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ALIGNMENT OF IT PROJECTS WITH BUSINESS STRATEGY:

An analysis of the interrelationships between the factors affecting IS alignment at strategic, tactical and operational levels

A Thesis submitted for the degree of Doctor of Philosophy

by

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ABSTRACT

Despite numerous efforts to integrate business and IS strategic plans, organisations are not delivering the expected benefits from IS investment. To address this issue, IS alignment research has discussed extensively the idea of establishing two-way commitment between business and IS managers. This commitment, however, has proved to be difficult to achieve at strategic level and consequently difficult to transmit to lower levels within organisations. Given that current literature has identified the main factors affecting IS alignment, this research extends the analysis of those factors to tactical and operational levels to develop a **model that depicts the dynamic interrelationships between the factors affecting IS alignment**. Through an interpretative approach that combines quantitative and qualitative methods, the model was developed, tested and evaluated in three phases.

During the **exploratory phase** the factors IT governance, communication, partnership, IT value, scope & architecture and human resources skills were scrutinised using a pilot case study and a survey. The results aided the selection of relevant variables that could be used in the model to assess alignment across different levels, and therefore, to develop a preliminary model that included the initial relationships between the factors. For the **testing phase**, a case study approach was selected. An *IS alignment assessment process* was designed and applied in one SME and one large organisation. Although the assessment process did not prove appropriate in an SME context, the application of the assessment process in the large organisation allowed the identification of the root causes of high or low levels of IS alignment of five strategic IT projects. For the **evaluation phase** further analysis was conducted to modify the preliminary model in the light of the outcomes from the large organisation.

The findings from the evaluation phase helped in the identification of two categories of factors (structural and dynamic) and how they interrelate, and these are incorporated into the final model. Structural factors refer to those cultural and structural forces that determine whether the information systems function is valued or not as a partner in delivering business value from IT investments. On the other hand, the dynamic factors refer to those aspects that impact on IS alignment as a result of the dynamic interaction between the people involved in the strategy formulation and implementation. The model and the assessment process represent a contribution towards a better understanding of the nature of IS alignment.

This thesis is dedicated with deepest love and everlasting respect to:

My parents, Maria Luisa and Edmundo Gutierrez, for their unconditional support and encouragement of my personal and professional dreams.

My husband Enrique Correa who, despite the distance, has been always close to me during this journey with plenty of love, patience, advice and jokes! We are closer than ever.

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My entire family, I wish I could mention everyone. All have helped in a unique way.

Esta tesis la dedico con mi amor y respeto a:

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DECLARATIONS

The following publications have been produced as a direct or indirect result of the research discussed in this thesis:

Journal Papers:

1. **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.

2. **Gutierrez, A.** and Serrano, A. (2008). Assessing strategic, tactical and operational alignment factors for SMEs: alignment across the organisation's value chain. *Int. J. Value Change Management*, 2(1), pp. 33-56.

Paper in Edited Book:

3. **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.

Papers in Refereed Conference Proceedings:

4. **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, Canada 14-17 August 2008. Available at: http://aisel.aisnet.org/amcis2008/290, (Accessed: 20 April 2009).

5. **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.

6. **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.

7. **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.

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"There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things. Because the innovator has for enemies all those who have done well under the old conditions and lukewarm defenders in those who may do well under the new."

Niccolo Machiavelli (1469-1527), Italian Philosopher

Chapter 1 INTRODUCTION

1.1 Overview

This chapter introduces the research motivation and context for this investigation. An introduction to IS alignment is presented with the aim of establishing the context of this research. Connections with other disciplines that have identified the gap between strategy formulation and strategy implementation are presented and used as context for the investigation. In light of these arguments the aims and objectives are presented together with an outline of the thesis structure.

1.2 Research Background and Motivation

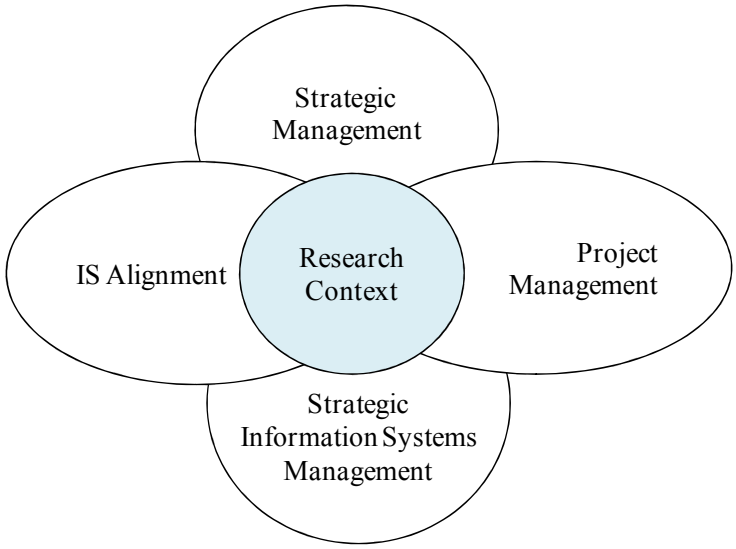
For the last two decades the relevance of alignment between business and information systems (IS) strategies has continuously grown and remains a top priority for academics and practitioners. Research suggests that aligning business and IS strategies has a positive effect on organisational performance (Teo and King, 1996; Reich and Benbasat, 2000; Chan et al., 2006). Moreover, the value of

information technology (IT) has been related to IS alignment (Tallon and Kraemer, 2003). They found that organisations with strategic goals for IT showed higher levels of strategic alignment and, as a consequence, the perception of IT business value was higher. However, organisations that have developed IS strategies often fail to deliver IT business value, despite having integrated their business and IT strategies. This suggests business-IS strategy is necessary but not sufficient to deliver business value from IT investments (Peppard et al., 2000; Benbya and McKelvey, 2006).

IS alignment research has extensively discussed the coordination between business and IS strategy (Henderson and Venkatraman, 1993; Reich and Benbasat, 2000; Kearns and Sabherwal, 2007). As strategic alignment has become embedded in the strategic management process, a closer relationship between IS and business managers is required to establish a two-way commitment that enables managers in both IS and business domains to prioritise IT projects that will support the business strategy (Luftman et al., 1999). This commitment, however, has been difficult to achieve at strategic level in organisations and consequently difficult to transmit to lower levels within organisations (Lycett et al., 2004; Srivannaboom, 2006). Additionally, the frequent failure of IT projects has reduced the trust of senior managers in IT investments and their business value (Peppard et al., 2000; Taylor, 2000; Hartman and Ashrafi, 2004). When an IT project is conceived at strategic level, it may be aligned with company goals; however, as it moves down through the lower levels of an organisation to be implemented, the original objectives for which the project was conceived can be lost. Relationships between business and IS implementers are not always close and IS staff tend to be more concerned with technical issues. Business and IS also need a close relationship at implementation level to ensure the project goals are well communicated and understood (Lederer and Salmela, 1996; Campbell et al., 2005). Therefore the motivation behind this research is to develop a model that depicts the dynamic interrelationships between the factors affecting IS alignment from strategy formulation to strategy implementation.

In doing so, perspectives from IS alignment literature are integrated with other related areas such as strategic management, project management and strategic information systems management. The following sections explored the context of IS alignment and the connections with the related disciplines used in this research as illustrated in Figure 1-1.

Figure 1-1 Research context



1.3 IS Alignment Paradigms

The significance of IS alignment has increased as a result of the strong dependence of organisational activity on information systems and related technologies. Consequently, organisations want to ensure that IT investments are made on those projects that improve business performance and competitiveness (Tallon et al., 2000; Byrd et al., 2005). In addition, IT executives consider IS alignment as one of the main challenges that organisations have to face (Tallon and Kraemer, 2003; Ives and Mandviwalla, 2004; Luftman et al., 2006). However, alignment has been subjected to different interpretations in both theoretical and practical studies and it is difficult to find any general agreement, which is reflected in the variety of definitions and approaches to study alignment that are found in the literature.

1.3.1 IS Alignment Definitions

Defining alignment is a challenge not only for the many perspectives that have emerged but also for the multiple definitions that have been identified including integration (Weill and Broadbend, 1988); fit (Porter, 1996); strategic alignment (Henderson and Venkatraman, 1993); harmony (Luftman, 1996); bridge (Ciborra, 1997); fusion (Smaczny, 2001); business-IT alignment (Luftman, 2007a); IT alignment (Chan, 2007) and IS alignment (Chan et al., 2006; Benbya and McKelvey, 2006). All these definitions, though, focus on how to improve organisational capabilities through technology with subtle differences.

Broadbent and Weill (1993) define strategic alignment as the extent to which business strategies were enabled, supported and stimulated by information strategies. Similarly, Reich and Benbasat (1996) defined alignment as the degree to which the IT mission, objectives, and plans support and are supported by the business mission, objectives and plans. Later, Luftman (2000) argued that achieving alignment is an evolutionary process, which requires strong support from senior management, good working relationships, strong leadership, appropriate prioritisation, trust, and effective communication, as well as a thorough understanding of the business and technical environments. Hirschheim and Sabherwal (2001) defined alignment as the extent to which the IS function's strategies and structures support, and are supported by the business' strategies and structures. Most definitions emphasise the alignment dichotomy explained by Kearns and Lederer, (2000), which argues that the IS plan should be aligned to the business plan (ISP-BP) and the business plan should be aligned to the IS plan (BP-ISP). Both perspectives of alignment increase the organisational understanding of IT that help to prioritise IT projects. Furthermore, it signifies better top manager understanding and commitment which are considered enablers of alignment (Luftman et al., 1999). Whilst some of the authors regard alignment as an event others assume it is a continuous process, therefore the following section describes the main alignment perspectives adopted in order to identify the key elements which define alignment.

1.3.2 Static and Dynamic Nature of Alignment

Despite efforts to align business strategy with IS strategy, alignment has proved difficult to achieve and the existence of integrated IS plans do not ensure alignment (Peppard et al., 2000; Sabherwal et al., 2001; Benbya and McKelvey, 2006). One reason for these difficulties is that alignment is not a 'state' that concludes with strategic planning but a journey with unpredictable challenges (Benbya and McKelvey, 2006). Additionally, the strategic process itself adds complexity to alignment due to the fact that most of the models assume the existence of formal strategic processes and written plans. For example Ciborra (1994) concluded that the use of IS for competitive advantage is due more to serendipity than the result of formal planning. Orlikowski (1996) adopted a perspective of improvisation to consider plans are emergent which imply the planning process is the starting point and those plans will be continually adapted to respond to the realities of the changing environment that organisations face. Grant (2003) also characterises strategic planning as the reconciliation of top-down rational designs with bottom-up emergent processes. These arguments suggest that integration of business and IS plans is important but not enough and alignment should be pursued at all levels of the organisation (Benbya and McKelvey, 2006; Chan, 2007).

1.3.3 Intellectual and Social Dimensions of Alignment

The previous section highlights the relevance of having strategic plans although their existence does not ensure alignment. Moreover, Lederer and Mendelow (1988) show that only a small number of organisations gained a competitive advantage even though they aligned their information system plan (ISP) to the business plan. Therefore, Reich and Benbasat (2000) proposed that it is important to consider two dimensions of alignment namely social and intellectual dimensions. The intellectual dimension refers to the content of plans and planning methodologies that was the focus of early IS alignment studies. On the other hand the social dimension focuses on the people involved in the creation of alignment. Although the authors recognised both dimensions are important and necessary to

achieve high levels of alignment they focus on the social dimension. Reich and Benbasat (2000) defined alignment as the mutual understanding and commitment that IS and business executives have regarding each other mission, objectives and plans. The authors used three large organisations to collect data from two main sources: written material and interviews with strategic and tactical managers. Among Reich and Benbasat (2000) conclusions are: the most important predictor of alignment in their study is communication between business and IT executives, which is influenced by the shared domain knowledge and IT implementation success. Additionally, they explain that line managers who have knowledge in both core business and information systems, are the catalysts in bringing innovation. In IT planning practices, they concluded that having a connection event for both business and IS together with a regular re-evaluation of priorities are influential in ensuring high levels of short-term alignment.

1.3.4 Structural Dimension of Alignment

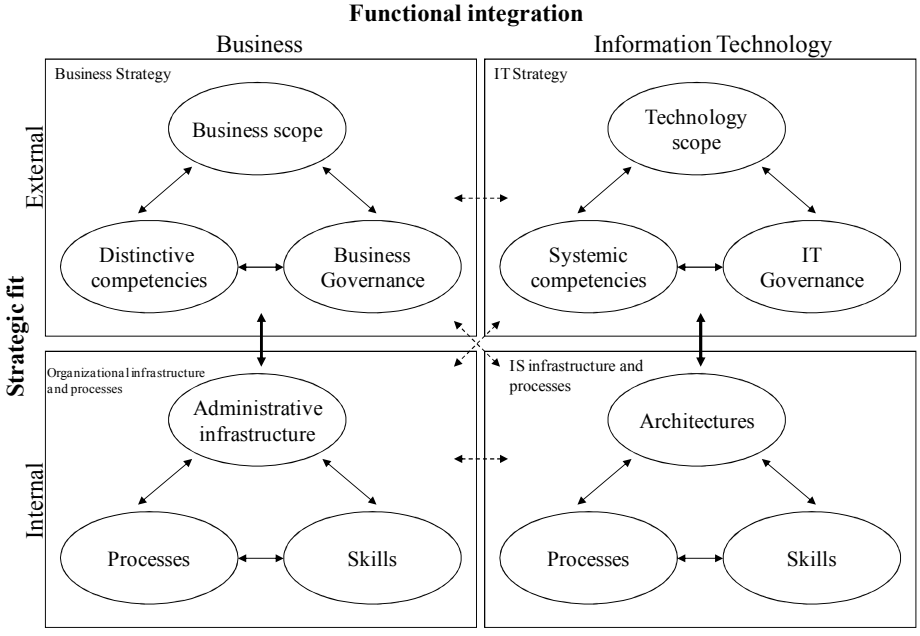
Chan (2007) describes the structural dimension of alignment as the influence produced by the location of IT decision-making, reporting relationships, IS organisational structure, IS employee development and organisational culture. IS alignment is more likely to be considered as an enabler of business strategy when there are few levels between senior management and IS management (Pyburn, 1983; Luftman 2000). Most common arrangements of IS organisational structure have also been analysed: centralised, decentralised and federated. Luftman and Kempaiah (2007a) found that organisations with a federated structure achieve higher levels of alignment. However, the study by Sabherwal and Chan (2001) suggests that resources are better spent on improving the informal organisation than on aligning formal structures due to the high impact of informal relationships. Finally, the organisational culture and the mind-set of managers have an important influence as alignment need to be culturally supported (Chan, 2007) and IS personnel need business skills to contribute to the business strategy (CIO insight Staff, 2004; Luftman and Kempaiah, 2007b; Sauer and Reich, 2009).

In summary, all these structures influence the relationships between business and IS (social dimension) as well as the strategic plans (intellectual dimension).

