibited by different participants might impact on the way they collaborate and understand the IT-business relationship. Some participants supported the idea that there is a gap between organisational levels as consequence of this different knowledge in *budgetary controls*:

> *"We are seen as an expensive team, so if we could leave away the char back model that we have for the moment, I think suddenly the relationship (IT-business) will improve dramatically."*

IT investment management and budgetary control are both mechanisms that can be formally connected. This connection however seems to be enabled the authority of hierarchies in the form of formal or informal sponsorship & championship. A business director mentioned the relevance of these mechanisms in order to succeed IT investments, he indicated:

> *"It is very important the type of sponsor you might have. It is not a secret for any project or company. Successful projects, the biggest ones, all of them have as a common factor the support from the corporation, support from the CEO; at least from the vice-president. From top-to-bottom, there is guarantee that projects are going to work well. When directors champion a project there is guarantee it is going to be better."*

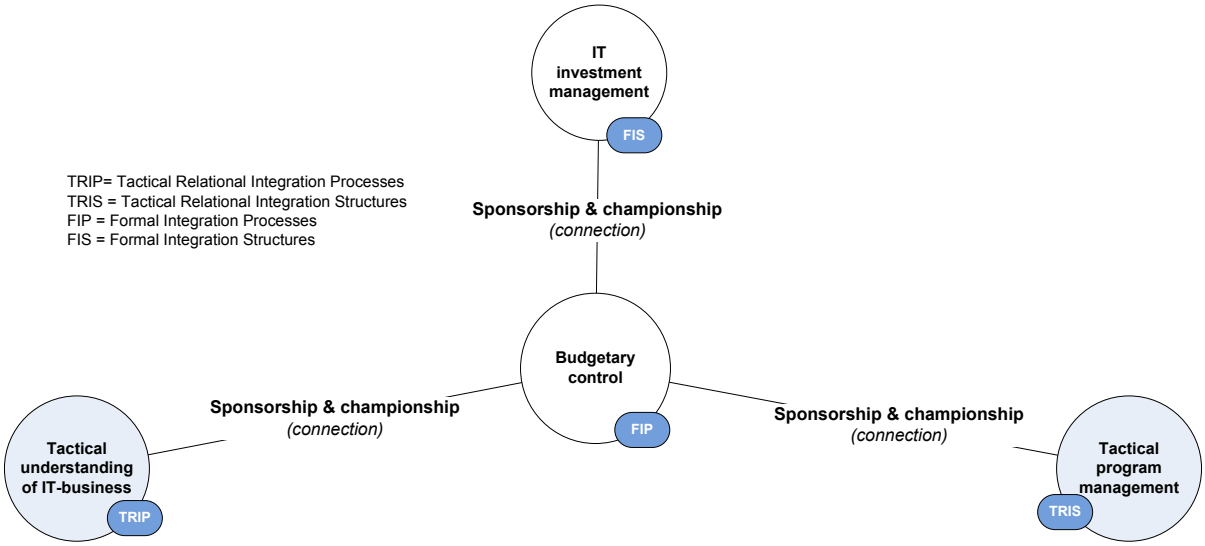

Figure 6.6 Budgetary control and ITG associations

Capturing how well IT and business understand each other was also part of this analysis. Eventually, measuring effectively the understanding of business and IT could be subjective. Interestingly, it was found that this understanding, at least in tactical levels, is somehow provided by the support of sponsors and champions. For instance, a tactical manager mentioned:

> *"Although the role of directors or project leaders is focused on dealing with managerial issues related to our projects, we need to involve them in early stages. This will help to visualise new technical requirement and their scope. We cannot wait until projects are executed and then, until the end, realise additional needs."*

From these results, it can be assumed that the more sponsorship and championship at tactical and operational levels, the more IT-business understanding people will get. This association is depicted in Figure 6.6 where *budgetary control* has been associated to the level of *IT-business understanding* by the influence of sustained sponsorship and championship. In addition, all associations related to budgetary control are also depicted.

6.4.4 Strategic and tactical understanding of IT-business and their associations

Literature has indicated that cooperative participation is enabled when shared knowledge exist between business and IT (Chan, Sabherwal & Thatcher, 2006; Reich & Benbasat, 2000; Luftman & Brier, 1999). Chan, Sabherwal & Thatcher (2006) highlights the influence of strategic IS planning to develop share domain knowledge between IT and business. *Understanding the IT-business relationship* is a relational integration process that describes tactical and strategic dialogue and shared learning between IT and business stakeholders. Sharing knowledge is inherently dynamic but it has to be enabled by organisational structures and processes. In this research, it was identified that the *understanding of the IT-business* relationships lays on the *sponsorship and championship* at tactical levels whereas strategic planning helps to improve such understanding. For instance, a business technical leader (tactical level) discussed his good collaborative relationship with top management (strategic level) in order to collect IT requirements. Hence, *sponsorship and championship* enhance relational integration processes through collaborative mechanisms towards better *understandings of the IT-business* relationships. He stated:

> *"Before, I was meeting him (sales vice-president) once a year. Sure, we have a good relationship with sales, with sales directors and managers. But having a relationship with the vice-president gives you visibility, priority and alignment. I can now see him once a month; that can guarantee me to know what he wants. Otherwise, we can review our planning and make decisions to add or discards outstandings."*

Furthermore, it was also identified that large IT investments in technology can influence the understanding of the IT-business relationship. A supply chain director discussed her perspective about the recent technological changes that the organisation faces as follows:

"For long time, top management was not very technological-oriented. However, this is now changing because I can see our president talking about SAP with familiarity. He already understood what SAP is. It was hard to make understood people what an ERP is. We change our culture. Thanks to SAP this culture has changed!"

Figure 6.7, similar to Figure 6.3, Figure 6.4, Figure 6.5 and Figure 6.6, depicts graphically the aforementioned arguments about *strategic and tactical understanding of the IT-business* relationship. This figure depicts the connection with organisational structures such as *budgetary control* and the coordination among processes such as *IT-business planning* and *IT project prioritisation.*

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Figure 6.7 Strategic and tactical understanding of IT-business and ITG associations

6.5 INTEGRATION OF RESULTS: ALIS-G FRAMEWORK

Different dimensions have been indicated around IS/business alignment research to understand, approach and portray intellectually, strategically, operationally, politically and culturally IS/business alignment. Four dimensions strategic/intellectual, structural, informal structural and social has been indentified relevant for this research (Chan & Reich, 2007; Grant, Hackney & Edgar, 2009b). These dimensions can bring clarity to allocate the context of the four relevant IS/business alignment management practices. Thus, *IT investment management, strategic and tactical understanding of the IT-business relationship, strategic and tactical program management* and *budgetary control* are below discussed in terms of which IS/business alignment dimension they address:

1. Reich & Benbasat (1996) argue that alignment research should consider the difference between social and intellectual dimensions. Social IS/business alignment dimension blends how well commitment does IT and business in a collective understanding. Thus, *strategic and tactical understanding of the IT-business relationship* conduct their *relational integration processes* effect on the social IS/business alignment dimension.

2. In view of intellectual dimension occurs when IS and business executives understand each other's objectives and plans and it often occurs at strategic level; then *strategic relational integration process (understanding of the business-IT relationship)* and *strategic relational integration structure (strategic program management)* have their *relational integration*

process and *relational integration structures* effects respectively within the intellectual IS/business alignment dimension.

3. The structural dimension has strong influence in decision-making processes, IT organisational structure, organisational levels of reporting and personnel deployment. Thus, *formal integration process (IT project prioritisation, IT investment management), formal integration structure (budgetary control), tactical relational integration process (tactical understanding of IT-business)* and *tactical relational integration structure (tactical program management)* have been categorised within the structural IS/business alignment dimension.

4. The informal structure dimension refers to those human and soft relationships and those no formal ways to strength formal organisational structures (Chan, 2002). Hence, *strategic relational integration process (strategic understanding of the IT-business relationship)* and *tactical relational integration process (tactical understanding of the IT-business relationship)* occur in the informal structure IS/business alignment dimension.

These four dimensions were already mapped against strategic, tactical and operational organisational levels in Figure 3.1. At strategic and tactical levels, the strategic dimension takes significant relevance since here is where strategies and plans are designed and then pushed down to lower levels. The social and informal structures link the integration of these plans or strategies between upper and lower organisational levels. At operational and tactical levels, structural and social organisational components interact to provide formal and informal mechanisms to integrate upper and lower organisational levels.

Based on the analysis of Section 6.4, the four relevant IS/business alignment management practices as well as described associations were compiled into a conceptual design. In addition, this design was contextualised by four IS/business alignment dimensions. This design was called ALIS-G (alignment in information systems governance) framework. In Figure 6.8, this framework is outlined.

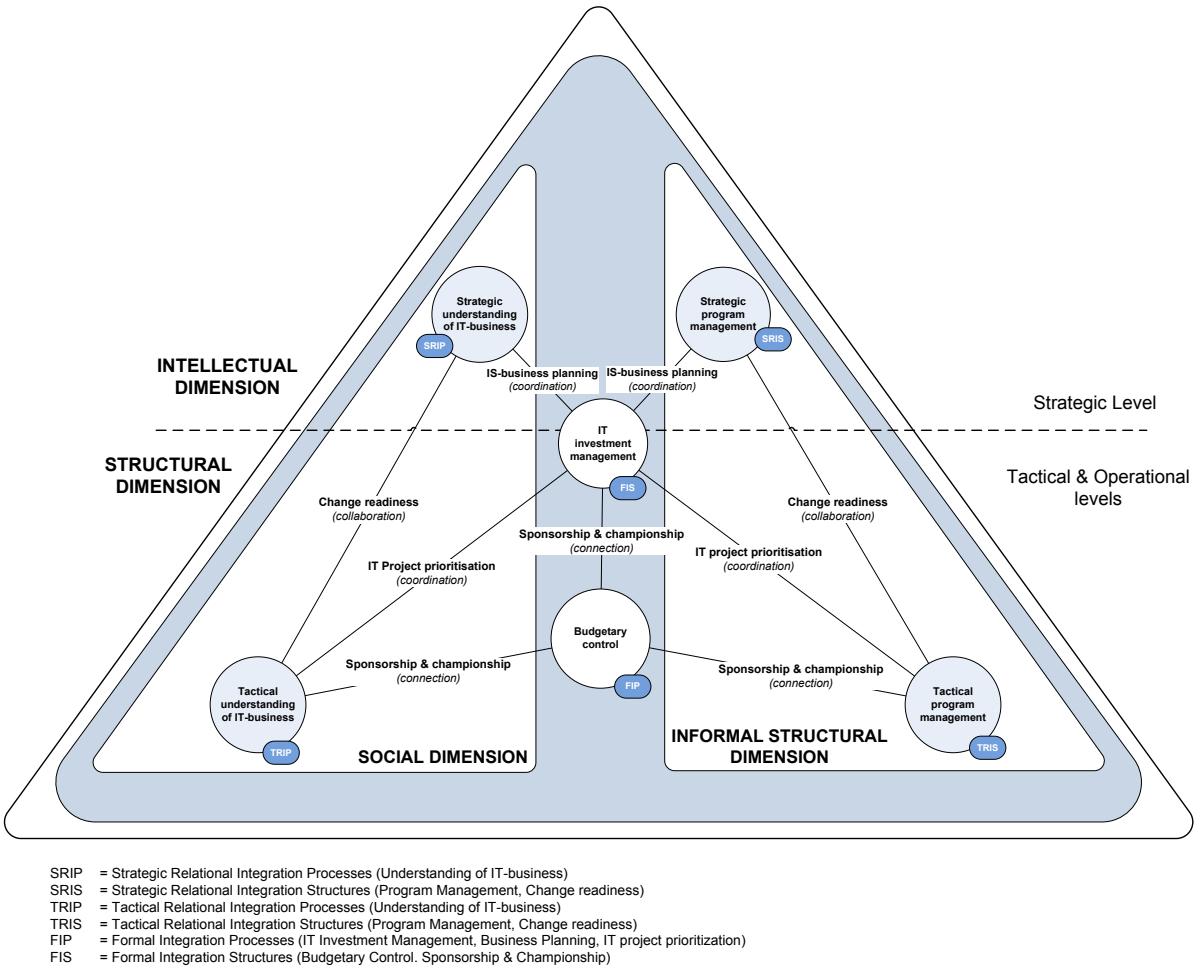

Figure 6.8 ALISG framework

Literature in IS/business alignment has rarely shown studies that integrate strategic and operational dimensions (Gutierrez, Orozco & Serrano, 2009). ALIS-G contributes in this claim outlining relevant management practices for either IT governance or IS/business alignment. Three formal integration processes undertake an angular place within the proposed ALIS-G framework: *IT investment management, IT project prioritization and IT-business planning*. In comparison to other constructors, these three processes can influence significantly the effectiveness of IT governance arrangements but also and play strong effects in the IS/business alignment dynamics. Two of these three processes, *IT project prioritisation* and *IT investment management*, supply core influence in IT governance arrangements and IS/business alignment whilst *IT-business planning* brings them coordination effects. Both *IT-business planning* and *IT project prioritization process* are formal integration processes that bring coordination to the *IT investment management process*. *IT-business planning process* occurs at strategic levels whereas

the *IT investment management* process at strategic, tactical and operational levels. A well-established strategic relational integration structures such as *strategic program management practices* can enable improved coordination mechanisms to develop effective IT-business business planning processes. Consistently, an a coordinated *strategic management program* can be realised as long as strategic levels have good understanding of the IT-business relationship. It is expected that *IT-business planning* process reconciles bottom-up and top- down approaches but only if uniform and consistent decisions are made towards a formal *IT investment management* process. IT investment management process however needs to be grounded with formal structures and processes at tactical and operational levels to be effective. *Budgetary control* is formal integration structure that seems to influence significantly the effect of *IT investment management*. The support of *sponsors and champions* in addition can enable structural connections to improve either the understanding of the IT-business relationship throughout hierarchical structures or empower tactical relational integration structures.

6.6 CONCLUSIONS

The analysis from this exercise indicate that at operational and tactical levels, improving the coordination of the *IT investment management* process and enabling organisational structures that strengthen the connection of *budgetary controls* can impact positively the integration of additional formal capabilities; consequently, enhance positively the IS/business alignment dynamics and enable mechanisms to design effective IT governance architectures. For example, between strategic and operational levels, promoting *program management practices* would influence collaboration towards a unified *understanding of IT* and business knowledge. From a practitioner's point of view, these results suggest that management should concentrate and put special emphasis in control mechanisms to support and monitor the *IT investment management* process and consolidate it by means of improved structural costing schemas. Specially, there is a need to establish balanced practices between stakeholders. In the case research, several issues related to IT investments were caused by the lack of standardised procedures since the diversity of informal practices were caused of conflicts and misalignment. At strategic level, this research found that the *understanding of IT-business* affects their strategic relational and process integration capabilities. Conversely, operational participants evidenced that the understanding of IT-business influences their tactical relational, process and structure capabilities.

In summary, an effective implementation of IT governance is expected to play an important role in the organisational decision making processes as long as an effective IT investment

management processes is in place. Then, IT governance can enhance positively the dynamics of IT/business alignment. The *IT investment management process* needs to provide connections with formal integration structures such as *budgetary controls* as well as coordination with *IT-business planning* and *IT projects prioritisation processes*. In addition, an effective *IT investment management process* would be grounded by relational integration structures such as *strategic and tactical program management* practices and relational integration processes such as *strategic and tactical good understanding of the IT-business relationship*.

6.7 SUMMARY

This chapter addresses the following aspects:

- The analysis of two management tools: SAMs framework by Luftman & Rajkumar (2007) and ITGAP model by Peterson (2004) were discussed to develop an analytical method that maps IS/business alignment practices into IT governance capability's criteria. The results after applying this method helped to categorise IS/business alignment practices in terms of IT governance capabilities.

- The proposed ALIS-G framework was developed based on a qualitative analysis of four relevant IS/business alignment management practices (*IT investment management, budgetary control, strategic and tactical understanding of IT-business* and *strategic and tactical program management*) and their associations.

- The implementation of ALIS-G framework suggests that enhancing the IS/business alignment dynamics and having effective implementations of IT governance arrangements are significantly consequence of a well-established and implemented IT investment management process.

CHAPTER 7: Conclusions & further research

7.1 RESEARCH OVERVIEW

The research presented in this thesis aimed at proving a framework of management practices, called ALIS-G (alignment in information systems governance), for enhancing the dynamics of IS/business alignment and improving effective designs of IT governance arrangements. This framework is an attempt to provide practical insights into the implementation of effective designs of IT governance and enhancement of the IS/business alignment dynamics. The research was conducted in four phases which are presented in seven chapters in this document.

The objectives of this thesis are below listed with the summary of each phase and related chapters:

1) Objective: outline the research context and introduce the research opportunity

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Chapter 1, Research Introduction addressed the main motivations that drove this research as well as the context that supports such motivations. The author explored incipient insights related to the context of IS/business alignment and argued its importance amongst current organisations. It is outlined some of the challenges around IS/business alignment and established claims for a pragmatic IS/business alignment. This chapter also includes an overview of IT governance as a management solution which has been related to IS/business alignment and seems to provide practical implications towards IS/business alignment. Moreover, addressed the fact that looking at practical implications of both IT governance and IS/business alignment in terms of management practices, can bring clarity to improve the design of IT governance arrangements and the

IS/business alignment dynamics. After providing contextual arguments that delineate this research, it is indicated the research aim and objectives. Thereafter, an overview of the phases involved in this research is outlined.

2) *Objective: explain the research perspective such as research process, methods, techniques used in this research.*

Chapter 2, Research strategy and design delineated the research process and outlined the structure of this document. The research process of this research was presented in terms of activities and outcomes in four phases: exploratory phase, validation phase, explanatory phase and evaluation phase. For each phase, objectives, activities and outcomes were addressed. This chapter indicated the use of a multimethod approach which includes quantitative and qualitative methods in the form of survey and case research respectively to collect data. In addition, philosophical and theoretical background was discussed in support of the research process attained and assumptions of the author.

3) *Objective: compile relevant literature of IS/business alignment which focuses on its practical implications and indicate relationships between IS/business alignment and IT governance*
4) *Objective: develop a conceptual understanding of IS/business alignment research and position this research in terms of this assumption*

Chapter 3, Exploratory Phase overviewed IS/business alignment research. The reviewed conducted identified different challenges, assumptions and conceptualisations in IS/business alignment research. Three main findings were indentified when addressing this review: 1) IS/business alignment has been tackled from different philosophical perspectives (strategic/intellectual, structural, social, informal structural and cultural) which makes complex its unified conceptualisation and understanding. 2) Research in IS/business alignment provides few pragmatic options and most of t its approaches are limited to assess perceptions at strategic levels which leaves a gap for operational and tactical IS/business alignment arguments. 3) IS/business alignment research with practical implications is limited and, particularly, few research focuses on integrating strategic, tactical and operational alignment. The literature review also helped to setup philosophical assumptions and develop a conceptual understanding of IS/business alignment among this research. Thus, based on a historical and current literature, it was assumed that IS/business alignment is the result of a series of adjustments at operational,

tactical and strategic levels and is better supported by an organic and evolutionary process-based approach. Moreover, the historical review also helped to identify two arguments in the rationale of IS/business alignment: management practices and IS-business planning process. From there, the relationship between IS/business alignment and IT governance was addressed and was found that there is a positive relationship between both areas.

5) *Objective: identify what management practices exhibit extreme outcomes along the IS/business alignment dynamics*

Chapter 4, Validity phase examined both IS planning and management practices arguments in the rationale of IS/business alignment to confirm their practical implications and indicate their foundational relationship towards IS/business alignment. To do so, an international survey was conducted. The design of this questionnaire considered that well-established IS planning process and effective management practices underpinned the dynamics of IS/business alignment. Given these assumptions, the analysis was focused on knowing what relevant management practices enable tight alignment between IS and business given an adopted IS planning integration strategy. Results confirmed that IT governance and partnership factors are significantly related to the process of IS/business alignment but, most important, regardless of any type of IS-business planning integration. Interestingly, when organisations evolve over more sophisticated planning integrations (independent-sequential-simultaneous), they tend to rank higher IS/business alignment maturity. Results show that, particularly, governance, communication and partnership become higher over other factors when a more sophisticated IS-business planning integration is perceived. Results also confirm that formal structures and process in the form of IT governance and informal process and structures in the form of IT governance and partnership are relevant in the dynamics of IS/business alignment

6) *Objective: identify how relevant management practices of IS/business alignment interact in the three level dynamics of IS/business alignment*

Chapter 5, Explanatory phase included a case research of two independent large companies which confirmed empirically the strong relationship and the effect between IT governance & partnership and IS/business alignment. Having argued in the exploratory phase that IS/business alignment is the product of both IS and business coevolving together and its materialisation becomes when the integration of IS and business occurs at strategic, tactical and operational levels; the investigation included data from strategic, tactical and organisational managerial levels. Although focus was given to management practices related to partnership and IT governance, the assessment included six factors by (Luftman & Rajkumar, 2007).Results from this exploratory phase support the multilevel organisational effect of IT governance and partnership. Management practices related to these two factors were examined and results indicated that IT investment management, budgetary control, understanding of IT by business and understanding of business by IT are significantly related to the IS/business alignment dynamics. According to these results, management should develop effective mechanisms over these four management practices that allow coordination and collaboration between strategic, tactical and operational managerial levels.