1.3.5 IS Alignment Models

One of the first models that identified the components of alignment was the Strategic Alignment Model (SAM) proposed by Henderson and Venkatraman (1993). This model was intended to support the integration of IT and business strategies by advocating alignment between and within four domains: business strategy, IT strategy, organisational infrastructure and IT infrastructure. These components depict a complex relationship as shown by the arrows in Figure 1-2. One interesting consistency along the evolution of IS alignment theory is that several researchers took the SAM model as a foundation theory. Figure 1-2 draws attention to the complex relationships between all the components. However, most of the alignment research focuses on functional integration at strategic level (external) and pays less attention to operational (internal) integration. Other models were proposed like the MIT90s framework (Scott Morton, 1991), Baets Model (1992) though they were mainly influenced by the strategic focus of the time (Chan, 2007).

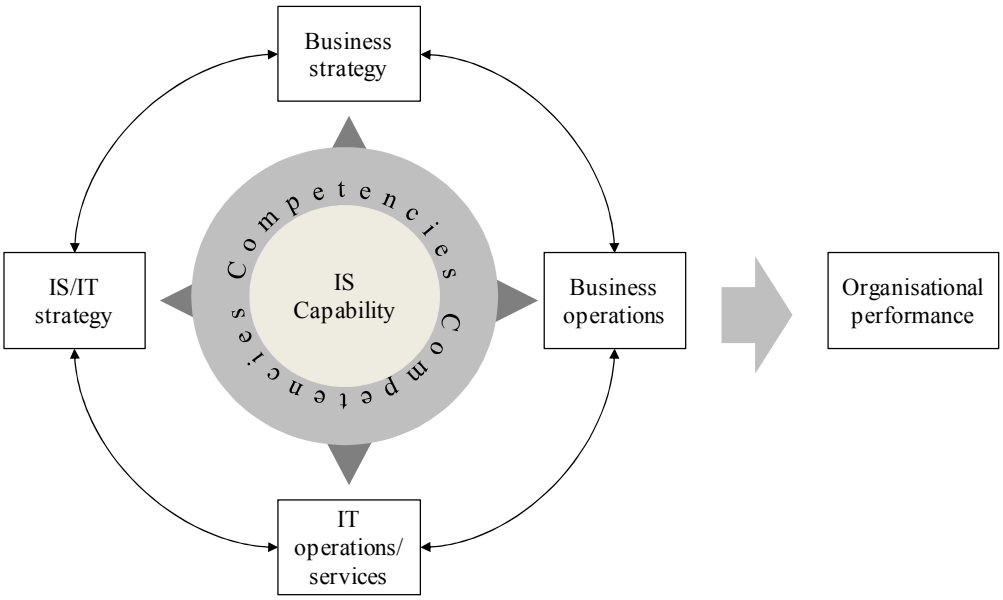
Figure 1-2 Strategic alignment model (SAM)



(Source: Henderson & Venkatraman, 1993)

Another relevant model illustrated in Figure 1-3 was proposed by Peppard and Ward (2004). This model highlighted the relevance of developing IS capabilities to create value, and emphasises that creating value from information is an organisational wide responsibility that cannot be delegated to the IS function (Peppard et al., 2000). The extent to which these capabilities are developed will determine how IT opportunities are incorporated in the business strategy, the effectiveness of business operations through systems and technology support, how well the IT infrastructure is designed and resourced, the level of performance achieved by IT operations and the quality of its services and the ability of an organisation to deliver specific, measureable business benefits from IS/IT investment and deployment. Peppard and Ward (2004) asserted that an organisation could conceive an innovative strategy based on IT, however, it is their IS capabilities that will enable the organisation to implement such a strategy. Finally, the model concluded that organisational performance is derived from business operation not directly from IT.

Figure 1-3 The new IS/IT alignment: IS capability and organisational performance



(Source: Peppard and Ward, 2004)

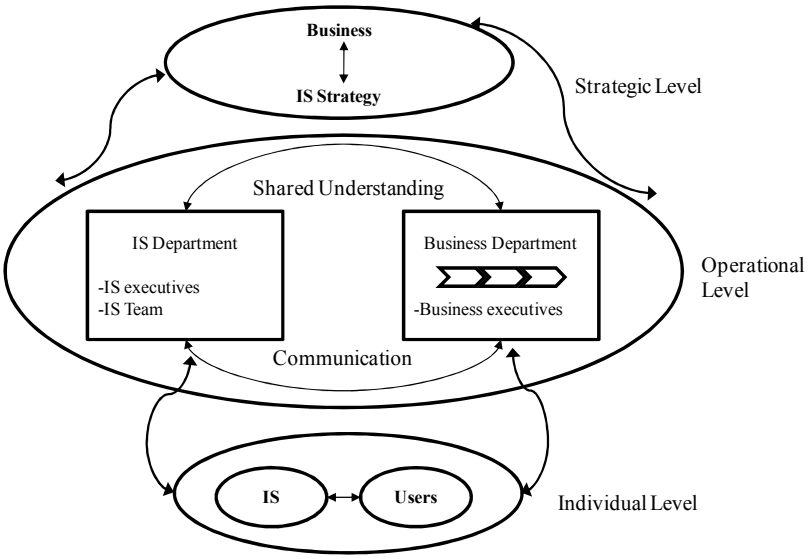
An updated model that integrates the various dimensions discussed above is shown in Figure 1-4. The coevolutionary IS alignment model proposed by Benbya and McKelvey (2006) broadens the concept of alignment to respond to the

difficulty of achieving alignment in a complex and changing environment. Drawn on coevolutionary and complexity theories they provide a comprehensive definition of alignment:

> *"IS alignment is a continuous coevolutionary process that reconciles top-down 'rational designs' and bottom-up 'emergent processes' of consciously and coherently interrelating all components of Business/IS relationships at three levels of analysis (strategic, operational and individual) in order to contribute to an organisation's performance over time".* (p. 287).

This model highlights the relevance of analysing the relationship between business and IT (horizontal IS alignment) but also the need to reconcile the views at different levels of analysis (vertical IS alignment). The coevolutionary IS alignment perspective emphasises the mutual adaptation and change that result from the dynamic interplay of coevolving interactions, interrelationships and effects among the components of alignment. Therefore, this view does not aim for harmony or balance between the components of IS alignment since the lack of balance due to changes in the environment drives improvements and innovations.

Figure 1-4 Coevolutionary IS alignment



(Source: Benbya and McKelvey, 2006)

In this thesis, among the various terms 'IS alignment' or 'alignment' for short, have been adopted. Additionally, the model and definition proposed by Benbya and McKelvey (2006) that considers IS alignment a dynamic process are used. The intellectual and social dimensions are also taken into consideration, with a focus on the social interactions between participants at strategic, tactical and operational levels. The interactions at different levels of decision-making are influenced by the structural dimension of alignment and therefore included for this investigation.

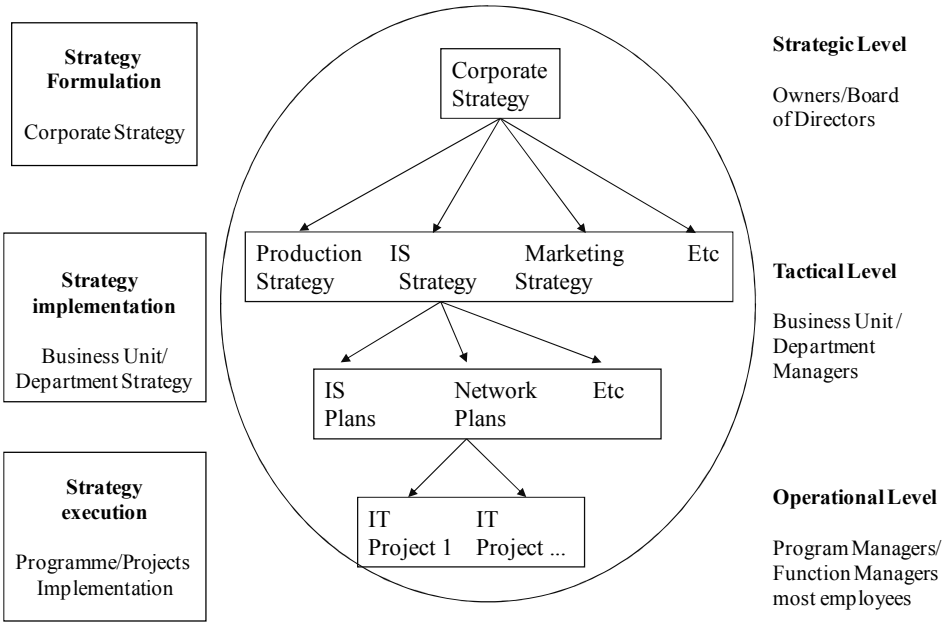
1.4 Relevant Perspectives from Related Disciplines

1.4.1 Strategic Management

In an organisation the corporate strategy defines the businesses with which a company will compete and defines the objectives, purposes, goals, plans for achieving such aims (De Wit and Meyer, 2004, p. 71). Corporate strategy is inseparable from the structure, behaviour and culture of the company in which it takes place. This aspect has been considered in the structural dimension of alignment (Section 1.3.4). De Wit and Meyer (2004, p. 73) identify two main aspects of the corporate strategy process, namely, formulation and implementation. The strategy formulation includes identifying opportunities and threats in the company's environment. The implementation of strategy comprises management sub activities to allocate resources, monitoring, control and learning systems as well as incentives and staffing systems (De Wit and Meyer, 2004, p. 127). These sub activities allow the execution of specific plans, projects and business operations. Strategic process management is conducted by managers at different levels of decision-making illustrated in Figure 1-4. First senior managers formulate the corporate strategy to be used by the rest of the organisation. Corporate strategy is then refined by tactical managers in charge of the strategy implementation. This hierarchical strategy organisation then produces more detailed plans and specific projects to support the corporate strategy. The top-down approach only serves to illustrate the components involved in the strategic process although in practice the process involves complex interaction between all

levels in a changing environment (De Wit and Meyer, 2004, p. 128). Hereinafter, the strategic, tactical and operational levels will be used to signify not only the strategic process but also the people involved at each decision-making level as indicated in Figure 1-5. This complexity of the strategic process is then augmented by the need to integrate the IS strategy to the corporate strategy as explained in the following section.

Figure 1-5 Hierarchy of strategies



(Source: adapted from Robson, 1997)

1.4.2 Strategic Information Systems Planning

The improvement of IT during the 1990s brought plenty of new opportunities. Some successful examples of organisations that developed strategic use of information technology made more researchers and practitioners interested in strategic information systems planning (SISP). Organisations wanted to replicate the ways of obtaining competitive advantage through the innovative use of information technology. The main concern was using IT in order to help business to change and/or transform (Earl, 1996) and frameworks emerged to improve strategic information system planning such as Critical Success Factors, the Value Chain and the Strategic Option Generator. Also methodologies such as Business

System Planning, Strategic System Planning (Robson, 1997) and paradigms such alignment emerged to improve SISP.

Several approaches have been used to integrate business strategy and information technology (IT) strategy. Most of these approaches are planning oriented (Smaczny, 2001) and assume structured environments under full control (Ciborra 1997, Maes 1999) which contrast with the real environment organisations face where uncertainty, flexibility and changeability prevail (Peppard and Ward 2004). Even if some organisations do not have a formal planning process, they still need to be able to develop their business direction (Reich and Benbasat 2000). This direction should be clear enough to allow organisations to focus on those IT projects that add business value.

SISP involves a proactive search for competitive advantage and value creation (Grover and Segars, 2004) and includes the management of IT department activities, the technological infrastructure and technological scanning (Croteau and Bergeron, 2001). Grover and Segar (2004) consider that the SISP process evolves in three stages. In the preliminary stage top management allows SISP but provides limited information and there are no formal planning roles, therefore alignment is limited as the business goals are not well understood. During the evolving stage top managers start involving IS in the planning process. Finally, the mature stage is reflected by a more integrated planning that promotes a two-way flow of information and involvement. In order to be more effective, SISP requires rational elements of comprehensiveness and formalisation (structured methods, written guidelines, extensive budgeting, etc) at the same time that require adaptable elements of participation and consistency across hierarchical levels and functions. The balance between rationality and adaptability varies depending on the organisation's context, industry and competitive environment. Netkirk and Lederer (2006) analysed the effectiveness of SISP under environmental uncertainty in the context of five IS planning phases: strategic awareness, situation analysis, strategy conception, strategy formulation, and strategy implementation. After measuring SISP success Netkirk and Lederer

(2006) concluded that the strategy implementation phase had greater impact on SISP success regardless the environment, therefore efforts should be on improved action plans, change management, follow-up and control in order to improve SISP effectiveness. The SISP process helps to identify IS strategies and IT projects from the requirements of each business unit and creates links between the strategic and the operational levels (Peak et al., 2005). Therefore, the IT projects act not only as the medium to implement the strategies but also as connections between strategic and operational levels that need constant review and adjustment to maintain alignment with the corporate strategy.

1.4.3 Project Management

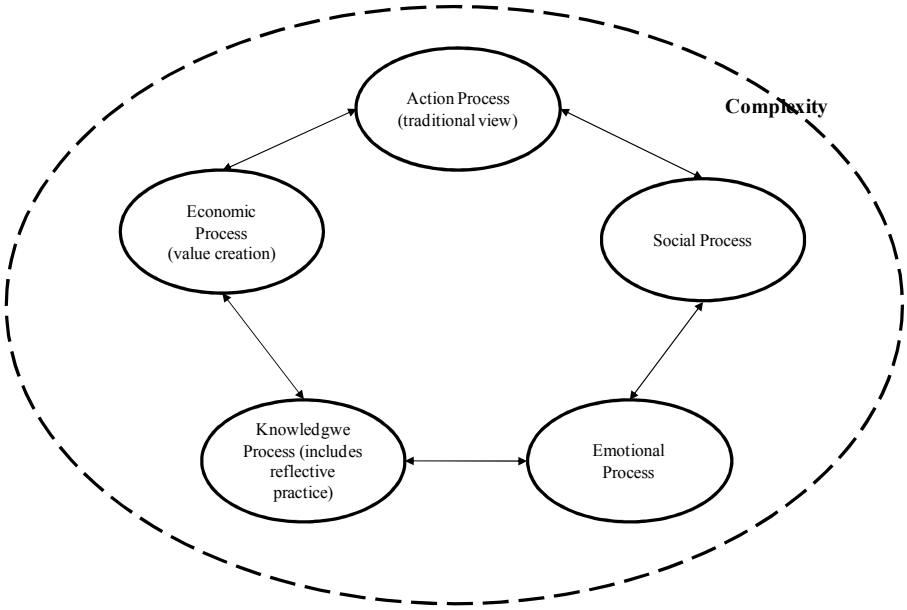
Whilst organisational projects represent the implementation of business strategies; IT projects represent the implementation of IS strategy and should be aligned with business strategies (Srivannaboon and Milosevic, 2006). However, the low percentage of successful IT projects suggests, among other reasons, a lack of alignment during the implementation stage (Peppard et al., 2000; Taylor, 2000; Hartman and Ashrafi, 2004). Research in the IT project management discipline also indicates a need to reduce the gap between project delivery and corporate strategy (Lycett, et al., 2004). It is recognised that although IT projects share many characteristics with organisational projects, IT projects are significantly impacted by the rapid change of technology, the organisational changes that its use produce and their complexity (Johnstone et al, 2006; Sauer and Reich, 2009). Therefore, due to the scope and complexity of IT projects, management theory used for single projects should evolve to enable flexibility in a changing business environment. In addition, Srivannaboon (2006) suggests that alignment should be monitored during any project execution in order to provide feedback to management and allow for business strategy modifications. Kearns and Sabherwal (2006) also draw attention to the relevance of incorporating IT project aspects into IS alignment. However, most alignment research has focused on strategic integration in order to align IS strategy with business strategy. Kearns and Sabherwal (2006) analysed how the planning and implementation of IT projects

mediate the relationship between business-IT and the business effects of IT. Their results suggest that IS alignment enables improved IT project planning that increase the business effects of IT and therefore the relevance of IT project management for IS alignment. Additionally, from a practitioner's perspective collaboration between business and IS represents a prerequisite to achieve alignment and this collaboration must occur not only at strategic level but during the implementation of IT projects (Campbell et al., 2005).

A study conducted by Winter et al. (2006) proposed a framework to rethink the project management context that recognises the complexity of projects. This framework added two more processes to the traditional project management view called social process and economic process (value creation). The social process moves the project perspective to include the influence of the group structure given that projects are socially constructed. The value creation changes the focus on cost-time-quality to the achievement of organisational benefits (value creation). Within this broader conceptualisation of project management Sauer and Reich (2009) conducted an analysis of the evolution of thinking and practice in IT project management. As part of the conclusions, Sauer and Reich (2009) proposed two more components they named the knowledge process and the emotional process as shown in Figure 1-6.

The knowledge process includes formal and informal knowledge relating to the project organisation, politics, business context, technology and management which are all particularly relevant for the IS context. The emotional process was included to recognise the intense and stressful impact of projects that influence feelings such as trust. For the IT project context this framework implies a change of project managers' role from supporters for the main actors to become more influential and therefore being able to actively interact with strategic and tactical managers (Sauer and Reich, 2009).

Figure 1-6 Multiple process views of IT projects



(Source: Sauer and Reich, 2009)

Taking into consideration these broader views, this thesis focuses on projects that are conceived as part of the corporate strategy to achieve business benefits (value creation) and included a high IT component as part of the implementation. Such projects are called 'Strategic IT Projects' or 'IT project' for short as the term is more widely recognised in literature as explained by Sauer and Reich (2009).

1.5 Research Aim and Objectives

Having argued that IS alignment is relevant not only to improve strategic IT projects' alignment but also to achieve business performance the motivation of this research is to investigate the relationships between business and IS from strategy formulation to strategy implementation. Therefore, the specific aim of this thesis is:

> *"To propose a model that depicts the dynamic interrelationships between the factors that affect IS alignment. The model will take into consideration the impact of those factors across strategic, tactical and operational levels"*

To achieve this aim the objectives to fulfil are classified as follows:

Research methodology objectives

Objective 1: Explain the research process cycle and research questions that led to the selection of different strategies and methods during this investigation.

Theory objectives

Objective 2: Synthesise the relevant alignment literature with a particular focus on alignment assessment approaches to identify the main constructs.

Objective 3: Design a model to analyse the relevance of IS alignment factors and their relationship at strategic, tactical and operational levels.

Practical objectives

Objective 4: Validate the model through two case studies.

Objective 5: Evaluate the results in terms of their significance to theory and practice. Identify future IS alignment research.

1.6 Thesis Outline

The thesis is structured around seven chapters. The flow of the chapters is organised according the main research phases: (a) exploratory phase, (b) testing phase and (c) evaluation phase. The **exploratory phase** refers to the research activity undertaken to *develop a preliminary model*. The literature review (Chapter 3) provided the main constructs. Two exploratory studies were conducted (Chapter 4) to better understand the constructs and their relevance at operational level. The **testing phase** is related to the empirical setting design and data collection to *validate the preliminary model* through two case studies (Chapter 5). For the **evaluation phase** further analysis was performed to *modify the preliminary model* in light of the empirical results (Chapter 6). Finally, a summary of the main findings and contributions are presented together with suggested future research (Chapter 7). In the following paragraphs, the content of each chapter is summarised and the structure of the thesis is displayed (Figure 1-6).

Chapter One. *Introduction*.

The first chapter explains the antecedents of alignment and gives an introduction to the problem areas of this thesis. Then key concepts are explained in the context of alignment. The final sections state the aim, objectives and structure of the thesis is outlined in Figure 1-7.

Chapter Two. *Research Methods*.

The chapter aims to illustrate the research approach used in this thesis. The chapter starts with an explanation of the research process approach and the rationale for the research methods selected in this thesis. The chapter ends with an argument about information systems paradigms and notes regards the lessons learned and stances adopted.

Chapter Three. *Literature Review*.

The literature is organised in three main sections as described below:

a) The first section highlights the main strengths and limitations of current assessment approaches through a comparative analysis of relevant research.
b) In the second section, the antecedents of IS alignment are analysed which led to the selection of the factors included in the alignment maturity model SAM.
c) The alignment maturity model is explained in the third section to explore the feasibility of adapting the model to assess IT projects' alignment.

Chapter Four. ***Exploratory Phase: Developing a Preliminary model.***

In order to develop a preliminary model, this chapter presents the results of two exploratory studies. Study 1 is a pilot case study to analyse the feasibility of using the selected factors to assess alignment at different levels. The results allowed the development of a preliminary model which was validated by a second study that involved a survey to rank the relevance of the factors and variables. Both studies assisted with the development of a model of factors affecting IS alignment at strategic, tactical and operational level.

Chapter Five. ***Testing Phase: Empirical Design and Data Collection***

This chapter describes the design process used to assess IS alignment at strategic, tactical and operational level that assisted with the practical application of the concepts and also with the empirical validation of the proposed model. Two case studies are presented and qualitative analysis is conducted in order to identify the root causes of high or low levels of alignment. The chapter ends with an overall conclusion of the results and findings that are used in the following phase.

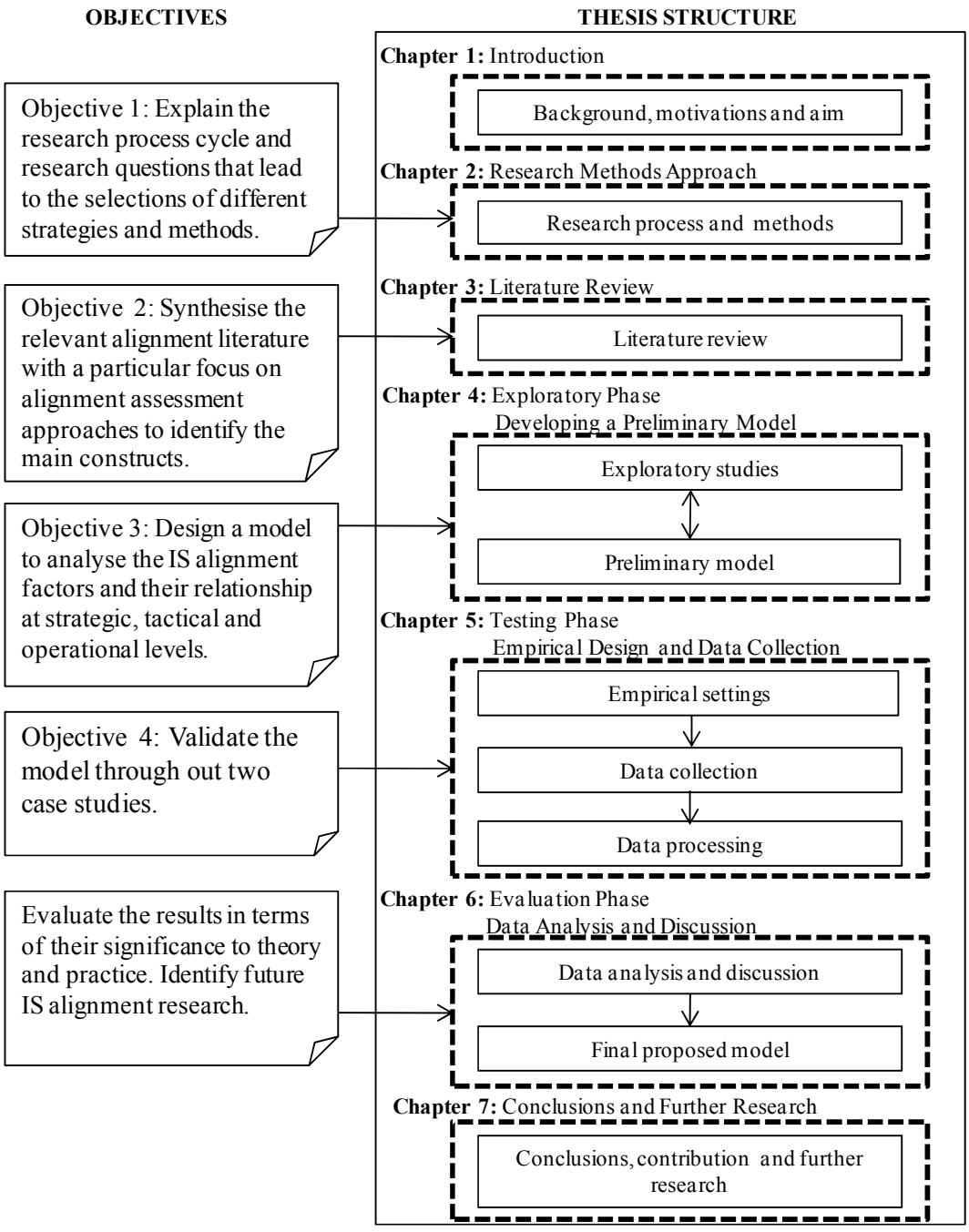
Chapter Six. ***Evaluation Phase: Data Analysis and Discussion*****.**

This chapter elaborates on the case studies linking the results and lessons learned with previous work in the field to depict key interrelationships and their impact. A final model with the interrelationships between the factors affecting IS alignment is presented.

Chapter Seven. *Conclusions and Further Research*.

Finally, a summary of the research is presented by analysing how each objective was achieved together with the main findings. Then an exposition of the main contributions is presented. The chapter ends with an exposition of the research limitations and new lines of research proposed for further research.

Figure 1-7 Thesis outline



"When we answer some questions, we raise others. And no matters how well thought out we think our project is at the beginning, there always are those unanticipated twists and turns along the way that lead us to rethink our positions and question our methods and to let us know that we are not as smart as we think we are."

(Strauss and Corbin, 1998, p.55)

Chapter 2 RESEARCH METHODS APPROACH

2.1 Overview

The chapter aims to illustrate the research approach used to investigate the relationships between the factors affecting IS alignment from strategy formulation to strategy implementation. This chapter starts with an exposition of research paradigms and methods in the context of information systems research. Then it proceeds to provide a detailed explanation of the research questions that guided the investigation and the rationale for the research methods selected. The research process includes three research phases: (a) exploratory phase, (b) testing phase and (c) evaluation phase.

2.2 Research Paradigm and Methods

Different authors use words such as paradigm, methodology, method, technique with different interpretations. Mingers (2001) study on information systems research explain that a **paradigm** is a construct that specifies a general set of philosophical assumptions which include aspects such as *ontology* (what is assumed to exist, the nature of existence), *epistemology* (the nature of valid knowledge), *ethics* or *axiology* (what is valued or considered right) and *methodology* (set of guidelines to assist in generating valid and reliable research results). Additionally, discussions of the boundary between methodology and method are not very clear and different interpretations are also adopted. For this

thesis it is agreed that **methodology** is more general and less prescriptive than a method and can be defined as mentioned above as set of guidelines to assist in generating valid and reliable research results under a specific *paradigm*. A **method** then is a set of procedures and techniques for gathering and analysing data (Strauss and Corbin, 1998, p.3), which are usually associated to methodologies.

According to Orlikowski and Baroudi (1991) three distinct paradigms can be identified in IS research: positivist, interpretive and critical. Differences between these paradigms and their associate philosophical assumptions are illustrated in Table 2-1, based on Orlikowski and Baroudi's (1991) interpretations.

Table 2-1 Philosophical assumptions of research paradigms

Philosophical assumption	Positivist	Interpretive	Critical
Ontology	An objective reality exists independently of our construction of it.	Reality is subjective or inter-subjective human construction.	Reality is an historically constituted subjective or inter-subjective human construction.
Epistemology	Facts and values are distinct. True knowledge of phenomena exists and is measureable.	Facts and values are entwined. Knowledge exists in understanding how social process, mechanisms and practice are formed and informed by language and culture.	Facts and values are entwined. Knowledge is grounded in social and historical practice.
Axiology	Explanation, prediction and control.	Situated and descriptive understanding of a situation.	Research is designed to initiate change.
Theory/Practice Relation (Methodology)	Researcher is detached from the phenomena under investigation.	Researcher's assumptions, beliefs and values shape and are shaped by investigation.	Researcher's assumptions, beliefs and values shape and are shaped by investigation.

(Source: based on Orlikowski and Baroudi, 1991)

The aim of this thesis is to better understand the dynamic interrelationships between the factors affecting IS alignment across strategic, tactical and operational levels. The essence of these relationships is based on the meaning that participants at different levels assign to the factors in the organisational context to comprehend the impact and interrelationships between these factors. Based on the characteristics of the different research paradigms (Table 2-1) an interpretative

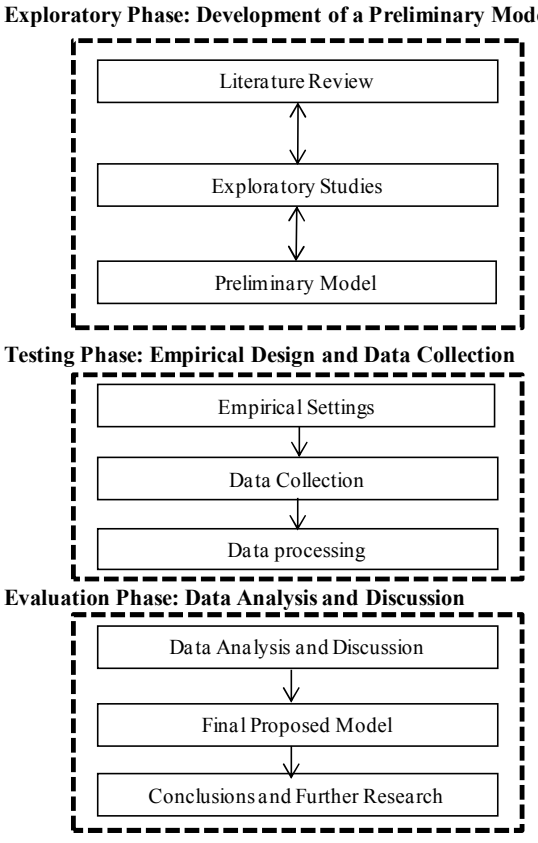
approach is adopted as the most appropriate to address the aim of this thesis. IS alignment has been defined as a coevolutionary process that involves mutual adaptation and change among the business and IS individuals across different organisational levels. An interpretive approach stands for this conceptualisation of IS alignment to enhance the understanding of social processes, mechanisms and practices involved. Furthermore, information systems research is more than computer-based business systems, IS are fundamentally social rather than technical systems and therefore IS paradigm draws heavily from social sciences (Mingers, 2001; Hirschheim, 1992, p. 28).