7) *Objective: identify how relevant management practices of IS/business alignment are associated and related in real-life organisational environments and elaborate on the design of the proposed ALIS-G framework*

Chapter 6, Interpretative phase extended the relationship of IS/business alignment and IT governance by elaborating an integrated analysis to bring clarification in the associations of four IS/business alignment management practices. The analysis was then centred on IT investment management, budgetary control, understanding of IT by business and understanding of business by IT. To elaborate on the analysis, an additional method was designed and later implemented in Nvivo to evaluate the qualitative data from the case research presented in the evaluation phase. This method included two management tools: SAMs framework by Luftman & Rajkumar (2007) and ITGAP model by Peterson (2004) which were mapped to related IS/business alignment practices into IT governance capability's criteria. The results after applying this method helped to categorise the four relevant IS/business alignment practices in terms of IT governance capabilities. To this end, the proposed ALIS-G framework was developed based on a

qualitative analysis of IT investment management, budgetary control, strategic and tactical understanding of IT-business and strategic and tactical program management and their associations. The most interesting finding is the fact that the implementation of ALIS-G framework suggests that enhancing the IS/business alignment dynamics and having effective implementations of IT governance arrangements are significantly consequence of a well-established and implemented IT investment management process.

8) *Objective: discuss the aggregate results in terms of the contribution in the body of knowledge of IS/business alignment and IT governance areas*

Chapter 7, Conclusions is addressed in the following sections.

7.2 CONCLUSIONS

The conclusions made throughout this research could be diverse in terms of theory and practice but five bullet points have been identified and later addressed by the author. The main conclusions of this research are:

Four core management practices (IT investment management, budgetary control, strategic and tactical program management, strategic and tactical understanding of IT-business) and four supportive management practices (IT-business planning, IT projects prioritisation, sponsorship & championship and change readiness) show collective and compelling influence over the IS/business alignment dynamics and the effectiveness of IT governance arrangements.

The contribution of the proposed ALIS-G framework can be seen in two different ways: 1) the IS/business alignment assessment, proposed in the explanatory phase, is a novel approach that integrates strategic, tactical and operational managerial levels. Traditional approaches have focused on a single level and have barely explored the interaction between the three levels. The three layered analysis helped to identify that although a certain level of alignment was perceived at a strategic level, this was not the case when looking at tactical and operational levels. This suggests that the measurements obtained by looking only one single level, may not reflect the overall business/IT alignment across the organisation. This research contributes to exhibit the differences between each organisational level and also integrate them in the form of management practices for their later managerial actions. Results wer then focused on identifying those relevant management practices across the three-layer organisational settings. 2) The aggregated

results derived from this research also helped on the identification of two sets of management practices, namely core and supportive, that have significant influence among the three organisational levels. The identified core practices are: *IT investment management, budgetary control, strategic and tactical program management, strategic and tactical understanding of IT-business* and the identified supportive management practices are *IT-business planning, IT projects prioritisation, sponsorship & championship and change readiness.* The identification of these practices was directly derived from the aggregated analysis in the explanatory phase. In addition to this, the associations between the practices and across organisational levels were identified. Interestingly, both sets show significant interactions for IS/business alignment and IT governance. For instance, results showed that the interaction of three different processes, *IT investment management, IS-business planning and IT projects prioritisation*, commonly related in the literature, were of higher relevance for IT governance and IS/business alignment. Their interaction goes from formulation to execution of IT investments by crossing different organisational levels. Although, the relationship between IT governance and IS/business alignment has been indicated in the literature, there are few findings that show the way this relationship can be conceived. This research contributes with a particular perspective exhibiting such relationship by means of eight collective and compelling management practices.

The design of the ALIS-G framework suggests that the dynamics of IS/business alignment and the arrangements of IT governance can be positively improved by a well-established IT investment management process.

Consistently, IT investment management was higher ranked in the validity and explanatory phases. The extended analysis, in the interpretative phase, also provided clarification on how this process is being assumed and undertaken in the organisations under analysis. Despite the fact that this process can have different settings, a flexible and formal IT investment management process should drive better assumptions of IT governance and consequently tight IS/business alignment. This research contributes to indicate that an adequate IT investment management process brings the gap closer between the practical implications among strategic, tactical and organisational levels of IT governance and IS/business alignment. Moreover, it was found that this process has consistent effects in the three organisational levels. For instance, by following the associations depicted in the ALIS-G framework, the IT investment management process can increase its effect over IS/business alignment and IT governance if it is supported by additional formal integration structures such as budgetary control and supportive formal

integration processes such as IT-business planning and IT project prioritisation. Particularly, budgetary control was one of the management practices that reported lower scores which suggest contentions against its interactions with IT investment management. Hence, balanced and sustained implementations of IT investment management processes should advance the IS/business alignment dynamics and formalised the arrangements of IT governance.

This research highlights the fact, perhaps obvious, that the arrangement of IT governance and the dynamics of IS/business alignment are very much conditioned by the resilient assignment, allocation and administration of budgets.

The fact that three formal relational processes *(IT investment management, IT-business planning and IT projects prioritisation)* have been identified with strong relationships to both IT governance and IS/business alignment suggests that the arrangement of IT governance and the dynamics of IS/business alignment are very much conditioned to the resilient assignment, allocation and administration of budgets. Participants at top level management positions highlighted the awkward role of budgets among IT investment decisions. Apparently, "budget" is the most relevant variable from the formulation to the execution of IT investments and eventually configures relationships throughout organisations. Although both large organisations reported the existence of a formal IT investment management process, the assignation of budgets was found highly managed by the support of informal relational integration processes and less by formal integration processes or structures. Evidence shows several informal sub-processes of informal negotiation and agreements at either the formulation or execution of IT projects.

Overall, this research supports the idea that formalizing a program management process, improving support from hierarchies of authority and integrating collaboration values along the organisation can advance significantly the process of IS/business alignment and the arrangements of IT governance.

Interestingly, the case research provided results that suggest that the gap between IT and business is getting closer however the gap across the three organisational levels remains quite significant. This result suggests to bring closer the gap across (IT-business) but also to develop effective strategic and tactical program management practices among the organisation. This addresses the need to have managerial mechanisms with significant effects across organisational levels. The structure of ALIS-G framework implicitly suggests

the formalisation of a program management process to improve support from hierarchies of authority and integrate collaborative values. The whole effect of these practices can improve the IS/business alignment as well as IT governance arrangements across different organisational levels. Moreover, the perspective addressed in this research supports the idea that the combination of formalizing a program management process, improving support from hierarchies of authority and integrating collaboration values can catalyse other organisational mechanisms to positively affect the IS/business alignment dynamics and IT governance arrangements.

The strong relationship between IT governance and IS/business was confirmed by means of the practical implications of both areas in the form of management practices.

Although the IT governance-IS/business alignment relationship has been addressed in the literature, few research exhibits how this relationship is either conceptually or organisationally assumed. No doubt, bringing a holistic approach that addresses such claim is pretty ambitious. This research contributes with an approach based on collective and relevant management practices between IS/business alignment and IT governance. The selected management practices have been claimed to be equally and collectively relevant towards the extent of IS/business alignment (Luftman 2000) however this research evidences that these management practices have different organisational impacts and effects. This fact has been currently supported by a very recent study (Luftman, Ben-Zvi & Dwivedi, 2010), which was available at the last stage of this research.

Results from the validity phase indicated significant relevance of management practices related to partnership and IT governance in the IS/business dynamics. Interestingly, some management practices related to partnership has been also reported in terms of IT governance. For instance, sharing knowledge has been demonstrated as an antecedent of IS/business alignment but also a relational integration process within IT governance. Since most IT governance definitions include this relational aspect, it can be assumed as part of IT governance and then position IT governance with strong effects in the IS/business alignment dynamics.

7.2.1 Further research

Extending research scope. Considering that two particular organisational contexts were evaluated in the case research, the core and supportive management are settings of a given IT governance architecture. However, there is no unique IT governance architectural arrangements in order to bring IT and business objective (Weill & Ross, 2004). These differences may impact the processes and relationships chosen for IT governance and subsequently the management choices in the IT investment process. Thus, the three-level IS/business alignment assessment process explained in Section 5.2.1 would be conducted in additional organisations in order to confirm the results depicted by the ALIS-G framework.

Structural IS/business alignment. The formal integration process of IT investment management process was one of the highest ranked IS/business alignment management practices and seems to be significantly supported by formal organisational structures such as budgetary control. In the search for IS/business alignment structures of sustainable IS/business alignment, further research should be focus on these process for identifying, organising and managing typologies of structural IS/business alignment.

***Strategic, tactical and operational IS/business alignment gap*.** From the case research of the explanatory phase, it was identified high variance in the participant's perceptions among different organisational levels in the ranking of IS/business alignment management practices. Particularly, management practices from IT governance were higher ranked but with substantial variances in their ranked among organisational levels. Further research should investigate root causes that cause these varying perceptions. A longitudinal case research should also provide additional insights among the evolution of IT governance practices in the execution of IT projects

7.2.2 Implications and assumptions

(Validity phase) This phase examined pragmatic insights by means of collecting organizational perceptions of IS/business alignment management practices via an online survey. Despite online surveys provide advantages to administrate respondents and increase substantially the number of respondents, there are disadvantages in their use. Since the data collected was mainly supplied by the members of two large associations, it was not possible to ensure who answered the questionnaires although both organisations seem to provide trusted sources. These issues might reduce credibility and validity from the answers, so to overcome this issue, personal details of respondents were reviewed in order to discard invalid responses. Limitations and

assumptions might be affected the study results, mainly due to the question's design. Each question in the questionnaire was designed based on the theoretical constructors by (Luftman, 2000) however the questions in the survey are quite different from the original instrument of Luftman.

Although original Luftman's instrument is not formally published, this questionnaire was shared by the author after the study in the validity phase was conducted. A comparative table between Luftman's instrument and the instrument designed in this study is included in Appendix A.3. Moreover, a validation study of the current version of Luftman's instrument was presented by (Sledgianowski, Luftman & Reilly, 2006).

(Explanatory phase) Two large organisations were considered to run this case research. However, no other assumption was undertaken but the higher interest that IS/business alignment generates in these type of organisations (Cragg, King & Hussin, 2002). Although the organisational settings might be different in order to improve this research such as opting for organisations in specific sectors or seeking to similar IT projects, the difficulties associated to access more organisations was a considerable limitation in this case research.

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APPENDIX

A.1. International survey (validity phase)

Part I: Background Information

1. ***Please answer the following general questions. How many employees are there in total in your organisation?***
    a) 1-100
    b) 101-250
    c) 251-1000
    d) 1001-5000
    e) >5000
2. ***Tick the classification most appropriate for your organisation:***
    a) Education
    b) Manufacturing
    c) Retail
    d) Government or Public Administration
    e) Banking/Finance
    f) Insurance
    g) Pharmaceutical
    h) Construction
    i) Health
    j) Petroleum
    k) Business services
    l) Other
3. ***Where is your organisation located?*** _____
4. ***To which of the following business units do you belong?***
    a) Business
    b) IT
    c) Both

Please answer the following section from your experience using information technologies (IT). When necessary, a brief definition is presented.