The traditional difficulties associated with social sciences are similar to the ones in information systems as there is a conflict in regards to how knowledge is acquired. Whilst the scientific method is widely accepted as a valid form of inquiry, many social scientists are convinced that the reason for little progress in social science is that the scientific method is too limiting and not appropriate for the subject of study (Hirschheim, 1992, p. 31; Orlikowski and Baroudi, 1991; Galliers and Land, 2002). However, for information systems it is claimed that different methods, especially from different paradigms, are desirable as each method generates information about different aspects of the world which provide a richer understanding of a research topic (Mingers, 2001; Galliers, 1992, p. 144). Orlikowski and Baroudi (1991) suggest two primary variants for the interpretative perspective namely ‘weak’ and ‘strong’ constructionist views. The strong constructionist view cannot accommodate positivistic beliefs as they are essentially different and therefore interpretative research is not seen as a complement of positivist investigation, but a replacement of them. In the weak constructionist view, the interpretive research is complemented by positivist research and the researcher chooses between positivist and interpretive approaches based on the research question and the nature of the phenomenon. Following that logic, a method is an instrument for provoking a response from the world and can be used critically and knowledgeably in different contexts, its selection depends more on the researcher’s objectives, the problem being studied and the kind of knowledge desired (Mingers, 2001; Hirschheim, 1992, p. 60).

A combination of qualitative and quantitative methods is used in this thesis as an acceptable approach for interpretative studies according to Orlikowski and Baroudi (1991). As discussed above, the use of methods from different paradigms enrich the understanding of the phenomenon under investigation (Galliers, 1992, p. 144; Hirschheim, 1992, p. 60; Mingers, 2001).

This thesis presents a research process where the aim and objectives were well framed and defined around the research problem and motivation, whereas, the research questions and methods were determined by the nature of the specific research question that emerged during the process. Figure 2-1 identifies the main research phases, each one provided new insights for evaluating the overall design and appropriated decisions making for the next stage. A list of 12 research questions resulted to be able to answer the main research question and therefore fulfil the aim and objectives of the thesis.

Figure 2-1 Research process



2.3 Research Process and Methods Adopted in this Thesis

The research approach used for this thesis was constructed as a result of a cyclical process that aims to investigate IS alignment in its natural settings. In doing so, quantitative and qualitative methods are used to take advantages of each method according to the specific research questions. The research process of this thesis is described linearly, however, as it is well known that any research process represents a constant iteration between the main research question that starts broadly and the new questions that emerge along the process to progressively narrow and focus on the concepts and relationships discovered (Strauss and Corbin, 1998, p.41). In chapter 1 the relevance of incorporating IT projects to understand the gap between strategy formulation and strategy implementation was presented and this research starts with a broad research question:

> *How can IT projects alignment with business strategy be assessed and improved?*

As illustrated in Figure 2-1 the research process has three main phases, the **exploratory phase** refers to the research activity performed to *develop a preliminary model*. The literature review provides the main constructs, and two exploratory studies were conducted to better understand their application at strategic, tactical and operational level and therefore a preliminary model is proposed. The **testing phase** is related to the empirical setting design and data collection to *validate the preliminary model*. For the **evaluation phase** further analysis was performed to *modify the preliminary model* in the light of the empirical results.

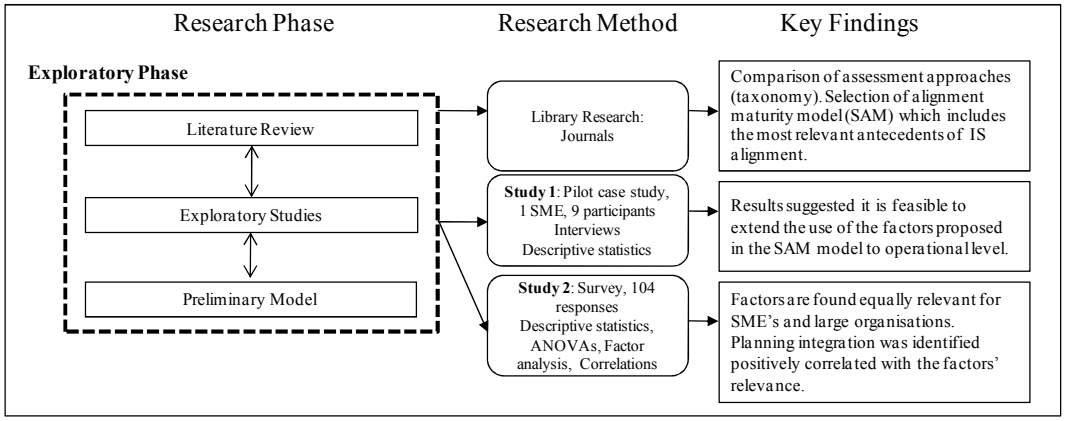
A sequence of research questions emerged during the investigation until the aim and objectives were fulfilled. The selection of research methods were justified in terms of the nature of the each research sub question, the research phase and the type of information that was needed (Mingers, 2001; Hirschheim, 1992, p. 60). A hybrid approach resulted from combining both quantitative and qualitative

methods and the use of a variety of data collection and analysis techniques. The justification for the research methods used is explained below in the context of the exploratory, testing and evaluating phases and their related research questions.

2.3.1 Exploratory Phase: Preliminary model Development

The exploratory phase generates the constructs for the preliminary model by exploring the phenomenon in both theory and practice. Three elements can be differentiated: literature review, exploratory studies and preliminary model.

Figure 2-2 Exploratory phase: preliminary model development



Literature Review

The main research question about the problem of how to assess IT projects alignment with business strategy and how to improve IS alignment led to more specific questions:

RQ 1: Which IS alignment assessment approach is the most appropriate to address the alignment gap between strategy formulation and implementation of IT projects?

RQ 2: Which antecedents of alignment should be selected to analyse their interrelationship at strategic, tactical and operational levels?

As research questions 1 and 2 aim to gain a profound understanding of the assessment approaches from previous studies, library research was the most appropriate method and electronic tools and resources were selected to gather the most relevant literature focused on IS alignment assessment approaches. E-journals were identified and tracked using tools such a Find it, Web Science, part of ISI web of knowledge service for UK education and its associated database "science citation index expanded". This database indexes 5900 major journals across 150 scientific disciplines (ISI knowledge 2006) and permits a review of a wider selection of databases. From the identified journals, references and citations allowed drill down to other relevant articles. Although this process was more intensive during this phase, the literature was continually reviewed and updated throughout the whole research process.

Chapter 3 details the comparative analysis of the literature that allows the identification of strengths and limitations of each assessment approach. The rationale for the selection of the strategic alignment maturity model (SAM) is also presented. The SAM model includes the following factors: communication, IT value, IT governance, partnership, scope & architecture and human resources skills which were found to be the most comprehensive antecedents of IS alignment as they include most of the views expressed in alignment literature. These factors were used to conduct the exploratory study 1.

Exploratory studies

The next step was to explore the feasibility of extending the SAM model to operational level and more specifically to extend its use to assess the alignment of strategic IT projects. New research questions emerged:

RQ 3: How feasible is it to use the SAM model to assess the views at operational level?

RQ 4: Who should be the participants in order to capture the dynamic between the different actors in business and IS across strategic, tactical and operational levels?

RQ 5: How specifically to incorporate the IT projects as the unit of analysis at operational level?

The research questions aim is to investigate the interactions between business and IS in the process of formulating and implementing strategies. Benbasat et al. (2002, pp. 84) found that case study is a suitable approach to investigate phenomena where there have not been a lot of previous studies. Moreover, he suggested a **single case study** may be useful as a pilot study when the research is highly exploratory as this will help to determine the appropriate unit of analysis as well as familiarise the researcher with the phenomenon in its context.

Therefore, a pilot case study was conducted in one SME organisation in Mexico City with nine participants from strategic, tactical and operational level. An instrument based on the SAM model to assess alignment was developed and the results suggested it was feasible to extend the use of the model and constructs selected to operational level. The pilot study facilitated understanding of research design and empirical settings considerations. However, the main drawback of the pilot case study was the instrument. The questionnaire was too long considering the limited time managers can spare for the research project. Additionally, although IT projects can be used as a unit of analysis, the instrument has to be adapted to address specific projects to be able to compare the results and examine relationships. Exploratory study 2 aims to overcome this problem by examining the variables used to operationalise the attributes of each factor in the SAM model as shown in Section 4.3.

Preliminary model

Study 2 focuses on the validation of the constructs and variables and the impact of organisational size. Most of these constructs are based on studies of large

organisations and it was not until recently that alignment paradigms have turned their attention to small and medium enterprises (Hussin et al., 2002; Chan et al., 2006). Consequently it was important to validate the constructs for SMEs and large organisations. Additionally, Benbasat et al. (2002) recommends the site selection should not be opportunistic. However, in practice access to organisations is limited and sometimes SMEs are more willing to participate in research projects than large organisations. Thus the following research questions were defined:

RQ 6: How relevant are the factors included in the alignment maturity model for practitioners in SMEs and large organisations?

RQ 7: Which variables are the most appropriate to operationalise each construct?

To address these research questions a **survey** was found to be the most appropriate approach for data collection as large number of variables are involved for the analysis. Additionally, from the data collected it is important to be able to make generalisations about the relevance and priority of the factors for SMEs and large organisations. An online survey tool (QuestionPro) was chosen since it is easier to access a large audience and also provides an efficient way of collecting responses from organisations at different geographical locations.

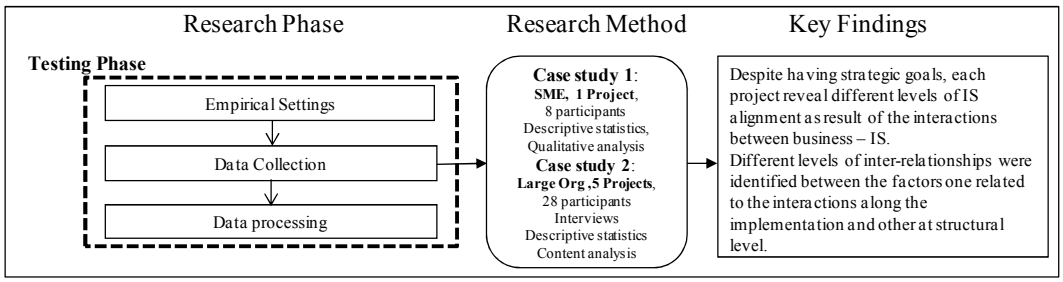
A number of organisations were asked to participate in the survey by telephone to achieve a better response rate. For example, associations such as ISACA (London Chapter of Information Systems Audit and Control Association) and LACAIS (Latin American and the Caribbean Chapter of Association for Information Systems) were contacted which significantly improved the response rate. A total number of 161 responses were collected from organisations all over the globe and detailed results are presented in Section 4.4. SPSS was used to screen and clean the data resulting 104 complete and valid responses that were used to conduct a factor analysis, ANOVA tests and correlations. By the time the results were ready to initiate the development of a new assessment instrument base on the most

relevant variables, new literature was available. A validated instrument for the SAM model was published (Sledgianowski et al., 2006). Therefore the author was contacted to obtain the full instrument version in order to evaluate its use as one of the various sources of information for the testing phase. Section 4.5 compares the variables of both studies. A model of factors affecting alignment at strategic, tactical and operational level is proposed in Section 4.6 and the validated instrument (Sledgianowski et al., 2006) was adapted for the operational assessment of strategic IT projects.

2.3.2 Testing Phase: Research Design and Data Collection

The exploratory phase concluded with a preliminary model of factors affecting alignment. Therefore during the testing phase data was collected to validate the proposed model at strategic, tactical and operational level also provided a tool for the practitioner to assess the level of IS alignment in their organisations.

Figure 2-3 Testing phase: research design and data collection



The new research questions that emerged are:

RQ 8: Which factors/attributes cause high or low levels of IS alignment?

RQ 9: Why are some strategic IT projects more or less aligned with business strategy?

RQ 10: How can practitioners' assess IS alignment and make use of the results?

The empirical settings focused on how to collect data that captures the views at different levels that it is feasible to compare in order to find out the interrelations between the strategy formulation and the strategy implementation as well as the impact on strategic IT projects. Additionally, it was important for the researcher to ensure that the research design provides practitioners with valuable information as result of their participation in order to have organisations' access and support. The practical perspective is important as other researchers have argued for more connections between theory and practice (Avison et al., 2004; Campbell et al., 2005).

A **Case study** allows capturing the knowledge of practitioners in their natural environment (Cavaye, 1996; Walsham, 2002; Benbasat et al., 2002) and was considered the most appropriate method of answering 'how' and 'why' questions which need to be traced over time and context rather than by frequency of incidence (Benbasat et al., 2002). However, a single case would not be suitable and a multi-case approach was selected to capture greater detail from practitioners' knowledge in their natural environment and thus be able to make comparisons. Ideally, more than one source of information is needed to support case research studies (Benbasat et al., 2002). From the several sources identified by Yin (2003) for the testing phase the following were selected:

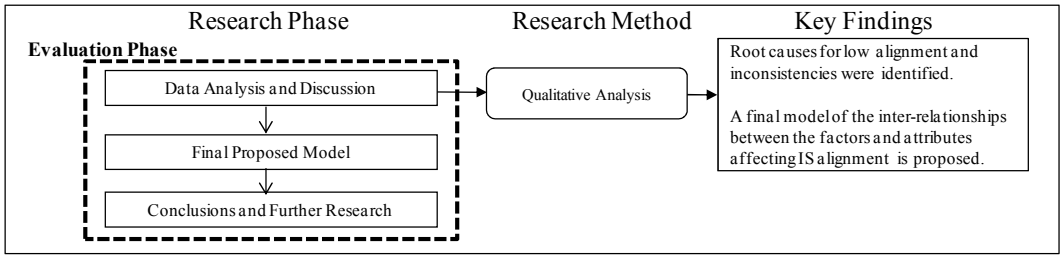
1. Archival records. Written information about the organisation's profile i.e. organisational charts, mission, business and IT objectives.
2. Documentation. Project documentation for the IT projects involved in the case study.
3. Interviews. Semi-structured interviews were conducted with key participants.
4. Direct observation. At each meeting notes were taken on details, actions and subtleties within the field environment.
5. Physical artefacts. A validated instrument was used to assess the maturity level of alignment at strategic level and adapted to assess the level of alignment of strategic IT projects selected from the views of tactical and operational managers.

Therefore, the analysis of the data was a hybrid approach combining both quantitative and qualitative methods. The use of different methods also enables to build a richer picture of the phenomena under study and cross-validation of findings (Cavaye, 1996). For processing the quantitative data SPSS was used to screen the data and calculate the level of alignment and standard deviation between the participants' views. Then contextual data from different sources assisted the assessment of IT projects alignment with the business strategy. The research design and implementation in two organisations is presented in detail in Chapter 5. The first organisation was an SME. The assessment process was successfully applied and the maturity at strategic, tactical and operational levels reflects the current position of the organisation. Results show low levels of alignment, however, mainly due the lack of strategic direction and resources to invest in IT infrastructure. No documentation was available. Although the assessment results involved the analysis of quantitative and qualitative data, the qualitative data was limited as it was not possible to interview all the participants. This again proved to be a limitation to further analysis of the root causes of low levels of alignment or high levels of inconsistency between the participants. Consequently, for the second case study conducted in a large organisation, face-to-face questionnaires and interviews were agreed to ensure qualitative data from all the participants. The interviews were all recorded (28 participants from strategic, tactical and operational views) and notes were added about the field environment. The interviews were all transcribed and QSR NVivo 8 software was used to analyse the content.

2.3.3 Evaluation Phase: Data Analysis and Discussion

At this stage, it was possible to answer why some projects were more aligned than others by analysing the attributes that received higher or lower levels of alignment or by the inconsistency between the participants' views. However, the root reasons for those results needed to be investigated to establish the interrelation between the factors and attributes and better understand how to improve them.

Figure 2-4 Evaluation phase: data analysis and discussion



The final research questions were defined:

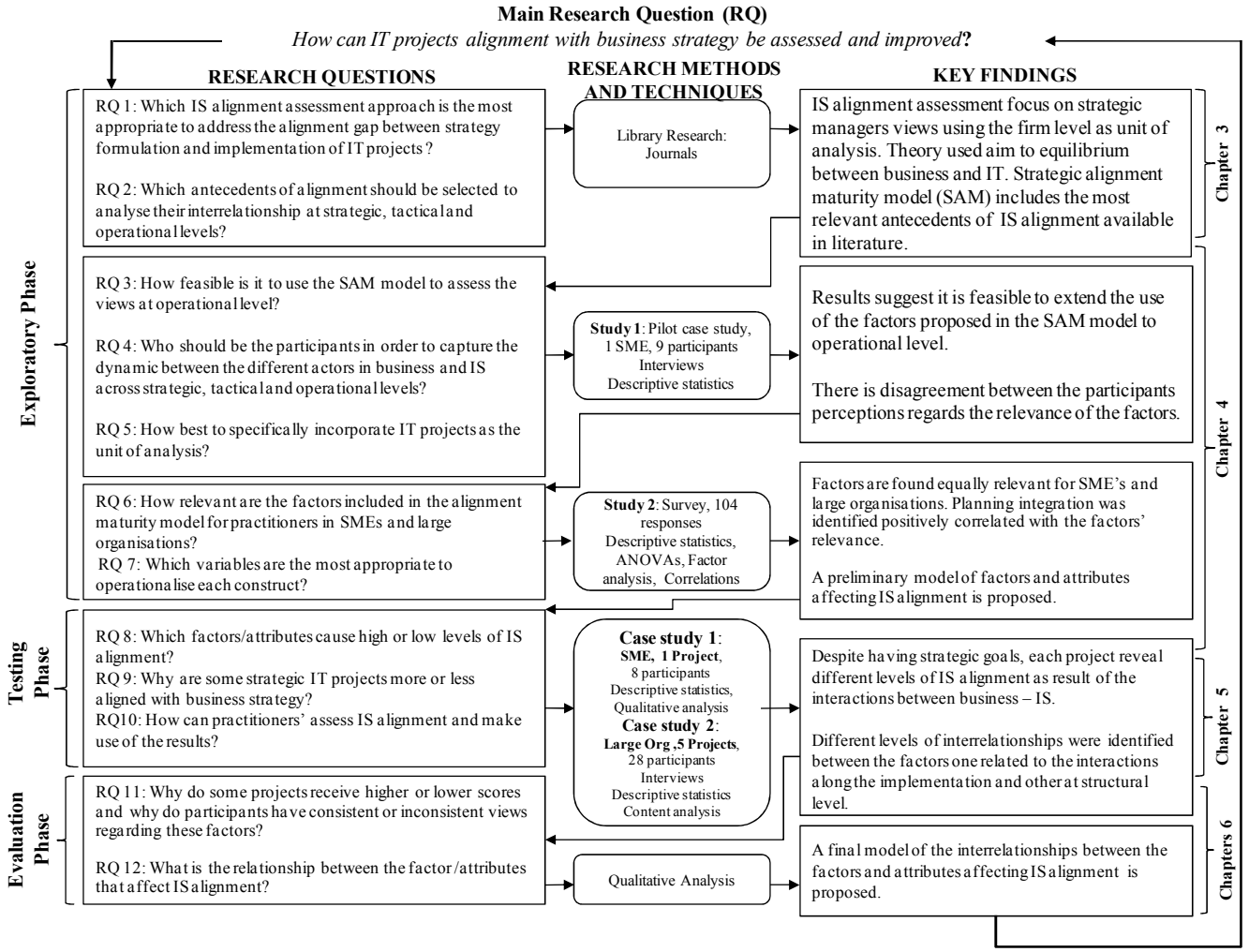
RQ 11: Why do some projects receive higher or lower scores and why do participants have consistent or inconsistent views regarding these factors?

RQ12: What is the relationship between the factor/attributes that affect IS alignment?

Given the nature of these questions none of the statistical procedures would be able to provide answers to the root causes behind the results. Qualitative methods are more appropriate when it is needed to understand the meaning or nature of the experience of individuals and obtain intricate details about the phenomenon under study (Strauss and Corbin, 1998, p.41). Therefore, for this phase **qualitative analysis** procedures were chosen in order to interpret and organise the data. Strauss and Corbin (1998, p. 12) explain the coding process as consisting of conceptualising and reducing data, and elaborating categories in terms of their properties and dimensions. The comparison between the elements resulting from the coding process allows the identification of patterns and root causes or consequences that strengthen support for the final model. The final model proposed includes factors affecting alignment from two perspectives, the structural factors that are related to the organisational context and the dynamic factors that are related to the aspects that change over the interaction between business and IS across strategic, tactical and operational level. This model is presented and explained in chapter 6.

A summary of the 12 research questions, methods and key findings is presented in Figure 2-5 together with the research phase they belong to and the chapter where the details are reported.

Figure 2-5 Research process and methods adopted in this thesis



2.4 Summary

This chapter emphasises the use of multiple research methods, even if those methods come from different ontological, epistemological paradigms. The emphasis on empirical and practical research leads the investigation through a series of research questions that are reflected in three main phases. Once the research problem, context, aim and objectives were defined an exploratory phase was conducted, targeting a depth of understanding of the research constructs to the development of a preliminary model that fits the research aim and objectives. This phase is followed by the testing and evaluation phase where the model is empirically tested and improved. The use of qualitative and quantitative methods for data gathering and analysis is justified in this chapter, whilst the detailed description of the way each method was designed and conducted is presented in the appropriate chapters.

"Take time to gather up the past so that you will be able to draw from your experience and invest them in the future."
Jim Rohn (1930-), American Entrepreneur

Chapter 3 LITERATURE REVIEW

3.1 Overview

This chapter first discusses the literature available to assess IS alignment. The discussion aim to understand the different approaches other researchers have adopted, the nature of their study, the dimensions covered and unit of analysis. Then a review of various antecedents affecting IS alignment is presented to explore how to extend their use to assess the alignment of IT projects. As result the rationale for selecting the factors proposed on the alignment maturity model is justified. Finally, the alignment maturity model is explained in detail to identify its strengths and limitations in the context of this thesis.

3.2 IS Alignment Assessment Approaches

In chapter one the relevance of IS alignment to address the alignment of IT projects was exposed as well as the lack of connections between strategy formulation and strategy implementation. One of the first steps towards achieving alignment is to have adequate means to measure it. Chan and Reich (2007) also support the point that alignment can be better understood and managed if it can be measured. Therefore the first research question this chapter answer is:

RQ1: Which IS alignment assessment approach is the most appropriate to address the alignment gap between strategy formulation and implementation of IT projects?

The literature provides us with several approaches and it is necessary to evaluate their characteristics to identify which one provides the best metrics to accomplish the thesis aim.

3.2.1 Criteria for Evaluating IS Alignment Approaches

In order to select the assessment approaches E-resources were used as the primary means to investigate the available literature. A collection of relevant literature whose title or abstract contained the keywords 'strategic alignment' was compiled. Then the articles were ranked according to their research impact (the number of times a study has been cited). These articles were also categorised according to criteria which included: a) proposed tools or instruments of assessment, b) implemented empirically their instruments or tools and c) hold relevant keywords such as 'measure', 'measurement', 'measuring', 'assessing' or 'assessment' in their abstract or title. After the abstract revision, the references and citations were allowed drill down to other relevant articles. Therefore, new articles were added to the group 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. Finally, eight key articles from 31 were analysed to further understand assessment approaches by identifying the research approach, the dimension and nature of the measurement as well as the unit of analysis.

3.2.2 Alignment Assessment Approaches Comparison

A variety of approaches have been proposed in the literature to assess alignment, though most of them are based on different rationales. Sabherwal and Chan's (2001) research indicates that alignment affects perceived business performance. The model has two components: one to conceptualise the business strategy and the other to conceptualise IS strategy. The first component of the model, the business strategy, classifies the types of business strategy in terms of Miles and Snow's typology. This typology includes three types: defenders, prospectors and

analysers. Defenders are more stable and stress operational efficiency and economies of scale. The prospectors' type continuously seeks new products/market opportunities, and is the creator of change in its market. Finally, the analysers share common characteristics with each of the other two types, and seek to simultaneously minimise risk whilst maximising opportunities for growth. The second component of the model is the information systems strategy that is described in terms of the IS purpose: IS for efficiency, IS for flexibility and IS for comprehensiveness. Then, a correlation is established between these two components to allocate the most appropriate IS strategy for a specific type of business strategy to improve alignment. Greater alignment between an organisation's business strategy and IS strategy implies that the systems are oriented on areas that are critical to achieve business strategy, therefore IS should contribute to the business performance as they are using IS for competitive advantage.

A survey aiming to examine the impact of alignment on business performance shows that the association between alignment and business success depends on selecting the appropriate IS strategy for the specific type of business strategy. Whilst analysers and prospectors showed a strong correlation between alignment and performance, for defenders this association was not found. Consequently, the authors conclude that for organisations with a defenders type of business strategy, the emphasis on IS may not improve strategy execution and business success (Sabherwal and Chan, 2001). The alignment paradigm then is more appropriate for organisations that are interested on using IS for competitive advantage. Even though this assessment proposed an analytical approach for measuring alignment based on well-established constructs, it is not designed to be applied by organisations to help them to assess their own IS alignment level.

Small and medium-sized enterprises are usually less strategically oriented than larger organisations (Sabherwal & Chan 2001). However, Hale and Cragg (Hale and Cragg, 1996) constructed measures to assess small firms based on Venkatraman's instrument called STROBE that conceptualises the business

strategy and also used Chan's STROIS instrument to conceptualise the IS strategy. For each dimension of these instruments the corresponding results are compared to assess the degree of mismatch between business and IS strategies. Low scores for a dimension indicate that dimension is receiving sufficient attention. A high matching score indicates an opportunity to improve alignment in that dimension. When a 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. This research demonstrated that current models could be adapted to provide SMEs with relevant tools to assess and improve alignment. To validate these assumptions, though, more empirical research is required.

Hussin et al. (2002) stated that not all of the factors proposed by Reich and Benbasat (2000) or the proposal by Luftman et al (1999) seems to be suitable for small organisations. Therefore they investigated from the intellectual perspective (focusing on the content aspect of alignment) the factors that might influence alignment in small organisations which included IT sophistication, CEO commitment to IT and external IT expertise. Hussin et al. (2002) found support for the relevance of IT sophistication and CEO commitment to IT which suggest that it is possible for small organisations to use IS alignment paradigm to improve their business performance. No support was found for external IT expertise. However, other relevant factors were not included and the methods used to measure the constructs remain as exploratory study. They also concluded that alignment for small organisations is related to IT maturity and suggest for future research to investigate further the social processes associated with alignment (social dimension of alignment).

Although executives are sceptical of the payoffs of IT investment due to its difficulties in demonstrating tangible benefits (Broadbent and Weill, 1997), there is evidence that corporations with clear strategic goals for IT achieve higher levels of strategic alignment, therefore higher IT business value (Tallon and Kraemer, 2003; Tallon et al., 2000). In addition to the measurement of alignment, key contributions from Tallon's work are the unit of analysis and the measurement of

realised strategy rather than planned strategy. Whilst most of the literature focuses the alignment analysis at company level, Tallon focuses on process level to obtain deeper insight of alignment. A survey was developed to measure the payoffs across the processes in the value chain; this survey was duplicated to address both the business and the IT realised strategy. Despite the fact that they found that strategic alignment can improve the business value of IT, the authors also found that rigid strategies between IT and business strategy could prevent organisations from the adopting the necessary flexibility required to react in a changeable environment (Tallon and Kraemer, 2003), also known as the alignment paradox. Thus, the business value of IT depends, to some extent, on the organisation's ability to link their strategic process with the IT strategic process within a flexible framework.

Research to achieve alignment in practice was presented by Avison et al. (2004) where the strategic planning was merged with a prioritisation process. The approach aims to determine the degree of alignment between business and IS strategies based on their completed projects. The authors modified the original perspective of the SAM model (Henderson and Venkatraman, 1993) and developed empirical research. In order to identify what type of alignment or perspective the organisation has, Avison et al. (2004) analysed IT projects' data instead of collecting executives' perceptions. This approach emphasises the relevance of having clear business goals and a prioritisation process to align the IT projects to the organisational goals. Moreover, the four-step process they suggest represents a practical approach not only to examine the current alignment but also it can be used to monitor and track alignment in a flexible way by re-allocating project resources when a strategy change or if the project is not well aligned with the strategy (Avison et al., 2004). Despite the fact that this approach represents a deeper analysis of assessing alignment, the matching project process to identify the alignment perspective the organisation follows was not considered conclusive by the authors. In addition, the assessment results do not help to identify details of those areas that need improvement in terms of strategic alignment. More specific information, such as the identification of the factors that

hinder alignment, could help managers to take appropriate action to improve the level of alignment.

In 1999, Luftman published the enablers and inhibitors of alignment as a result of deeper research using his framework for alignment (Luftman et al., 1999). In 2000, he had provided a maturity level of alignment called the strategic alignment maturity (SAM) model. This model is consistent with his previous research and, using the same background he concluded that the harmony between the 12 components of the original SAM model (Henderson and Venkantraman, 1993) is impacted by six factors: communication, IT value, governance, partnership, scope & architecture and skills. For each of these factors, he defined the attributes that determine the level of maturity in each one (Luftman, 2000).

Chan et al. (2006) proposed a model to explain the factors affecting alignment that included shared domain knowledge, planning sophistication, prior success, organisational size and environmental uncertainty. This model found support for the argument that IS alignment improves organisational performance by examining the factors in the model across business strategies in different industries.

From the above discussion it was noted that alignment paradigm is more appropriate for organisations that are interested on using IS for competitive advantage. However, this competitive advantage could be limited if business and IS strategies are aligned without considering the changeable and dynamic environment organisations face. On the other hand, Table 2-1 summaries the research criteria observed on the discussed IS alignment assessment approaches. It can be observed on Table 2-1 that survey is the main research approach used which provides mainly statistical analysis of large samples that help to generalise findings. However, it does not provide depth understanding of alignment in the organisational context through the participants' voices or the messiness of everyday reality that organisations face (Ciborra, 1997; Campbell et al., 2005). In the same line of argument, the social dimension is found less in alignment

assessment approaches which may help towards understanding how to achieve alignment given the context of multiple antecedents and outcomes identified in IS alignment literature (Chan and Reich, 2007). Finally, the unit of analysis is mainly focused at strategic level, some studies incorporated the tactical level but few have included the operational level where the strategies are implemented.