5. ***How would you rate the level of integration within your organization? Choose one.***
    a) Independent (IS strategy formulation and business strategy formulation are separate, unrelated processes)
    b) Sequential (IS strategy formulation follows and supports business strategy formulation)
    c) Simultaneous (IS strategy formulation and business strategy formulation are done concurrently)

Part II: Relevance of Factors

The following section presents 6 factors and their attributes (Luftman, 2000) that are believed to impact achievement and/or improvement of strategic Business/IT alignment. A short definition is given below each factor to assist in rating the relevance of each attribute.

Luftman, J. 2000, "Assessing Business-IT Alignment Maturity", Communications of the Association for Information Systems, vol. 4, no. 14, pp. 1- 51.

6. ***COMMUNICATIONS: This refers to the exchange of ideas, knowledge and information among the IT and business managers, enabling them to have a clear understanding of a company's strategies; business and IT environments; and, the priorities and what must be done to achieve them. Rate each of the following elements of Communication on a scale of 1 to 5 according to the relevance of achieving each one. (1=Least relevant, 5=Most relevant).***
    a) Understanding of business strategies by the IT department
    b) Understanding of IT capabilities by the business department
    c) Knowledge sharing between organisational levels from strategic to operational and with business partners (e.g. other commercial entities such as suppliers, customers, etc)
    d) Creating a communication environment that promotes freedom to express opinions about business and IT strategies in a flexible and informal way
    e) Conducting regular meetings between IT and business departments to discuss IT priorities, requirements and implementation

7. ***MEASUREMENT OF THE COMPETENCY AND VALUE OF IT: This refers to the assessment of IT investment through the use of metrics to demonstrate the contribution of IT to a business. Rate each of the following elements on a scale of 1 to 5 according to the relevance of achieving each one. (1=Least relevant, 5=Most relevant).***
    a) Selection of appropriate metrics for the organisation
    b) Balancing of metrics by linking Business and IT metrics
    c) Application of metrics at different organisational levels
    d) Making effective use of measurements obtained from the metrics application
    e) Using selected metrics on a regular basis

8. ***GOVERNANCE: This refers to the degree to which the authority for making IT decisions is defined and shared among management, and the processes managers in both IT and business organizations apply for setting IT priorities and the allocation of IT resources. Rate each of the following elements of governance on a scale of 1 to 5 according to the relevance of achieving each one. (1=Least relevant, 5=Most relevant).***
    a) Integrating the enterprise's business plan and IT plan
    b) Linking IT projects with the integrated business-IT plan
    c) Reviewing business priorities before adopting any IT project
    d) Conducting steering committees to prioritise IT projects
    e) Evaluating IT investments before and after implementation

9. ***PARTNERSHIP: This refers to the relationship among business and IT organizations, including the IT involvement in defining business strategies, the degree of trust between the two organizations, and the ways in which each perceives the contribution of the other. Rate each of the following elements of partnership on a scale of 1 to 5 according to the relevance of achieving each one. (1=Least relevant, 5=Most relevant).***
    a) Involving IT department in developing business strategies
    b) Sharing of risk and rewards by IT and business management in relation to IT projects
    c) Using IT to enable and drive business strategies
    d) Considering IT to be a significant part of business, not just a cost centre for doing business
    e) Sharing a long-term relationship between IT and business that enables trust

10. ***SCOPE & ARCHITECTURE: This refers to an organisation's infrastructure, change readiness, flexibility in structure and the management of emerging innovations. Rate each of the following elements of scope & architecture on a scale of 1 to 5 according to the relevance of achieving each one. (1=Least relevant, 5=Most relevant).***
    a) IT is able to provide integrated information systems across the organisation and with business partners
    b) IT is able to provide a flexible infrastructure that enables fast response to changes
    c) IT is able to evaluate and apply emerging technologies effectively
    d) IT is able to enable or drive business processes and strategies with a broad scope of information systems
    e) IT is able to provide information security

11. ***SKILLS: This refers to human resource considerations of an organisation including practices such as training, performance feedback, encouraging innovation and providing career opportunities, as well as the IT organization's readiness for change, capability for learning and ability to leverage new ideas. Rate each of the following elements of skills on a scale of 1 to 5 according to the relevance of achieving each one. (1=Least relevant, 5=Most relevant).***
    a) Providing formal opportunities to learn both IT and business skills
    b) Providing formal training before implementing a new IT project
    c) Providing career crossover opportunities among business departments
    d) Willingness or readiness to adopt technological changes
    e) Trusting social and political culture

A.2. Inferential and descriptive statistics (validity phase)

i. RELIABILITY

Case Processing Summary

		N	%
Cases	Valid	104	100.0
	Excluded	0	0.0
	Total	104	100.0

in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.845	0.846	5

Inter-Item Correlation Matrix

	COMM1	COMM2	COMM3	COMM4	COMM5
COMM1	1.000	0.572	0.517	0.498	0.443
COMM2	0.572	1.000	0.554	0.461	0.412
COMM3	0.517	0.554	1.000	0.618	0.538
COMM4	0.498	0.461	0.618	1.000	0.621
COMM5	0.443	0.412	0.538	0.621	1.000

Item-Total Statistics

	Mean if	Variance	d Item-	Multiple	's Alpha if
COMM1	14.9231	11.392	0.626	0.420	0.821
COMM2	15.2885	11.780	0.614	0.424	0.824
COMM3	15.2981	11.104	0.704	0.505	0.800
COMM4	15.2212	10.504	0.696	0.519	0.802
COMM5	15.3462	11.044	0.628	0.435	0.821

Case Processing Summary

		N	%
Cases	Valid	104	100.0
	Excluded	0	0.0
	Total	104	100.0

in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.923	0.923	5

Inter-Item Correlation Matrix

	VALUE1	VALUE2	VALUE3	VALUE4	VALUE5
VALUE1	1.000	0.741	0.642	0.729	0.736
VALUE2	0.741	1.000	0.764	0.672	0.658
VALUE3	0.642	0.764	1.000	0.683	0.623
VALUE4	0.729	0.672	0.683	1.000	0.797
VALUE5	0.736	0.658	0.623	0.797	1.000

Item-Total Statistics

	Mean if	Variance	d Item-	Multiple	's Alpha if
VALUE1	14.1250	15.606	0.810	0.675	0.903
VALUE2	14.1442	15.717	0.803	0.694	0.904
VALUE3	14.2500	16.500	0.762	0.636	0.912
VALUE4	13.9135	15.361	0.820	0.711	0.901
VALUE5	14.0288	16.009	0.799	0.691	0.905

Case Processing Summary

		N	%
Cases	Valid	104	100.0
	Excluded	0	0.0
	Total	104	100.0

in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.875	0.878	5

Inter-Item Correlation Matrix

	PART1	PART2	PART3	PART4	PART5
PART1	1.000	0.595	0.591	0.518	0.536
PART2	0.595	1.000	0.552	0.584	0.587
PART3	0.591	0.552	1.000	0.591	0.641
PART4	0.518	0.584	0.591	1.000	0.707
PART5	0.536	0.587	0.641	0.707	1.000

Item-Total Statistics

	Mean if	Variance	d Item-	Multiple	's Alpha if
PART1	15.0673	12.724	0.664	0.465	0.860
PART2	15.1923	12.642	0.696	0.489	0.851
PART3	14.6923	13.885	0.714	0.520	0.850
PART4	14.6250	12.625	0.721	0.562	0.844
PART5	14.7308	12.820	0.747	0.597	0.839

Case Processing Summary

		N	%
Cases	Valid	104	100.0
	Excluded	0	0.0
	Total	104	100.0

in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.872	0.873	5

Inter-Item Correlation Matrix

	ARCH1	ARCH2	ARCH3	ARCH4	ARCH5
ARCH1	1.000	0.687	0.491	0.651	0.475
ARCH2	0.687	1.000	0.659	0.658	0.519
ARCH3	0.491	0.659	1.000	0.524	0.540
ARCH4	0.651	0.658	0.524	1.000	0.576
ARCH5	0.475	0.519	0.540	0.576	1.000

Item-Total Statistics

	Mean if	Variance	d Item-	Multiple	's Alpha if
ARCH1	14.6346	13.244	0.696	0.544	0.846
ARCH2	14.8173	12.461	0.777	0.639	0.826
ARCH3	15.0962	12.903	0.664	0.489	0.854
ARCH4	15.0481	12.493	0.733	0.561	0.836
ARCH5	14.5577	13.336	0.628	0.416	0.862

Case Processing Summary

		N	%
Cases	Valid	103	99.0
	Excluded	1	1.0
	Total	104	100.0

in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.845	0.846	5

Inter-Item Correlation Matrix

	SKILL1	SKILL2	SKILL3	SKILL4	SKILL5
SKILL1	1.000	0.572	0.653	0.557	0.434
SKILL2	0.572	1.000	0.571	0.538	0.359
SKILL3	0.653	0.571	1.000	0.493	0.591
SKILL4	0.557	0.538	0.493	1.000	0.472
SKILL5	0.434	0.359	0.591	0.472	1.000

Item-Total Statistics

	Mean if	Variance	d Item-	Multiple	's Alpha if
SKILL1	13.7573	11.715	0.698	0.524	0.801
SKILL2	13.7573	11.735	0.630	0.444	0.820
SKILL3	14.2427	11.382	0.737	0.580	0.790
SKILL4	13.7573	12.323	0.640	0.429	0.817
SKILL5	14.1553	12.191	0.564	0.395	0.838

ii. CROSSTABULATION BY COMMUNICATION MEAN

Notes

	Output Created	31-Mar-2010 21:54:07
	Comments	
Input	Data	H:\DataFactorsJournal.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	103
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
	Syntax	CROSSTABS /TABLES=PLANINTEG BY COMMMEAN /FORMAT=AVALUE TABLES /STATISTICS=CHISQ CORR /CELLS=COUNT /COUNT ROUND CELL.
Resources	Processor Time	0:00:00.000
	Elapsed Time	0:00:00.000
	Dimensions Requested	2
	Cells Available	174762

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Planning integration * COMMUNICATION MEAN	103	100.0%	0	.0%	103	100.0%

Planning integration * COMMUNICATION MEAN Crosstabulation

Count

		COMMUNICATION MEAN				
		1.60	2.00	2.40	2.60	2.80
Planning integration	Independent	0	1	5	2	2
	Sequential	1	0	0	3	1
	Simultaneous	0	0	1	0	1
	Total	1	1	6	5	4

Planning integration * COMMUNICATION MEAN Crosstabulation

Count

		COMMUNICATION MEAN				
		3.00	3.20	3.40	3.60	3.80
Planning integration	Independent	1	1	1	2	0
	Sequential	3	1	3	2	5
	Simultaneous	3	1	1	5	4
	Total	7	3	5	9	9

Planning integration * COMMUNICATION MEAN Crosstabulation

Count

		COMMUNICATION MEAN				
		4.00	4.20	4.40	4.60	4.80
Planning integration	Independent	5	0	0	1	2
	Sequential	2	4	9	2	3
	Simultaneous	4	5	2	2	3
	Total	11	9	11	5	8

Planning integration * COMMUNICATION MEAN Crosstabulation

Count

		COMMUNICATION MEAN	
		5.00	Total
Planning integration	Independent	1	24
	Sequential	7	46
	Simultaneous	1	33
	Total	9	103

CHI-SQUARE TESTS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	46.324[a]	30	.029
Likelihood Ratio	52.555	30	.007
Linear-by-Linear Association	4.710	1	.030
N of Valid Cases	103		

a. 48 cells (100.0%) have expected count less than 5. The minimum expected count is .23.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.215	.093	2.211	.029[c]
Ordinal by Ordinal	Spearman Correlation	.171	.098	1.746	.084[c]
	N of Valid Cases	103			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

iii. CROSSTABULATION BY VALUE MEAN

Notes

	Output Created	31-Mar-2010 21:55:12
	Comments	
Input	Data	H:\DataFactorsJournal.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	103
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
	Syntax	CROSSTABS /TABLES=PLANINTEG BY VALUEMEAN /FORMAT=AVALUE TABLES /STATISTICS=CHISQ CORR /CELLS=COUNT /COUNT ROUND CELL.
Resources	Processor Time	0:00:00.016
	Elapsed Time	0:00:00.015
	Dimensions Requested	2
	Cells Available	174762

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Planning integration * VALUE & MEASUREMENT MEAN	103	100.0%	0	.0%	103	100.0%

Planning integration * VALUE & MEASUREMENT MEAN Crosstabulation

Count

		VALUE & MEASUREMENT MEAN				
		1.00	1.20	1.60	1.80	2.00
Planning integration	Independent	1	1	1	1	3
	Sequential	0	0	0	2	2
	Simultaneous	0	0	0	0	0
	Total	1	1	1	3	5

Planning integration * VALUE & MEASUREMENT MEAN Crosstabulation

Count

		VALUE & MEASUREMENT MEAN				
		2.20	2.40	2.60	2.80	3.00
Planning integration	Independent	3	1	2	1	0
	Sequential	0	2	0	2	5
	Simultaneous	1	0	0	0	7
	Total	4	3	2	3	12

Planning integration * VALUE & MEASUREMENT MEAN Crosstabulation

Count

		VALUE & MEASUREMENT MEAN				
		3.20	3.40	3.60	3.80	4.00
Planning integration	Independent	0	1	1	0	0
	Sequential	1	3	5	4	5
	Simultaneous	2	4	4	1	4
	Total	3	8	10	5	9

Planning integration * VALUE & MEASUREMENT MEAN Crosstabulation

Count

		VALUE & MEASUREMENT MEAN			
		4.20	4.40	4.60	4.80
Planning integration	Independent	2	1	1	1
	Sequential	4	6	0	0
	Simultaneous	1	2	3	2

Planning integration * VALUE & MEASUREMENT MEAN Crosstabulation

Count

		VALUE & MEASUREMENT MEAN			
		4.20	4.40	4.60	4.80
Planning integration	Independent	2	1	1	1
	Sequential	4	6	0	0
	Simultaneous	1	2	3	2
	Total	7	9	4	3

Planning integration * VALUE & MEASUREMENT MEAN Crosstabulation

Count

		VALUE & MEASUREMENT MEAN	
		5.00	Total
Planning integration	Independent	3	24
	Sequential	5	46
	Simultaneous	2	33
	Total	10	103

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	57.088[a]	38	.024
Likelihood Ratio	67.005	38	.003
Linear-by-Linear Association	6.819	1	.009
N of Valid Cases	103		

a. 59 cells (98.3%) have expected count less than 5. The minimum expected count is .23.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.259	.100	2.690	.008[c]
Ordinal by Ordinal	Spearman Correlation	.196	.106	2.012	.047[c]
	N of Valid Cases	103			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

iv. CROSSTABULATION BY GOVERNANCE MEAN

Notes

	Output Created	31-Mar-2010 21:55:33
	Comments	
Input	Data	H:\DataFactorsJournal.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	103
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
	Syntax	CROSSTABS /TABLES=PLANINTEG BY GOVMEAN /FORMAT=AVALUE TABLES /STATISTICS=CHISQ CORR /CELLS=COUNT /COUNT ROUND CELL.
Resources	Processor Time	0:00:00.016
	Elapsed Time	0:00:00.017
	Dimensions Requested	2
	Cells Available	174762

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Planning integration * GOVERNANCE MEAN	103	100.0%	0	.0%	103	100.0%

Planning integration * GOVERNANCE MEAN Crosstabulation

Count

		GOVERNANCE MEAN				
		2.00	2.20	2.40	2.60	2.80
Planning integration	Independent	3	0	3	1	3
	Sequential	0	1	3	0	2
	Simultaneous	0	0	0	0	0

Planning integration * GOVERNANCE MEAN Crosstabulation

Count

		GOVERNANCE MEAN				
		2.00	2.20	2.40	2.60	2.80
Planning integration	Independent	3	0	3	1	3
	Sequential	0	1	3	0	2
	Simultaneous	0	0	0	0	0
	Total	3	1	6	1	5

Planning integration * GOVERNANCE MEAN Crosstabulation

Count

		GOVERNANCE MEAN				
		3.00	3.20	3.40	3.60	3.80
Planning integration	Independent	4	0	1	2	0
	Sequential	3	3	2	3	1
	Simultaneous	3	2	0	1	5
	Total	10	5	3	6	6

Planning integration * GOVERNANCE MEAN Crosstabulation

Count

		GOVERNANCE MEAN				
		4.00	4.20	4.40	4.60	4.80
Planning integration	Independent	1	0	1	3	0
	Sequential	2	5	2	5	5
	Simultaneous	5	3	4	5	4
	Total	8	8	7	13	9

Planning integration * GOVERNANCE MEAN Crosstabulation

Count

		GOVERNANCE MEAN	
		5.00	Total
Planning integration	Independent	2	24
	Sequential	9	46
	Simultaneous	1	33
	Total	12	103

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	51.269[a]	30	.009
Likelihood Ratio	58.327	30	.001
Linear-by-Linear Association	10.837	1	.001
N of Valid Cases	103		

a. 46 cells (95.8%) have expected count less than 5. The minimum expected count is .23.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.326	.086	3.465	.001[c]
Ordinal by Ordinal	Spearman Correlation	.263	.094	2.743	.007[c]
	N of Valid Cases	103			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

v. CROSSTABULATION BY PARTNERSHIP MEAN

Notes

	Output Created	31-Mar-2010 21:55:53
	Comments	
Input	Data	H:\DataFactorsJournal.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	103
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
	Syntax	CROSSTABS /TABLES=PLANINTEG BY PARTMEAN /FORMAT=AVALUE TABLES /STATISTICS=CHISQ CORR /CELLS=COUNT /COUNT ROUND CELL.
Resources	Processor Time	0:00:00.016

Elapsed Time	0:00:00.015
Dimensions Requested	2
Cells Available	174762

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Planning integration * PARTNERSHIP MEAN	103	100.0%	0	.0%	103	100.0%

Planning integration * PARTNERSHIP MEAN Crosstabulation

Count

		PARTNERSHIP MEAN				
		1.60	2.00	2.20	2.40	2.60
Planning integration	Independent	2	3	1	1	2
	Sequential	0	0	2	0	3
	Simultaneous	0	0	0	0	0
	Total	2	3	3	1	5

Planning integration * PARTNERSHIP MEAN Crosstabulation

Count

		PARTNERSHIP MEAN				
		2.80	3.00	3.20	3.40	3.60
Planning integration	Independent	2	2	0	2	0
	Sequential	3	3	2	1	4
	Simultaneous	1	5	4	1	1
	Total	6	10	6	4	5

Planning integration * PARTNERSHIP MEAN Crosstabulation

Count

	PARTNERSHIP MEAN				
	3.80	4.00	4.20	4.40	4.60

Planning integration	Independent	1	1	1	2	1
	Sequential	1	3	6	5	4
	Simultaneous	3	1	9	4	3
	Total	5	5	16	11	8

Planning integration * PARTNERSHIP MEAN Crosstabulation

Count

		PARTNERSHIP MEAN		
		4.80	5.00	Total
Planning integration	Independent	2	1	24
	Sequential	4	5	46
	Simultaneous	0	1	33
	Total	6	7	103

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	47.290[a]	32	.040
Likelihood Ratio	51.115	32	.017
Linear-by-Linear Association	6.060	1	.014
N of Valid Cases	103		

a. 49 cells (96.1%) have expected count less than 5. The minimum expected count is .23.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.244	.094	2.526	.013[c]
Ordinal by Ordinal	Spearman Correlation	.178	.100	1.817	.072[c]
	N of Valid Cases	103			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

vi. CROSSTABULATION BY ARCHITECTURE MEAN

Notes

Output Created	31-Mar-2010 21:56:13

	Comments	
Input	Data	H:\DataFactorsJournal.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	103
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
	Syntax	CROSSTABS /TABLES=PLANINTEG BY ARCHMEAN /FORMAT=AVALUE TABLES /STATISTICS=CHISQ CORR /CELLS=COUNT /COUNT ROUND CELL.
Resources	Processor Time	0:00:00.000
	Elapsed Time	0:00:00.000
	Dimensions Requested	2
	Cells Available	174762

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Planning integration * SCOPE & ARCHITECTURE MEAN	103	100.0%	0	.0%	103	100.0%

Planning integration * SCOPE & ARCHITECTURE MEAN Crosstabulation

Count

		SCOPE & ARCHITECTURE MEAN				
		1.00	1.40	2.00	2.20	2.40
Planning integration	Independent	1	1	1	1	1
	Sequential	0	2	1	0	3
	Simultaneous	0	0	0	0	0
	Total	1	3	2	1	4

Planning integration * SCOPE & ARCHITECTURE MEAN Crosstabulation

Count

		SCOPE & ARCHITECTURE MEAN				
		2.60	2.80	3.00	3.20	3.40
Planning integration	Independent	1	0	1	1	3
	Sequential	1	2	4	2	0
	Simultaneous	0	0	4	3	0
	Total	2	2	9	6	3

Planning integration * SCOPE & ARCHITECTURE MEAN Crosstabulation

Count

		SCOPE & ARCHITECTURE MEAN				
		3.60	3.80	4.00	4.20	4.40
Planning integration	Independent	3	2	3	1	0
	Sequential	3	4	3	5	9
	Simultaneous	3	5	7	3	2
	Total	9	11	13	9	11

Planning integration * SCOPE & ARCHITECTURE MEAN Crosstabulation

Count

		SCOPE & ARCHITECTURE MEAN			
		4.60	4.80	5.00	Total
Planning integration	Independent	2	1	1	24
	Sequential	2	1	4	46
	Simultaneous	1	2	3	33
	Total	5	4	8	103