Table 3-1 Comparison of alignment assessment approaches

Criteria		Study							
		Reich and Benbasat (2000)	Luftman (2000)	Sabherwal and Chan (2001)	Hussin, King and Cragg (2002)	Tallon and Kraemer (2003)	Kearns and Lederer (2003)	Avison et al. (2004)	Chan, Sabherwal and Bennett (2006
Research approach	Survey		✓	✓	✓	✓	✓		✓
	Case Study/Action Research	✓	✓					✓	
Alignment dimension	Intellectual	✓		✓	✓	✓	✓	✓	✓
	Social	✓	✓						
Unit of analysis	Strategic-Firm's level		✓	✓	✓	✓	✓	✓	✓
	Tactical-Business Units/Department	✓						✓	
	Operational-IT projects							✓	

(Source: adapted from Gutierrez et al., 2008)

Chan and Reich (2007) suggest that further examination of IS alignment antecedents is desirable that goes beyond merely listing antecedents but explores the interrelationships among them. Considering that strategic IT projects are formulated at strategic level and implemented at tactical and operational level, the next research question to investigate is:

RQ2: Which antecedents of alignment should be selected to analyse their interrelationship at strategic, tactical and operational levels?

3.3 Comparison of IS Alignment antecedents

In the previous sections the discussion of assessment approaches led to the selection of four studies to explore the constructs and operationalisation of IS alignment. The antecedents have similarities and are compared below.

Reich and Benbasat (2000) proposed a model with four factors: shared domain knowledge between IS and business executives, IT implementation success, communications between IS and business executives, and connections between IS and business planning. These factors are key elements in creating alignment and analysed from a social dimension. The social dimension of alignment implies reviewing the understanding of current objectives and the congruence of IT vision between business and IS executives. As a result, shared domain knowledge and strategic business plans were found to be the most important factors in achieving alignment. Chan et al. (2006) proposed a model to explain the factors affecting alignment that includes shared domain knowledge, planning sophistication, prior success, organisational size and environmental uncertainty. This model found support for the argument that IS alignment improves organisational performance by examining the factors in the model across business strategies in different industries. Hussin et al. (2002) examined three factors in the context of small organisations. They included IT sophistication, CEO commitment to IT and external IT expertise. In this study it was found by testing the aforementioned three factors that the major factors that affect alignment on small organisations were: IT maturity, technical IT sophistication and CEO's software knowledge.

Shared domain knowledge definition in Reich and Benbasat's (2000) study, coincides with the same perspective used by Chan et al. (2006). Both studies highlight the importance of business and IS managers understanding each other's environments. The strategic alignment maturity (SAM) model proposed by Luftman (2000) includes in the communication factor two attributes that contribute to this mutual understanding. The communication factor also has attributes to measure the mechanisms in place to promote shared knowledge, liaison roles and a learning environment which are similar to the communications

between IS and business executives included as another factor on Reich and Benbasat's (2000) study. Connections between IS and business planning processes, planning sophistication and IT sophistication are common to the three studies of Reich and Benbasat (2000), Chan et al. (2006) and Hussin et al. (2002), respectively. The three terms refer to the use of strategic planning process and stress the relevance of business and IS manager's participation in each other's planning processes. In the SAM model (Luftman, 2000) among the IT governance attributes the planning integration is included. The factors IT implementation success (Reich and Benbasat, 2000) and IS department track record (Chan et al., 2006) are related to the level of trust IS departments have in order to promote a partnership relationship between business and IS managers. This aspect is covered in the partnership factor in Luftman's model (2000). Hussin et al. (2002) use CEO commitment to IT in a very broad sense covering, among many aspects, the communication influence of the CEO with IS and the key role CEOs have in the planning process and prioritising IT projects which are attributes in the communications and governance factors of the SAM model. Hussin et al. also investigate the influence of the external IT expertise factor for small organisations. In this study, IT success was considered more likely to occur when IT experts worked in partnership with senior management. However, in the context of small organisations, many have neither an IT manager nor an IT department. Consequently, IT expertise comes from the consultants and vendors (Hussin et al., 2002). This factor relates to the partnership between business and IS, which is not covered on Luftman's model where the assumption is the existence of internal IT expertise.

Finally, two more factors have been considered to analyse alignment that are only included by Chan et al. (2006) study: environmental uncertainty and organisational size. The environmental uncertainty refers to environmental instability and changes different industries face which increases the need of information to make appropriate decisions. This factor is not directed linked with the factors in the SAM model (Luftman, 2000). Chan et al. (2006) observed that organisational size affects alignment and explained that, in general, small and

medium-sized firms tend to be structured around functions and use centralised structures to coordinate sub-units. This central coordination generally limits the need for other explicit mechanisms to promote functional alignment and consequently the organisation lacks alignment. In large organisations the decentralised governance structures make coordination more difficult and therefore more mechanisms to promote strategic alignment are needed and usually more resources are available to invest in these mechanisms (Chan et al., 2006). The organisational size factor is not directly linked to the alignment maturity model (Luftman, 2000). However, according to Chan et al. (2006) this factor impacts alignment.

Reich and Benbasat's (2000) concluded that for short-term alignment a precondition of business direction is needed, which is related to the business and IS planning process. Shared domain knowledge and IT implementation success do not directly impact alignment but acted as mechanisms to produce high or low levels of communication. Communication and connections between business and IS planning will have a direct positive impact on alignment. Similarly Chan et al. (2006) found that shared domain knowledge has a high impact on alignment which is influenced by planning sophistication.

Table 3-2 Antecedents of IS alignment

Reference	Rationale of assessment	Antecedents of alignment factors	Related factor in Luftman (2000)
Luftman (2000)	Analyse the level of alignment maturity	1. Communication 2. Competency/Value 3. Governance 4. Partnership 5. Scope and architecture 6. Skills	
Reich & Benbasat (2000)	Analyse the social dimension of alignment	1. Shared domain knowledge 2. IT implementation success 3. Communications between IS and business executives 4. Connections between IS and business planning processes	Communication Partnership Communication Governance
Hussin et al. (2002)	Analyse alignment for SMEs	1. IT sophistication 2. CEO commitment to IT 3. External IT expertise	Governance IT Governance/ Partnership Not related
Chan et al. (2006)	Analyse antecedents of alignment and the business performance outcome	1. Shared domain knowledge 2. Planning sophistication 3. Prior IS success (IS department track record) 4. Organisational size 5. Environmental uncertainty	Communication Governance Partnership Not related Not related

(Source: adapted from Gutierrez et al., 2009)

3.4 Rationale for the Selection of SAM Model Antecedents

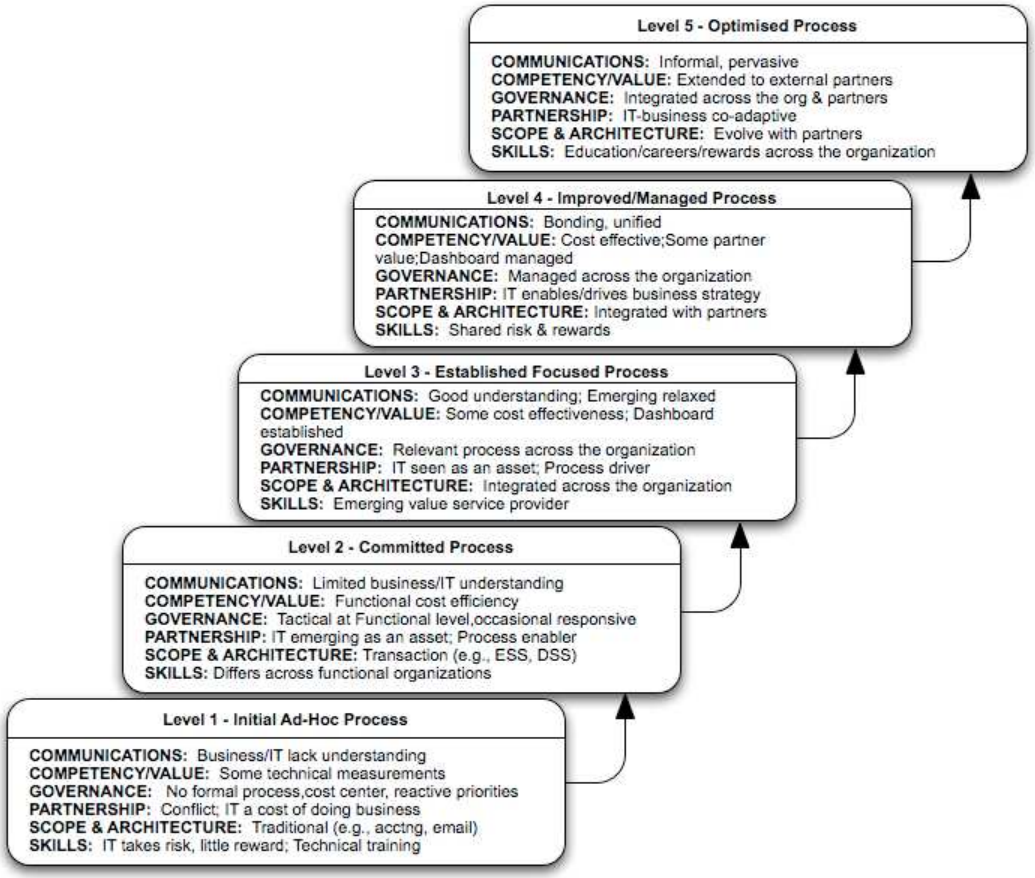
From the analysis of IS alignment antecedents, only three were not related to the Luftman's model: external IT expertise, environmental uncertainty and organisational size as shown in Table 3-2. For external IT expertise, Hussin et al. (2002) did not find strong support for its influence. For environmental uncertainty Chan et al (2006) found that it does have influence for academic organisations but not a significant influence for businesses. Conversely, organisational size factor in Chan's et al. (2006) study was found to have impact for businesses organisations but not for academic.

The selection of Luftman's approach can be justified in two main arguments. First and more importantly, is that SAM has been developed based on the original Strategic Alignment model (Henderson and Venkantraman, 1993) and includes most of the views expressed in IS alignment research as discussed above. The second argument is the SAM model facilitates the connection between theoretical knowledge and practical actions in both strategy formulation and strategy implementation. The practical view is relevant to complement the understanding of IS alignment and how to improve organisations alignment maturity.

3.5 Strategic Alignment Maturity (SAM) Model

Luftman (2000) brings an applied perspective to his identified factors. He refined SAM by elaborating more critical management issues. Luftman (2000) argues that achieving alignment is an evolutionary process, which requires strong support from senior management, good working relationships, strong leadership, appropriate prioritisation, trust, and effective communication, as well as a thorough understanding of the business and technical environments. Thus, he proposes a model for evaluating these activities within an organisation to understand its position in terms of maturity levels of alignment and how this can be improved as shown in figure 3-1. The maturity levels were conceptualised from the capability maturity model (CMM) of software quality development by the Software Engineering Institute at Carnegie Mellon (Humphrey, 1988).

Figure 3-1 Strategic alignment maturity summary



(Source: adopted from Luftman, 2000)

For the operationalisation of these factors, the model includes a range of attributes related to each factor as illustrated in Table 3-3. The advantage of the categorisation provided by Luftman (2000) is that every factor can be practically related to management practices that organisations have. Each factor in the model is defined whereas the attributes are only listed as shown in Table 3-3 and differentiated only by the corresponding characteristics for the maturity levels. This represents a limitation due the multiple interpretations that can be given to attributes that are not clear. For example, communication involves the mutual understanding of business and IS environments and the methods used to share this knowledge and provide organisational learning. The strategic alignment maturity model only includes the understanding characteristics for level 1 to 3 and from level 3 to 5 the communications maturity refers to the protocol rigidity that is the style of methods used to share information and knowledge. To overcome this

limitation, instead of ranking the attributes directly, the development of an instrument that provides more clarification is proposed. The instrument aims to explore the feasibility to extend the SAM model to operational level.

Therefore to better understand the selected factors affecting IS alignment at strategic, tactical and operational levels new research questions emerged:

RQ 3: How feasible is it to use the SAM model to assess the views at operational level?

RQ 4: Who should be the participants in order to capture the dynamic between the different actors in business and IS across strategic, tactical and operational levels?

RQ 5: How specifically to incorporate the IT projects as the unit of analysis at operational level?

These and new research questions are addressed on Chapter 4 that aim to develop a preliminary model based on the factors and attributes included in the SAM model that can be used to analyse the strategic, tactical and operational levels focused on the specific factors that impact IT projects alignment with the business strategy.

Table 3-3 Factors and attributes affecting strategic alignment maturity

Factors	Attributes
COMMUNICATIONS: includes exchange of ideas, knowledge and information among the IS and business managers, enabling both to have a clear understanding of the organisation's strategies, business and IS environments.	• Understanding of business by IT • Understanding of IT by business • Inter/Intra-organisational learning • Protocol rigidity • Knowledge sharing • Liaison(s) effectiveness
IT VALUE: includes assessment of IT investment by the use of metrics to demonstrate the contribution of IT to the business.	• IT metrics • Business metrics • Balanced metrics • Service level agreements • Benchmarking • Formal assessment reviews • Continuous improvement
IT GOVERNANCE: is the degree to which the authority for making IS decisions is defined and shared among management. It includes setting IS priorities and allocating IS resources.	• Business strategic planning • IT strategic planning • Reporting/organisation structure • Budgetary control • IT investment management • Steering committee(s) • Prioritisation process
PARTNERSHIP: is the relationship among the business and IS managers. It includes IS involvement in defining business strategies, the degree of trust between IS-business managers and how each perceives the contribution of the other.	• Business perception of IT value • Role of IT in strategic business planning • Shared goals, risks, rewards/penalties • IT program management • Relationship/trust style • Business sponsor/champion
SCOPE & ARCHITECTURE: includes an organisation's infrastructure, change readiness, flexibility in structure and the management of emerging innovations.	• Traditional, enables/driver, external • Standards articulation • Architectural integration • Architectural transparency • Flexibility • Managing emerging technology
HUMAN RESOURCES SKILLS: are human resource considerations for training, performance feedback, encouraging innovation and providing career opportunities. It also includes an organisation's readiness for IT change, capability for learning and ability to leverage new ideas.	• Innovation, entrepreneurship • Locus of power • Management style • Change readiness • Career crossover • Education, cross-training • Social, political, trusting environment

(Adapted from Luftman, 2000)

3.6 Summary

This chapter reviews the normative literature to identify the alignment assessment approaches and the IS alignment antecedents. A comparison of eight relevant studies was presented analysing the research approach, the alignment dimension

covered and the unit of analysis used for each study. The main finding was that most of the approaches focus on the strategic level. From these studies the IS alignment antecedents were also identified as communication, governance and partnership, antecedents all the studies found relevant. Two reasons were given for the selection of the SAM model, first, most of the views in IS literature are consistent with the model, second, it provides a practical perspective to connect the IS theory with practical actions for industry.

"All models are wrong but some are useful."