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	41.310[a]	34	.182
Likelihood Ratio	45.249	34	.094
Linear-by-Linear Association	5.098	1	.024
N of Valid Cases	103		

a. 53 cells (98.1%) have expected count less than 5. The minimum expected count is .23.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.224	.086	2.305	.023[c]
Ordinal by Ordinal	Spearman Correlation	.177	.091	1.803	.074[c]
	N of Valid Cases	103			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

vii. CROSSTABULATION BY SKILLS MEAN

Notes

	Output Created	31-Mar-2010 21:56:46
	Comments	
Input	Data	H:\DataFactorsJournal.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	103
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
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Case Processing Summary

	Cases		
	Valid	Missing	Total

	N	Percent	N	Percent	N	Percent
Planning integration * SKILL MEAN	103	100.0%	0	.0%	103	100.0%

Planning integration * SKILL MEAN Crosstabulation

Count

		SKILL MEAN				
		1.00	1.40	1.60	1.80	2.00
Planning integration	Independent	1	1	0	0	1
	Sequential	0	1	1	2	1
	Simultaneous	0	0	0	0	0
	Total	1	2	1	2	2

Planning integration * SKILL MEAN Crosstabulation

Count

		SKILL MEAN				
		2.20	2.40	2.60	2.80	3.00
Planning integration	Independent	1	1	3	1	3
	Sequential	0	2	2	0	4
	Simultaneous	0	1	2	0	4
	Total	1	4	7	1	11

Planning integration * SKILL MEAN Crosstabulation

Count

		SKILL MEAN				
		3.20	3.40	3.60	3.80	4.00
Planning integration	Independent	0	5	0	0	3
	Sequential	1	3	4	5	6
	Simultaneous	3	4	2	4	4
	Total	4	12	6	9	13

Planning integration * SKILL MEAN Crosstabulation

Count

	SKILL MEAN			
	4.20	4.40	4.60	4.80

Planning integration	Independent	4	0	0	0
	Sequential	10	1	1	0
	Simultaneous	3	2	1	1
	Total	17	3	2	1

Planning integration * SKILL MEAN Crosstabulation

Count

		SKILL MEAN	
		5.00	Total
Planning integration	Independent	0	24
	Sequential	2	46
	Simultaneous	2	33
	Total	4	103

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	37.236[a]	38	.505
Likelihood Ratio	43.652	38	.244
Linear-by-Linear Association	6.577	1	.010
N of Valid Cases	103		

a. 56 cells (93.3%) have expected count less than 5. The minimum expected count is .23.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.254	.084	2.638	.010[c]
Ordinal by Ordinal	Spearman Correlation	.207	.093	2.125	.036[c]
	N of Valid Cases	103			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