George Box (1919-), Statistician

Chapter 4 EXPLORATORY PHASE: DEVELOPING A PRELIMINARY MODEL

4.1 Overview

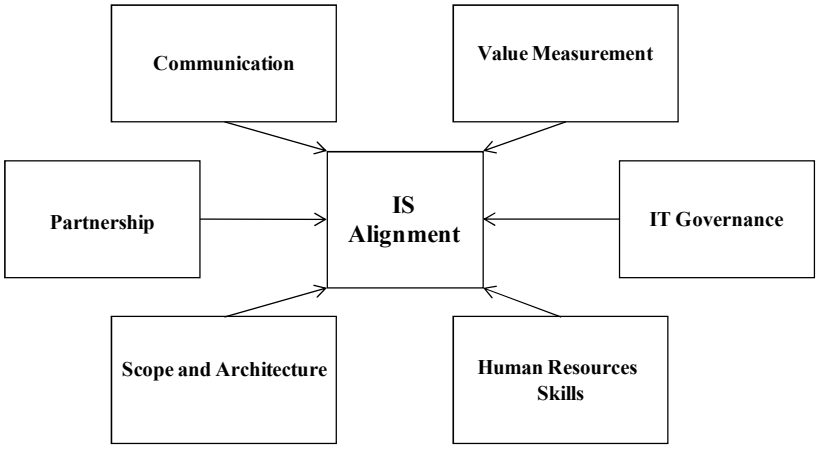
This chapter describes two studies conducted as part of the exploratory phase. According to the research methodology discussed in chapter 2, the exploratory phase addresses research questions to gain a profound understanding of the phenomenon under investigation, as well as an understanding of the design considerations for the testing phase. The chapter begins with discussing how study 1 revealed the feasibility of extending the selected model to operational level. The results raised new research questions about the constructs used and its operationalisation on the instrument used to collect data. Study 2 is a survey

conducted to gain a better understanding of the relevance of the attributes. The results provide support for the selected constructs in order to propose a model of factors affecting IS alignment across strategic, tactical and operational levels. The exploratory phase permits a better understanding of the construct and familiarisation with the phenomena in its environment. Practical considerations were also identified to bring not only theory but practical contributions.

4.2 Exploratory Study 1: Pilot Case Study

Chapter three exposed the lack of instruments available to assess the operational level where strategic IT projects are implemented to support the business strategy. The rationale for selecting the strategic alignment model was discussed as well in Chapter Three where the relevant constructs from the Strategic Alignment Model (SAM) were compared with the relevant literature. In summary, it was found that only few studies include the identification of the factors that affect alignment. Apart from Luftman (2000) who proposed the SAM model there are three other studies that specifically address the analysis of the factors that impact strategic alignment: Reich and Benbasat, (2000), Hussin et al. (2002) and Chan, et al., (2006). From this analysis it was found that the SAM model includes most of the views expressed in alignment research and has been used to assess alignment at strategic level. The SAM model considers that all factors are equally important to achieve alignment as illustrated in Figure 4-1. Thus, the next step is to explore the feasibility of extending its use to tactical and operational levels having the IT projects as the unit of analysis.

Figure 4-1 Influence of factors affecting alignment according to the SAM model



4.2.1 Research Question and Approach

Exploratory Study 1 helped the researcher to get familiarise with the phenomenon in its context, to be able to design a preliminary model and apply this in an empirical setting to investigate the interrelationships between the factors and attributes affecting IS alignment at strategic, tactical and operational levels. Additionally, Study 1 assisted with the identification on how IT projects can be incorporated as the unit of analysis as the focus of this thesis is to analyse the dynamics between business and IS in the process of formulating and implementing strategies. Specific research questions for this stage are:

RQ 3: How feasible is it to use the SAM model to assess views at operational level?

RQ 4: Who should the participants be in order to capture the dynamic between the different actors in business and IS across strategic, tactical and operational levels?

RQ 5: How specifically to incorporate the IT projects as the unit of analysis at operational level?

4.2.2 Instrument Design Considerations

The instrument is developed to obtain in depth understanding within one organisation rather than comparing the alignment between several organisations and collects information from the strategic perspective and current practices at tactical and operational levels. In order to obtain a maturity level a 1-5 scale (where 5 is the highest maturity) was used. The instrument provided a maturity level for each factor and the analysis of the data permitted recognition of areas of concern due the low level of alignment or inconsistencies between the participants at different levels.

Another consideration when developing the questions is the participants' knowledge so they can provide appropriate answers. Therefore an important aspect is to develop the questionnaire using language that every participant can easily understand even if they are not use to the SAM model (Luftman, 2000). The questions were designed to collect the same data from different people at all levels and use people's experience obtained from IT projects they had participated in.

4.2.3 Instrument Structure

The instrument consists of a questionnaire of 29 questions related to one or more of the factors from the alignment maturity model that impact alignment. The first 5 questions refer to demographic information, the rest of the questions are related to the alignment factors in two contexts: general management practices and IT project practices. The full instrument is included in Appendix A.1 and the following example describes the design of the instrument questions to assess the factors that impact alignment at strategic, tactical and operational levels on SMEs compared with the original model.

The first factor in Luftman's model is communications and one of its attributes is the understanding of business by IT. Then the top IS executives are asked to rank the maturity in terms of the following options:

Understanding of business by IT:

- IT management not aware
- Limited IT awareness
- Senior and mid-management
- Pushed down through organisation
- Pervasive

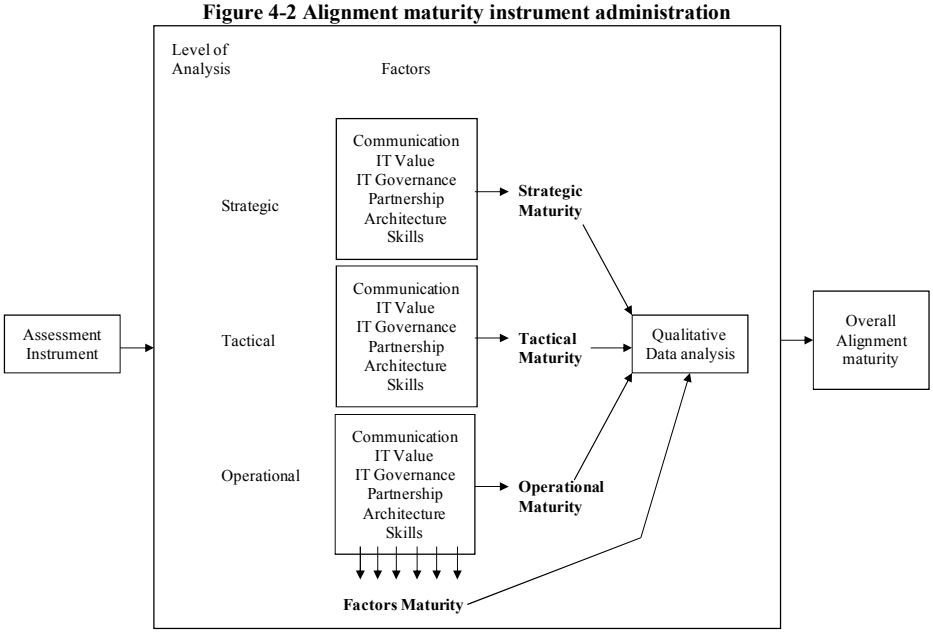
An understanding of business by IT is relevant not only at strategic level but also at tactical and operational levels. Moreover, it is needed to know if that

understanding is applied to all participants in IT projects. Consequently, the proposed questions for top IS executives, IS middle managers and IS staff are:

- Do you know which business strategies are supported by the IT project(s)?
- Do you know which organisational areas are impacted by the IT project(s)?
- Could you describe which business processes are impacted by the IT project(s)?
- Could you describe the main business benefits of the IT project(s)?
- Do you know what IT your competitors are using equivalent to the IT project(s) in your organisation?

The analysis of the responses not only provides a measure of alignment maturity for this attribute, it also allows a comparison of the consistency of results at different levels. All these questions refer mainly to communication but also cross reference with other factors like partnership. Figure 4-2 illustrates the use of the proposed instrument to obtain the maturity level of each factor and its consistency at strategic, tactical and operational levels. The factor maturity can then be further analysed to verify which practices inhibit alignment or if the problem is a lack of linkage between strategic, tactical and operational levels.

Figure 4-2 Alignment maturity instrument administration



4.2.4 Instrument Administration

To investigate the advantages and limitations of the proposed instrument, the case study was applied in a small business services organisation in Mexico City. The CEO involved nine participants from a total of 64 employees in the organisation. All of the participants belonged to different functional areas and had different levels of decision-making. Each one was personally contacted to explain the research project and then a link to the questionnaire was sent by e-mail to each participant using an online tool.

4.2.5 Data Analysis

To calculate the maturity alignment, the questionnaire was processed by participants to obtain a maturity alignment by factor at strategic, tactical and operational levels. Each question uses a 5-point scale to assess the alignment maturity of each factor. Hence, the maturity obtained is quantified for the factor or factors that each question is addressing. This interpretation was guided by the characteristics of the five levels of maturity in Luftman's model. A semi-structured interview was conducted with the organisation's CEO to present the results obtained. The main purpose was to discuss the inconsistencies found between the organisational levels to determine if the inconsistency represented a misinterpretation or a potential area that needed attention in order to improve alignment. This allows adjusting the level of maturity for each factor and estimates the organisation's overall alignment maturity.

4.2.6 Results and Discussion

The calculated maturity of each factor across the different levels of analysis is shown in Table 4-1. Communication, IT value, IT governance and skill reached a level 3 of maturity. However, the standard deviation prevents consideration of this maturity level as the final one. The maturity for partnership and skills were rated at level three as well, nevertheless in this case the standard deviation is low, reflecting agreement in the assessment of participants. The next step was to

validate the quantitative results and understand the reasons for the high standard deviation in some factors.

Table 4-1 Maturity alignment (levels of analysis vs factors)

Level of Analysis	*Communications*		*IT Value*		*Governance*		*Partnership*		*Architecture*		*Skills*		*Maturity Level*	*St. Dev.*
	Mean	*St. Dev.*	*Mean*	*St. Dev.*	*Mean*	*St. Dev.*	*Mean*	*St. Dev.*	*Mean*	*St. Dev.*	*Mean*	*St. Dev.*		
Strategic	3.32	0.74	3.20	0.98	3.21	0.74	3.63	0.64	2.92	0.79	3.85	0.68	3.35	0.68
Tactical	3.13	0.63	2.80	0.91	3.13	0.87	3.47	0.72	2.25	0.58	3.55	0.72	3.06	0.71
Operational	3.42	0.70	3.73	NA	3.39	NA	3.59	NA	2.33	NA	4.00	NA	3.41	NA
Factor Maturity	3.29		3.24		3.24		3.56		2.50		3.80		3.27	
Factor St Dev	0.63		0.84		0.58		0.46		0.73		0.47			

A qualitative analysis is required to fully understand if the level obtained corresponded to the SAM levels characteristics. Verifying if the organisation meets the attributes of each factor, the final level is shown in the qualitative column for the instrument results in Table 4-2. For example IT value factor resulted in Level 3, however, an in depth analysis of the answers in the questionnaire confirmed that the organisation had business and IT metrics but they were not using them continuously. Also, employees perceived that they were not evaluated with those metrics. For all these reasons the factor finally was rated with a maturity Level of 2. Reviewing the final column in Table 4-2, it is clear that most of the factors reached Level 2 instead of Level 3 as the quantitative results indicated, highlighting the need for different sources of information to triangulate the analysis of the results.

Table 4-2 Prioritisation of factors (instrument priority vs perceptions at different levels of analysis)

Factors	*Instrument results*		*Instrument priority*	*Organisation's priority*		
	Quantitative	*Qualitative*		*Strategic*	*Tactical*	*Operational*
Architecture	2.50	2	1	6	5	4
Governance	3.24	2	2	3	2	1
Metrics/Value	3.24	2	3	2	4	2
Partnership	3.56	2	4	4	3	3
Communications	3.29	3	5	1	1	6
Skills	3.80	3	6	5	6	5

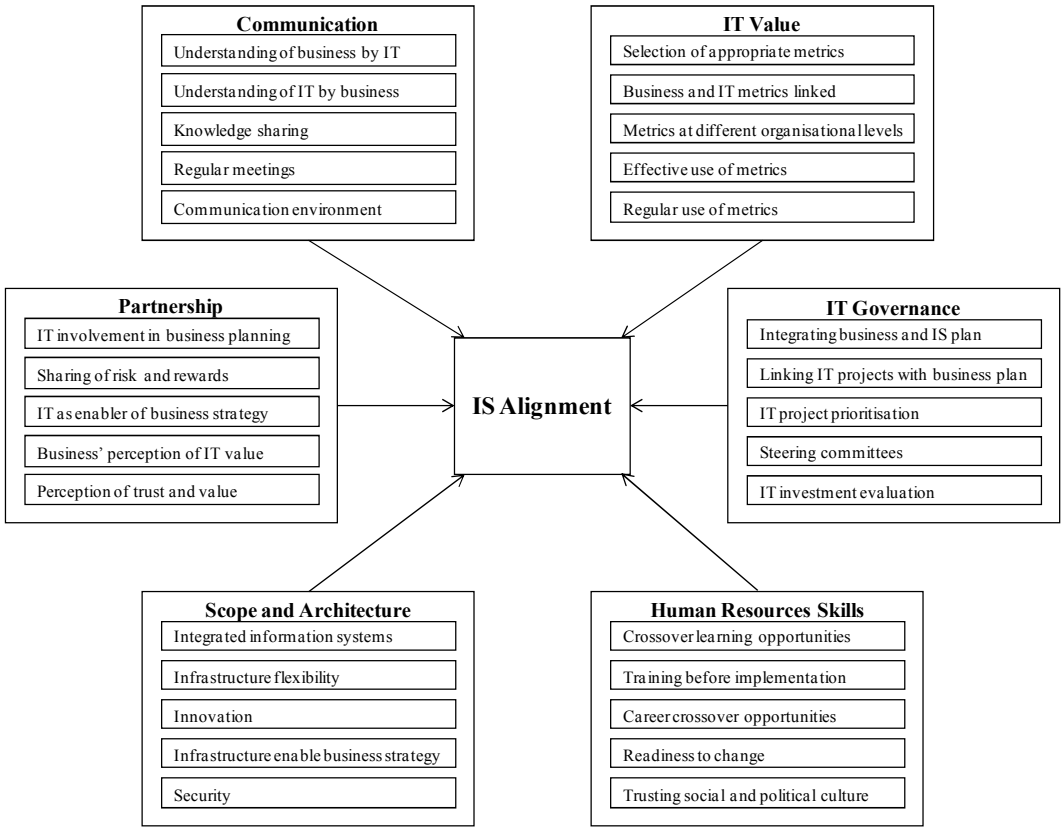
Finally, another interesting analysis the instrument provided is the comparison between the instrument and participants' prioritisation as regards which factors required more attention. In Table 4-2 the factors are ordered according the priority the instrument generates from the quantitative and qualitative results then the organisation's priority is shown for at strategic, tactical and operational levels.

Architecture is consider less relevant at strategic and tactical level, while the operational level indicates this infrastructure is not enough to develop the main business processes. The organisation requires overcoming these differences by understanding the reasons behind each organisational level to rate architecture with such a different priority. Another contrasting example is the communication factor. Whilst strategic and tactical levels consider they need to invest in communication, the operational level is more concerned with improving IT governance and IT value. A consistent result is the partnership factor that is ranked between 3 and 4 priorities by the instrument as well as by participants. The results obtained by the instrument represent a guide by which the organisation can identify their current level of alignment and the areas of concern that require attention. The instrument can also be a valuable tool to promote discussion among key participants without losing the focus on the alignment. This, in turn, may help to share the core alignment knowledge that is needed between participants at all levels.

4.3 Exploratory Study 2: Survey

Most of the lessons learned in the study 1 were related to the attributes validation as there are too many questions to cover the attributes proposed in the original model and some of the questions were related to more than one factor. Additionally, most of these constructs are based on studies of large organisations and it is not clear if the specific attributes are valid for large organisations as well as for SMEs. A preliminary selection of five attributes for each factor is suggested as illustrated in Figure 4-3. This preliminary attributes is drawn from the SAM model which suggests that all factor are equally important and have the same impact on IS alignment. The attributes were designed from both the SAM model characteristics and the instrument developed in the study 1.