viii. ONEWAY ANOVA

```
ONEWAY COMMMEAN VALUEMEAN GOVMEAN PARTMEAN ARCHMEAN SKILLMEAN BY
PLANINTEG /STATISTICS DESCRIPTIVES HOMOGENEITY BROWNFORSYTHE WELCH /PLOT
MEANS /MISSING ANALYSIS /POSTHOC=GH DUNNETT (1) ALPHA(0.05).
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	Cases Used	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.
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Descriptives

		N	Mean	Std. Deviation	Std. Error
COMMUNICATION MEAN	Independent	24	3.3667	.90730	.18520
	Sequential	46	3.9957	.81047	.11950
	Simultaneous	33	3.8909	.63066	.10978
	Total	103	3.8155	.81490	.08029
VALUE & MEASUREMENT MEAN	Independent	24	3.0333	1.30905	.26721
	Sequential	46	3.6478	.86634	.12774
	Simultaneous	33	3.7515	.71420	.12433
	Total	103	3.5379	.97861	.09642

GOVERNANCE MEAN	Independent	24	3.2917	.97442	.19890
	Sequential	46	4.0174	.87516	.12904
	Simultaneous	33	4.1030	.57035	.09929
	Total	103	3.8757	.87183	.08590
PARTNERSHIP MEAN	Independent	24	3.2250	1.09276	.22306
	Sequential	46	3.9000	.83772	.12352
	Simultaneous	33	3.8545	.61293	.10670
	Total	103	3.7282	.88022	.08673
SCOPE & ARCHITECTURE MEAN	Independent	24	3.4000	1.03336	.21093
	Sequential	46	3.7217	.93569	.13796
	Simultaneous	33	3.9394	.60101	.10462
	Total	103	3.7165	.88319	.08702
SKILL MEAN	Independent	24	3.1000	.89443	.18257
	Sequential	46	3.5304	.87658	.12924
	Simultaneous	33	3.6970	.67846	.11810
	Total	103	3.4835	.84507	.08327

Descriptives

		95% Confidence Interval for Mean			
		Lower Bound	Upper Bound	Minimum	Maximum
COMMUNICATION MEAN	Independent	2.9835	3.7498	2.00	5.00
	Sequential	3.7550	4.2363	1.60	5.00
	Simultaneous	3.6673	4.1145	2.40	5.00
	Total	3.6563	3.9748	1.60	5.00
VALUE & MEASUREMENT MEAN	Independent	2.4806	3.5861	1.00	5.00
	Sequential	3.3906	3.9051	1.80	5.00
	Simultaneous	3.4983	4.0048	2.20	5.00
	Total	3.3466	3.7291	1.00	5.00
GOVERNANCE MEAN	Independent	2.8802	3.7031	2.00	5.00
	Sequential	3.7575	4.2773	2.20	5.00
	Simultaneous	3.9008	4.3053	3.00	5.00
	Total	3.7053	4.0461	2.00	5.00
PARTNERSHIP MEAN	Independent	2.7636	3.6864	1.60	5.00
	Sequential	3.6512	4.1488	2.20	5.00
	Simultaneous	3.6372	4.0719	2.80	5.00
	Total	3.5561	3.9002	1.60	5.00
SCOPE & ARCHITECTURE MEAN	Independent	2.9637	3.8363	1.00	5.00
	Sequential	3.4439	3.9996	1.40	5.00
	Simultaneous	3.7263	4.1525	3.00	5.00
	Total	3.5439	3.8891	1.00	5.00
SKILL MEAN	Independent	2.7223	3.4777	1.00	4.20

	Sequential	3.2701	3.7907	1.40	5.00
	Simultaneous	3.4564	3.9375	2.40	5.00
	Total	3.3183	3.6487	1.00	5.00

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
COMMUNICATION MEAN	3.131	2	100	.048
VALUE & MEASUREMENT MEAN	10.148	2	100	.000
GOVERNANCE MEAN	6.679	2	100	.002
PARTNERSHIP MEAN	7.024	2	100	.001
SCOPE & ARCHITECTURE MEAN	3.917	2	100	.023
SKILL MEAN	1.096	2	100	.338

ANOVA

		Sum of Squares	df	Mean Square
COMMUNICATION MEAN	Between Groups	6.515	2	3.258
	Within Groups	61.220	100	.612
	Total	67.735	102	
VALUE & MEASUREMENT MEAN	Between Groups	8.172	2	4.086
	Within Groups	89.511	100	.895
	Total	97.682	102	
GOVERNANCE MEAN	Between Groups	10.815	2	5.408
	Within Groups	66.714	100	.667
	Total	77.529	102	
PARTNERSHIP MEAN	Between Groups	7.962	2	3.981
	Within Groups	71.067	100	.711
	Total	79.028	102	
SCOPE & ARCHITECTURE MEAN	Between Groups	4.045	2	2.022
	Within Groups	75.517	100	.755
	Total	79.562	102	
SKILL MEAN	Between Groups	5.135	2	2.567
	Within Groups	67.707	100	.677
	Total	72.842	102	

ANOVA

		F	Sig.
COMMUNICATION MEAN	Between Groups	5.321	.006
VALUE & MEASUREMENT MEAN	Between Groups	4.565	.013
GOVERNANCE MEAN	Between Groups	8.106	.001
PARTNERSHIP MEAN	Between Groups	5.601	.005
SCOPE & ARCHITECTURE MEAN	Between Groups	2.678	.074
SKILL MEAN	Between Groups	3.792	.026

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
COMMUNICATION MEAN	Welch	4.167	2	55.143	.021
	Brown-Forsythe	5.150	2	70.979	.008
VALUE & MEASUREMENT MEAN	Welch	2.941	2	52.005	.062
	Brown-Forsythe	3.936	2	52.133	.026
GOVERNANCE MEAN	Welch	6.696	2	54.136	.003
	Brown-Forsythe	7.876	2	65.981	.001
PARTNERSHIP MEAN	Welch	3.734	2	53.114	.030
	Brown-Forsythe	5.105	2	58.104	.009
SCOPE & ARCHITECTURE MEAN	Welch	2.811	2	54.112	.069
	Brown-Forsythe	2.611	2	66.165	.081
SKILL MEAN	Welch	3.726	2	56.373	.030
	Brown-Forsythe	3.799	2	77.922	.027

a. Asymptotically F distributed.

ix. POST HOC TESTS

Multiple Comparisons

Dependent Variable		(I) Planning integration	(J) Planning integration	Mean Difference (I-J)	Std. Error
COMMUNICATION MEAN	Games-Howell	Independent	Sequential	-.62899*	.22041
			Simultaneous	-.52424	.21529
		Sequential	Independent	.62899*	.22041
			Simultaneous	.10474	.16227
		Simultaneous	Independent	.52424	.21529
			Sequential	-.10474	.16227
	Dunnett t (2-sided)[a]	Sequential	Independent	.62899*	.19702
		Simultaneous	Independent	.52424*	.20990

VALUE & MEASUREMENT MEAN	Games-Howell	Independent	Sequential	-.61449	.29617
			Simultaneous	-.71818	.29472
		Sequential	Independent	.61449	.29617
			Simultaneous	-.10369	.17825
		Simultaneous	Independent	.71818	.29472
			Sequential	.10369	.17825
	Dunnett t (2-sided)[a]	Sequential	Independent	.61449*	.23823
		Simultaneous	Independent	.71818*	.25381
GOVERNANCE MEAN	Games-Howell	Independent	Sequential	-.72572*	.23709
			Simultaneous	-.81136*	.22231
		Sequential	Independent	.72572*	.23709
			Simultaneous	-.08564	.16281
		Simultaneous	Independent	.81136*	.22231
			Sequential	.08564	.16281
	Dunnett t (2-sided)[a]	Sequential	Independent	.72572*	.20567
		Simultaneous	Independent	.81136*	.21912
PARTNERSHIP MEAN	Games-Howell	Independent	Sequential	-.67500*	.25497
			Simultaneous	-.62955*	.24726
		Sequential	Independent	.67500*	.25497
			Simultaneous	.04545	.16322
		Simultaneous	Independent	.62955*	.24726
			Sequential	-.04545	.16322
	Dunnett t (2-sided)[a]	Sequential	Independent	.67500*	.21227
		Simultaneous	Independent	.62955*	.22616
SCOPE & ARCHITECTURE MEAN	Games-Howell	Independent	Sequential	-.32174	.25204
			Simultaneous	-.53939	.23545
		Sequential	Independent	.32174	.25204
			Simultaneous	-.21765	.17314
		Simultaneous	Independent	.53939	.23545
			Sequential	.21765	.17314
	Dunnett t (2-sided)[a]	Sequential	Independent	.32174	.21882
		Simultaneous	Independent	.53939*	.23313
SKILL MEAN	Games-Howell	Independent	Sequential	-.43043	.22369
			Simultaneous	-.59697*	.21744
		Sequential	Independent	.43043	.22369
			Simultaneous	-.16653	.17508
		Simultaneous	Independent	.59697*	.21744
			Sequential	.16653	.17508
	Dunnett t (2-sided)[a]	Sequential	Independent	.43043	.20720
		Simultaneous	Independent	.59697*	.22075

*. The mean difference is significant at the 0.05 level.

a. Dunnett t-tests treat one group as a control, and compare all other groups against it.

Multiple Comparisons

Dependent Variable		(I) Planning integration	(J) Planning integration	Sig.	95% Confidence Interval Lower Bound
COMMUNICATION MEAN	Games-Howell	Independent	Sequential	.018	-1.1643
			Simultaneous	.050	-1.0490
		Sequential	Independent	.018	.0937
			Simultaneous	.795	-.2831
		Simultaneous	Independent	.050	-.0005
			Sequential	.795	-.4926
	Dunnett t (2-sided)[a]	Sequential	Independent	.004	.1903
		Simultaneous	Independent	.026	.0568
VALUE & MEASUREMENT MEAN	Games-Howell	Independent	Sequential	.110	-1.3404
			Simultaneous	.052	-1.4414
		Sequential	Independent	.110	-.1114
			Simultaneous	.830	-.5299
		Simultaneous	Independent	.052	-.0051
			Sequential	.830	-.3225
	Dunnett t (2-sided)[a]	Sequential	Independent	.021	.0840
		Simultaneous	Independent	.010	.1530
GOVERNANCE MEAN	Games-Howell	Independent	Sequential	.010	-1.3015
			Simultaneous	.002	-1.3559
		Sequential	Independent	.010	.1500
			Simultaneous	.859	-.4748
		Simultaneous	Independent	.002	.2669
			Sequential	.859	-.3035
	Dunnett t (2-sided)[a]	Sequential	Independent	.001	.2677
		Simultaneous	Independent	.001	.3234
PARTNERSHIP MEAN	Games-Howell	Independent	Sequential	.031	-1.2972
			Simultaneous	.040	-1.2359
		Sequential	Independent	.031	.0528
			Simultaneous	.958	-.3446
		Simultaneous	Independent	.040	.0232
			Sequential	.958	-.4355
	Dunnett t (2-sided)[a]	Sequential	Independent	.004	.2023
		Simultaneous	Independent	.012	.1259
SCOPE & ARCHITECTURE MEAN	Games-Howell	Independent	Sequential	.416	-.9336
			Simultaneous	.071	-1.1162
		Sequential	Independent	.416	-.2901
			Simultaneous	.424	-.6315
		Simultaneous	Independent	.071	-.0374
			Sequential	.424	-.1962

	Dunnett t (2-sided)[a]	Sequential	Independent	.236	-.1655
		Simultaneous	Independent	.041	.0203
SKILL MEAN	Games-Howell	Independent	Sequential	.143	-.9722
			Simultaneous	.024	-1.1257
		Sequential	Independent	.143	-.1113
			Simultaneous	.610	-.5850
		Simultaneous	Independent	.024	.0683
			Sequential	.610	-.2519
	Dunnett t (2-sided)[a]	Sequential	Independent	.071	-.0310
		Simultaneous	Independent	.015	.1054

a. Dunnett t-tests treat one group as a control, and compare all other groups against it.

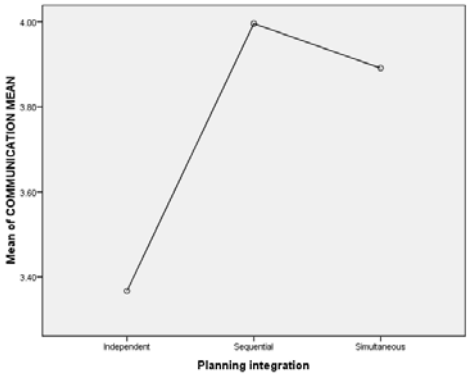
Multiple Comparisons

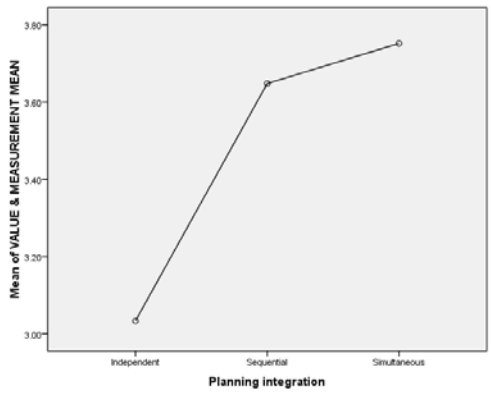
Dependent Variable		(I) Planning integration	(J) Planning integration	95% Confidence Interval Upper Bound
COMMUNICATION MEAN	Games-Howell	Independent	Sequential	-.0937
			Simultaneous	.0005
		Sequential	Independent	1.1643
			Simultaneous	.4926
		Simultaneous	Independent	1.0490
			Sequential	.2831
	Dunnett t (2-sided)[a]	Sequential	Independent	1.0677
		Simultaneous	Independent	.9917
VALUE & MEASUREMENT MEAN	Games-Howell	Independent	Sequential	.1114
			Simultaneous	.0051
		Sequential	Independent	1.3404
			Simultaneous	.3225
		Simultaneous	Independent	1.4414
			Sequential	.5299
	Dunnett t (2-sided)[a]	Sequential	Independent	1.1450
		Simultaneous	Independent	1.2834
GOVERNANCE MEAN	Games-Howell	Independent	Sequential	-.1500
			Simultaneous	-.2669
		Sequential	Independent	1.3015
			Simultaneous	.3035
		Simultaneous	Independent	1.3559
			Sequential	.4748
	Dunnett t (2-sided)[a]	Sequential	Independent	1.1837
		Simultaneous	Independent	1.2993
PARTNERSHIP MEAN	Games-Howell	Independent	Sequential	-.0528

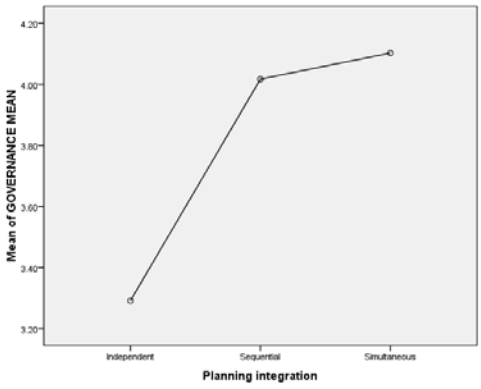
			Simultaneous	-.0232
		Sequential	Independent	1.2972
			Simultaneous	.4355
		Simultaneous	Independent	1.2359
			Sequential	.3446
	Dunnett t (2-sided)[a]	Sequential	Independent	1.1477
		Simultaneous	Independent	1.1332
SCOPE & ARCHITECTURE MEAN	Games-Howell	Independent	Sequential	.2901
			Simultaneous	.0374
		Sequential	Independent	.9336
			Simultaneous	.1962
		Simultaneous	Independent	1.1162
			Sequential	.6315
	Dunnett t (2-sided)[a]	Sequential	Independent	.8090
		Simultaneous	Independent	1.0585
SKILL MEAN	Games-Howell	Independent	Sequential	.1113
			Simultaneous	-.0683
		Sequential	Independent	.9722
			Simultaneous	.2519
		Simultaneous	Independent	1.1257
			Sequential	.5850
	Dunnett t (2-sided)[a]	Sequential	Independent	.8918
		Simultaneous	Independent	1.0885

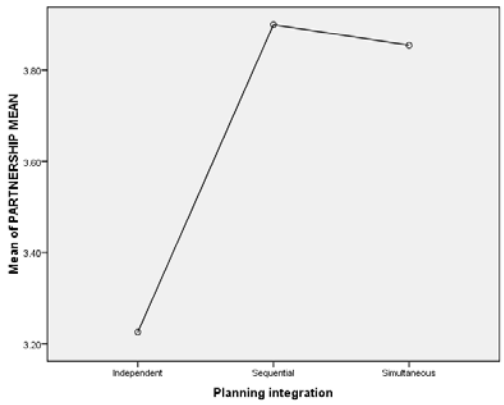
a. Dunnett t-tests treat one group as a control, and compare all other groups against it.

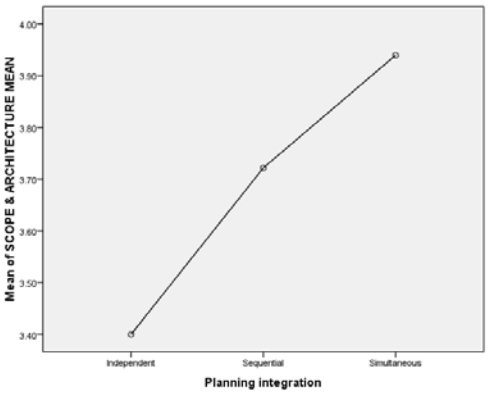
x. MEANS PLOTS

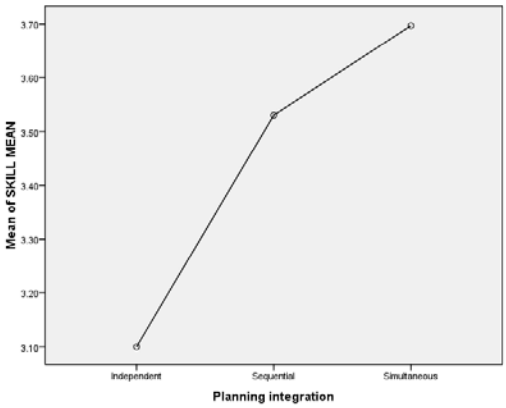












A.3. Item comparative between Luftman (2007)'s questionnaire and international survey (validity phase)

Factor	Attribute in (Luftman & Rajkumar, 2007) Management Practice	(Luftman & Rajkumar, 2007)'s questionnaire (Item rated)	Survey designed in the Validation phase (Item rated)
Governance	Business planning with IT	Strategic business planning with IT participation	Integrating the enterprise's business plan and IT plan
	IT planning with business	Strategic IT planning with business participation	Linking IT projects with the integrated business-IT plan
	Organisation structure	Organisation structure of the IT function	
	IT budgeting	Budgeting of the IT function	Reviewing business priorities before adopting any IT project
	IT investment decisions	IT ability to do IT investment decisions	Conducting steering committees to prioritise IT projects
	Steering committees	Steering committees with senior level IT and business management participation	
	IT projects prioritisation	IT project prioritisation process	
	IT function business reactiveness	IT function to react/respond quickly to organisational business changes	Evaluating IT investments before and after implementation
Partnership	Business perception of IT Value	Perceptions of IT by business	Involving IT department in developing business strategies
	Strategic role of IT	Role of IT in strategic business planning	
	Sharing of goals, risks and rewards	Management sharing of risk and rewards associated with IT-based initiatives	Sharing of risk and rewards by IT and business management in relation to IT project
	Managing the IT business relationship	Formal process in place that focus on enhancing the partnership relationships that exist in IT and business	Using IT to enable and drive business strategies
	IT-business trust relationship	IT and business relationship and trust	Considering IT to be a significant part of business, not just a cost centre for doing business
	Business sponsors/champions	Support of IT-based initiatives by sponsors and champions	Sharing a long-term relationship between IT and business that enables trust
Scope & architecture	IT standards	Articulation and compliance of IT standards	IT is able to provide integrated information systems across the organisation and with business partners
	Scope of architectural integration	Scope of architectural integration	IT is able to provide a flexible infrastructure that enables fast response to changes
	Business & IT changes disruption Organisational change	Level of disruption caused by business and IT changes (Implementation of new technology, business process, merge/acquisition)	IT is able to evaluate and apply emerging technologies effectively
	Scope	Scope of IT systems across organisational structure	IT is able to enable or drive business processes and strategies with a broad scope of information systems

Factor	Attribute in (Luftman & Rajkumar, 2007) Management Practice	(Luftman & Rajkumar, 2007)'s questionnaire (Item rated)	Survey designed in the Validation phase (Item rated)
	IT infrastructure flexibility	Scope of IT infrastructure flexibility to business and technology changes	IT is able to provide information security
Communication	IT Business environment	Extend of IT understanding of the organisation's business environment	Understanding of business strategies by the IT department
	Business IT environment	Extend of business understanding of the organisation's IT environment	Understanding of IT capabilities by the business department
	Organisational education/learning	Methods in place to promote organisation learning/education	Knowledge sharing between organisational levels from strategic to operational and with business partners (e.g. other commercial entities such as suppliers, customers, etc)
	Knowledge sharing	Knowledge sharing between IT and business	Creating a communication environment that promotes freedom to express opinions about business and IT strategies in a flexible and informal way
	Protocol	IT and business communication style	
	Liaisons	Role and effectiveness of IT and business liaisons	Conducting regular meetings between IT and business departments to discuss IT priorities, requirements and implementation
Value	IT metrics	Metrics and process used to measure IT contribution to the business	Selection of appropriate metrics for the organisation
	Business metrics	Use of business metrics to measure contribution to the business	Balancing of metrics by linking Business and IT metrics
	Balance metrics	Use of integrated IT and business metrics to measure IT's contribution of the business	Application of metrics at different organisational levels
	Service Level Agreements	Use of service level agreements	
	Benchmarking practices	Informal and formal benchmarking practices	
	Assessment and review of IT investments	Extend of assessment and review of IT investments	Making effective use of measurements obtained from the metrics applications
	Continuous improvement practices	Extend of IT-business continuous improvement practices and effectiveness measures are in place	
	Strategic IT function contribution	Contribution that the IT function has made to the accomplishment of the organisation's strategic goals	Using selected metrics on a regular basis
Skills	Innovation & Entrepreneurship	Extend of the organisation to foster innovative entrepreneurial environment	Providing formal opportunities to learn both IT and business skills
	Cultural locus of power	Cultural locus of power in making IT-based decisions	Providing formal training before implementing a new IT project
	Change readiness	Organisation's readiness for change	Providing career crossover opportunities among business departments

Factor	Attribute in (Luftman & Rajkumar, 2007) Management Practice	(Luftman & Rajkumar, 2007)'s questionnaire (Item rated)	Survey designed in the Validation phase (Item rated)
	Career crossover	Opportunities for IT and business personnel to develop crossover careers	
	Opportunities to learn	Opportunities to learn outside the employee functional unit using programs such as cross training and job rotation	
	Attract & retain talent	IT organisation's ability to attract and retain the best business and technical professionals	Willingness or readiness to adopt technological changes
	Interpersonal interaction	Interpersonal interaction that exists across IT and business units in our organisation	Trusting social and political culture

A.4. Questionnaire for the Tactical and Operational assessment (explanatory phase)

Please contact Dr. Jerry N. Luftman (jluftman@stevens.edu)

A.5. Questionnaire for the Strategic Assessment (explanatory phase)

Please contact Dr. Jerry N. Luftman (jluftman@stevens.edu)

A.6. Corporate profile interview guideline (explanatory phase)

OBJECTIVE

This document is an interview guideline for the executives to be interviewed about key issues for IT decisions. Document based on (Weill & Ross, 2004).

OVERVIEW

This document has been structured in 5 groups that enclose the most relevant IT decisions in organisations. Groups have been defined as:

1. IT Principles
2. IT Architecture
3. IT Infrastructure
4. Business Application Needs
5. IT Investment and Prioritization

IT PRINCIPLES

Could you describe your Organisation's structure?

What is your organisation strategy? How IT was included in this strategy?

How important is IT for your organisation development?

How do the business principles translate to IT principles to guide IT decisions making?

What is the role of IT in the business?

What are IT desirable behaviours?

How will IT be funded?

IT ARCHITECTURE

What are the core business processes of the enterprise? How are they related?

What information drives these core processes? How must this data be integrated?

What technical capabilities should be standardised enterprise-wide to support IT efficiencies and facilitate process standardization and integration?

What activities must be standardised enterprise-wide to support data integration?

What technology choices will guide the enterprise's approach to IT initiative?

IT INFRASTRUCTURE

What infrastructure services are most critical to achieving the enterprise's strategic objectives?

What infrastructure services should be implemented enterprise-wide and what are the service-level requirements of those services?

How should infrastructure services be priced?

What is the plan for keeping underlying technologies up-to-date?

What infrastructure services should be outsourced?

Business Application Needs

What are the market and business process opportunities for new business applications?

How are strategic experiments designed to assess success?

How can business needs be addressed within architectural standards? When does a business need justify an exception to standard?

Who will own the outcomes of each project and institute organisational changes to ensure the value?

IT investments

Could you tell me about the entire process of the investment decisions? How was a proposal initiated and developed?

Could you describe how a typical capital investment decision was made in your organisation? Who have the authority to allocate monetary resources inside your organisation?

What process changes or enhancements are strategically most important to the enterprise?

What is the distribution in the current IT portfolio? Is this portfolio consistent with the enterprise's strategic objectives?

What is the relative importance of enterprise-wide versus business unit investments? Do actual investments practices reflect their relative importance?

What is the right balance between top down and bottom projects to balance standardisation and innovation?

A.7. Nvivo coding structure (interpretative phase)

FACTOR		ITGAP CRITERIA	NODE TYPE	MANAGMENT PRACTICE
Type	Name	Sources	References	
Tree Node	Effectiveness of IT-Business Communications	0	0	

Type	Name	Sources	References
Tree Node	ITG capabilities	0	0

Type	Name	Sources
Tree Node	Relational	0

Type	Name
Tree Node	*Intra-Inter organisational learning*
Tree Node	*Knowledge sharing*
Tree Node	*Protocol rigidity*
Tree Node	*Understanding of IT by business*
Tree Node	*Understanding of business by IT*

Tree Node	Structural	0

Type	Name
Tree Node	*Liaisons effectiveness*

Tree Node	Human Resource Skills	0	0

Type	Name	Sources	References
Tree Node	IT value drivers	0	0

Type	Name	Sources
Tree Node	Innovation	0

Type	Name
Tree Node	*Entrepreneurship Environment*

Tree Node	ITG Capabilities	0	0

Type	Name	Sources
Tree Node	Process	0

Type	Name
Tree Node	*Hiring & training*

FACTOR	ITGAP CRITERIA	NODE TYPE	MANAGMENT PRACTICE
		Tree Node	*Management style*
	Tree Node	Relational	0
		Type	Name
		Tree Node	*Career crossover*
		Tree Node	*Change readiness*
		Tree Node	*Cultural interpersonal interaction*
	Tree Node	Structural	0
		Type	Name
		Tree Node	*Cultural locus of Power*
Tree Node	IT Governance	0	0
	Type	Name	Sources	References
	Tree Node	IT Value drivers	0	0
	Type	Name	Sources	
	Tree Node	Innovation	0	
		Type	Name	
		Tree Node	*IT change responsiveness*	
	Tree Node	ITG capabilities	0	0
	Type	Name	Sources	
	Tree Node	Process	0	
		Type	Name	
		Tree Node	*Business Strategic Planning*	
		Tree Node	*IT investment management*	
		Tree Node	*IT Strategic planning*	
		Tree Node	*Prioritisation process*	
	Tree Node	Structural	0	
		Type	Name	
		Tree Node	*Budgetary control*	
		Tree Node	*Organisation structure*	
		Tree Node	*Steering Committee*	

FACTOR		ITGAP CRITERIA	NODE TYPE	MANAGMENT PRACTICE
Tree Node	Measurement of the Competency and value of IT	0	0	

Type	Name	Sources	References
Tree Node	IT value drivers	0	0

Type	Name	Sources
Tree Node	Infrastructure	0

Type	Name
Tree Node	IT metrics

Tree Node	Innovation	0

Type	Name
Tree Node	*Strategic IT fuction contribution*

Tree Node	Integration	0

Type	Name
Tree Node	*Balance metrics*
Tree Node	*Business metrics*
Tree Node	*Continuous improvement practices*

Tree Node	ITG capabilities	0	0

Type	Name	Sources
Tree Node	Process	0

Type	Name
Tree Node	*Benchmarking practices*
Tree Node	*Formal IT investments-review*
Tree Node	*Service level agreements*

Tree Node	Partnership between IT-Business functions	0	0

Type	Name	Sources	References
Tree Node	IT value drivers	0	0

FACTOR	ITGAP CRITERIA	NODE TYPE	MANAGMENT PRACTICE
	Type	Name	Sources
	Tree Node	Innovation	0

Type	Name
Tree Node	*Business perceptions of IT value*
Tree Node	*Role of IT in strategic business planning*

Tree Node	ITG capabilities	0	0

Type	Name	Sources
Tree Node	Process	0

Type	Name
Tree Node	*Share goal, risk & rewards*

Tree Node	Relational	0

Type	Name
Tree Node	*IT program management*
Tree Node	*Trust business style*

Tree Node	Structural	0

Type	Name
Tree Node	*Business sponsorship & championships*

Tree Node	Scope and Architecture of the IT infrastructure	0	0

Type	Name	Sources	References
Tree Node	IT value drivers	0	0

Type	Name	Sources
Tree Node	Infrastructure	0

Type	Name
Tree Node	*Architecture transparency*
Tree Node	*Manage emerging technology*
Tree Node	*Standards articulation*

Tree Node	Innovation	0

FACTOR	ITGAP CRITERIA	NODE TYPE	MANAGMENT PRACTICE
		Type	Name
		Tree Node	*IT architecture strategy scope*
	Tree Node	Integration	0
		Type	Name
		Tree Node	*IT organisation architecture integration*