Figure 4-3 Influence of factors affecting alignment according to the SAM model and identified attributes



4.3.1 Research Questions and Approach

Further understanding of the factors and especially the attributes used to represent the factors is achieved by answering the following questions:

RQ6: How relevant are the factors included in the alignment maturity model for practitioners in SMEs and large organisations?

RQ7: Which variables are the most appropriate to operationalise each factor?

To address these research questions a **survey** was found to be the most appropriate approach for data collection as a great number of variables is involved for the analysis (Galliers, 1992). Additionally, from the data collected it is important to be able to make generalisations regards the relevance and priority of

the factors for SMEs and large organisations. An online survey tool (QuestionPro) was chosen since it is easier to access a large audience and also provides an efficient way of collecting responses from organisations at different geographical locations.

The purpose of the second exploratory study is twofold. Firstly, it aims to validate the variables used to measure the constructs and to prioritise the relevance of the factors and attributes affecting IS alignment maturity. Secondly, the study aims to validate their application to SMEs and large organisations context.

4.3.2 Survey Design Considerations

A pilot test was conducted on the survey in order to get feedback about the audience's understanding of the survey questionnaire. Professionals in this area were invited to conduct the pilot tests and 22 responses were collected. The feedback obtained was used to refine the questionnaire and as a result it was simplified from 21 to 12 questions. The questions omitted were considered unnecessary or redundant due to their content relating to factors others than Luftman's maturity model which corroborates the selection of the SAM model as the most comprehensive available. The pilot test additionally helped to identify some areas of improvement. For example, initial results derived from the pilot indicated that there was little correlation between the relevance given to each of the factors and the size of the organisation. As described in Section 3.3, planning integration is considered in all models as an important factor and thus should be assessed. Although SAM includes planning integration strategies within the IT governance factor, the results from the pilot study did not give enough information to assess its impact in relation to alignment and organisational size. Therefore, it was decided to make this more explicit by including the planning integration variable. Planning integration was found to improve alignment as IS planning systems evolved in terms of developing the business and IS plan simultaneously and interactively (King and Teo, 1997). For this study a simplification of type of planning integration is drawn from a model proposed by

King and Teo (1997) and is used to compare the impact of planning integration on the alignment factors for small, medium and large organisations. The first type is characterised by little or no input from top management to the IS planning process. At this stage the process provided limited or no alignment since business goals are not well understood and it is identified as independent. For the second stage, namely sequential, the organisation incorporates formal participation of IS to support the business strategy which allows the IS group to derive their strategic plan from business strategy. Finally, simultaneous stage promotes a two-way flow of information and involvement which allows IS not only to support, but also to influence, business strategies. It assumes IS and business strategies are formulated together (King and Teo, 1997; Grover and Segars, 2004; Byrd, T. A. et al., 2005).

4.3.3 Survey Structure

The final survey is composed of two main sections: the first section collects background information about the participants' organisational profile. This section consisted of 5 questions regarding size, business unit, location, sector and level of planning integration. In the second section, prioritisation of factors, the six maturity factors and their attributes were included in a format so that the respondent could rank the relevance for their organisation. There was one question for each of the six factors in Luftman's Strategic Alignment Maturity Model and a definition was added to allow the participant to answer in the context of that definition. The full survey is included at Appendix A.2 and Table 4-3 shows as an example the communication factor question with its five attributes that were developed as closely as possible to the original alignment maturity model. The respondents were asked to rate the elements affecting the alignment of each factor on a five-point Likert scale where '1' was the least relevant and '5' was the most relevant. The questionnaire was kept short in order to increase the responses to the questionnaires (Kitchenham and Pfleeger, 2003).

Table 4-3 Survey question example: Attributes of communication

Communication:
This refers to the exchange of ideas, knowledge and information among the IT and business managers, enabling both to have a clear understanding of the organization's strategies, business and IT environments.
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).

Attributes	1	2	3	4	5
Understanding of business strategies by the IT department	☐	☐	☐	☐	☐
Understanding of IT capabilities by the business department	☐	☐	☐	☐	☐
Knowledge sharing between organizational levels from strategic to operational and with business partners (e.g. other commercial entities such as suppliers, customers, etc)	☐	☐	☐	☐	☐
Conducting regular meetings between IT and business departments to discuss IT priorities, requirements and implementation	☐	☐	☐	☐	☐
Creating a communication environment that promotes freedom to express opinions about business and IT strategies in a flexible and informal way	☐	☐	☐	☐	☐

4.3.4 Survey Administration

The final survey was sent to various organisations around the world. Many organisations were requested to participate in the survey by telephone to achieve a better response rate. 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) were contacted which significantly improved the response rate. A total number of 161 responses were collected from organisations all over the globe. For the data analysis only complete surveys were included. SPSS was used to screen the data to identify missing values and outliners resulting in 104 complete and valid responses. The data was validated to find out if the parametric assumptions of normality, homogeneity of variance, interval data and independence were met as reported in Appendix A3.

Table 4-4 provides a list of the geographical areas where responses came from. It was not the intention of this research to find any correlation between geographical areas or countries. Thus, the information provided in Table 4-4 is simply to provide a better idea of the scope of this study.

Although there are many different ways of defining an SME, varying from size (number of employees) to revenue and other variables, a major factor that is repeatedly mentioned in the strategic alignment literature is communication. Therefore, based on the assumption that communication can be affected by organisational size this research defines an SME based solely on this variable. The European Union suggests small organisations to be in the range of 1 to 250, and large companies from 251 and above (European Commission, 2008). There are, however, other sources that use alternative scales for organizational size. For example Levenburg et al. (2005) divides small organisations into small (11-50 employees) and micro (0-10 employees). Based on the fact that many scales can be used to define organisational size, a further analysis of the data was performed to observe any other patterns. Some differences were identified when analysing the company size from 0 to 250, 251 to 5000, and more than 5000 (further sections expand on this analysis). Considering this information, organisational size was redefined as follows: small (up to 250 employees), medium organisations between 251-5000 and large organisations more than 5000 employees. This scale will be used consistently when referring to small, medium and large enterprises throughout the rest of this thesis.

Table 4-4 Survey respondent profiles

Location \ Organizational size	Small (1-250 employees)		Medium (251-5000)		Large (>5000)	
	# of respondents	% of respondents	# of respondents	% of respondents	# of respondents	% of respondents
Europe	12	11.54%	12	11.54%	11	10.58%
North and South America	4	3.85%	11	10.58%	5	4.81%
Oceania/Asia	1	0.96%	1	0.96%	1	0.96%
Africa	8	7.69%	12	11.54%	26	25.00%
Total	**25**	**24%**	**36**	**35%**	**43**	**41%**

Table 4-4 shows that nearly one quarter (24%) of the responses were from small organisations, 35% from medium organisations between 251-5000 and 41% from large organisations with more than 5000 employees.

4.3.5 Results and Discussion

After the pilot test on the survey, three main goals were redefined for the data analysis. First, to identify which attributes were significantly related to each factor as a reliable attribute. Second, to identify whether small, medium and large

enterprises have different perceptions as to which of the factors described in SAM are more relevant in attaining IS alignment, and third, whether there are any correlations between the factors and the planning integration strategy adopted in the organisations.

Table 4-5 Factor loading

Pattern Matrix(a)						
		Component				
		1	2	3	4	5
COMM5	Creating a communication environment that promotes freedom to express opinions about business and IT strategies in a flexible and informal way	0.808				
COMM4	Conducting regular meetings between IT and business departments to discuss IT priorities, requirements and implementation	0.754				
PART3	Using IT to enable and drive business strategies	0.654				
PART5	Sharing a long-term relationship between IT and business that enables trust	0.585				
COMM3	Knowledge sharing between organisational levels from strategic to operational and with business partners (e.g. other commercial entities such as suppliers, customers, etc)	0.574				
PART4	Considering IT to be a significant part of business, not just a cost centre for doing business	0.528				
PART1	Involving IT department in developing business strategies	0.405				
ARCH1	IT is able to provide integrated information systems across the organisation and with business partners		0.780			
ARCH2	IT is able to provide a flexible infrastructure that enables fast response to changes		0.726			
SKILL4	Willingness or readiness to adopt technological changes		0.708			
ARCH4	IT is able to enable or drive business processes and strategies with a broad scope of information systems		0.667			
ARCH3	IT is able to evaluate and apply emerging technologies effectively		0.611			
SKILL1	Providing formal opportunities to learn both IT and business skills		0.580			
SKILL2	Providing formal training before implementing a new IT project		0.503			
ARCH5	IT is able to provide information security		0.471			
COMM2	Understanding of IT capabilities by the business department			0.601		
SKILL5	Trusting social and political culture			0.595		
SKILL3	Providing career crossover opportunities among business departments			0.583		
GOV4	Conducting steering committees to prioritise IT projects				0.890	
GOV5	Evaluating IT investments before and after implementation				0.699	
GOV2	Linking IT projects with the integrated business-IT plan				0.693	
GOV3	Reviewing business priorities before adopting any IT project				0.652	
PART2	Sharing of risk and rewards by IT and business management in relation to IT projects				0.443	
VALUE4	Making effective use of measurements obtained from the metrics application					Dropped
VALUE5	Using selected metrics on a regular basis					Dropped
VALUE1	Selection of appropriate metrics for the organisation					Dropped
VALUE3	Application of metrics at different organisational levels					Dropped
COMM1	Understanding of business strategies by the IT department					Dropped
VALUE2	Balancing of metrics by linking Business and IT metrics					Dropped
GOV1	Integrating the enterprise's business plan and IT plan					Dropped
Extraction Method: Principal Component Analysis. a. Rotation converged in 19 iterations.						

Factor Analysis

Factor analysis was conducted to validate the attributes are grouped consistently into the proposed factor. Despite the fact that the results in Table 4-5 show a different pattern to the expected six factors in the SAM model, the analysis of the reliability test (Appendix A.6) provided the confidence to keep the six original factors on the SAM model. The reliability test demonstrated good internal consistency (Cronbach's Alpha general accepted values 0.7-0.8) according Field (2009) recommendations as illustrated in Table 4-6.

Table 4-6 Reliability test

Factor	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
COMMUNICATION	0.845	0.846	5
IT VALUE	0.923	0.923	5
IT GOVERNANCE	0.881	0.884	5
PARTNERSHIP	0.875	0.878	5
SCOPE AND ARCHITECTURE	0.872	0.873	5
HUMAN RESOURCES SKILLS	0.845	0.846	5

However, the factor analysis results are taken in consideration for the preliminary model as explained follows. Table 4-5 depicts five components in total. A close relationship between communication (COMM) and partnership (PART) is identified in the component 1. This relationship is likely to exist both factors involve the interaction between business and IS to improve the levels of trust and understanding of each other's environment.

Similarly for component 2 that groups human resources skills (SKILL) and scope and architecture (ARCH) are closely related as they represent two types of resources. However, for the preliminary model proposed in Section 4.6 all the factors are kept consistent with the SAM model (Luftman, 2000).

Component 3 has only three variables (COMM2, SKILL5 and SKILL3) that are related to cultural aspects of the organisations, there is not support to create a new factor at this stage, however, this relationship will be further explore in the testing phase. An interesting interrelation is observed for component 4, where the sharing of risk and rewards by IS and business (PART2) contribute to IT governance (GOV) instead of partnership. Therefore, this relation is taken into consideration for the preliminary model in Section 4.6.

Finally, for component 5 all the IT value variables (VALUE) were grouped together with negative loading. Additionally, the reliability test for IT value (VALUE) is α=.92 which indicates the attributes for IT value may be redundant. After reviewing the attributes of IT value factor, a decision was taken to drop them as they were not representing unique information to characterise IT value.

However, it can be observed the integration of the enterprise's business plan and the IS plan attribute (GOV1) was included as well in this component and required further analysis as it does not represent an attribute for any of the factors. Section 4.3.2 explained planning integration is considered to have a highest impact on all the factors and Reich and Benbasat (2000) concluded the connections between IS and business planning processes were preconditions for alignment. Therefore, this attribute (GOV1) is confirmed as an independent variable and will be further analysed in the next section to evaluate its influence and impact.

Relevance of Factor Affecting IS Alignment by Organisational Size

In Table 4-7 only the mean of governance factor varies significantly in large organisations that placed more emphasis on this factor than did medium sized or small organisations. However the relationship between organisation size and the alignment factors was also tested with six separate ANOVAs (Appendix A.7), one for each factor as shown in Table 4-7. The factors were found to be equally relevant regardless of the organisation's size because the differences between the means are not significant (Sig. > 0.05). These results suggest that although small and medium enterprises have different characteristics in terms of resources and IS expertise than large organisations, the factors proposed to assess alignment in large organisations such as SAM are also relevant to small and medium enterprises.

Table 4-7 Factor relevance by organisational size

	Mean			*Global mean*	*Std deviation*	*Organisation's Size ANOVA*	
Factors	*Small*	*Medium*	*Large*			*F*	*Sig.*
Communication	3.80	3.71	3.88	3.80	0.81	F(2,84)=.425	0.656
Competency/Value measurement	3.36	3.42	3.68	3.52	0.98	F(2,74)=1.08	0.369
Governance	3.75	3.70	4.05	3.86	0.87	F(2,81)=1.95	0.157
Partnership	3.71	3.53	3.85	3.71	0.88	F(2,77)=1.30	0.295
Scope and Architecture	3.70	3.52	3.85	3.70	0.88	F(2,86)=1.45	0.243
Skills	3.53	3.32	3.59	3.48	0.84	F(2,94)=1.05	0.342

IT governance, as defined in SAM, relates to the degree to which the authority for making IS decisions is defined and shared among management. It includes setting IS priorities and allocating IS resources. One way of interpreting the fact that

governance received highest scores in large organisations is by noting that large organisations tend to have well defined and usually large IT units, thus it makes sense that they rank this factor to be important to attain alignment. On the contrary, small and medium enterprises tend to have small IT units and/or to outsource IT, thus the emphasis that they put on this factor is not as important as for large organisations. In spite of this difference, a general statement that can be made from the analysis of this data is that regardless of size, organisations tend to interpret the factors that can help them to achieve better levels of business and IS alignment in a very similar way. It can also be noted that there are no significant differences to the values given to each factor, which leads one to think that all factors are equally important for attaining alignment.

Distribution of planning integration by organisational size

A second goal was to identify the impact of planning integration on the alignment maturity factors. Three IS-Businesses planning integration stages were considered: independent, sequential and simultaneous. As can be seen in Table 4-8, a higher percentage of organisations have sequential planning integration in contrast with medium organisations which show simultaneous planning.

The results show (see Table 4-8) that small and large organisations tend to practise sequential planning integration (41.67 and 59.52 per cent respectively) in contrast with medium organisations which show simultaneous planning (48 per cent). These results were unexpected considering the following. Planning integration strategies are thought to evolve. This is, organisations start with independent planning to then move to sequential and finally reach simultaneous planning, considered the best strategy to attain alignment. It then can be assumed that mature or large organisations, would have reached a simultaneous planning strategy, which is the highest level of evolution. The results, however, did not reflect this assumption. One possible explanation is that simultaneous planning requires a high level of coordination between business and IS people and considering the size of large organisations (more than 5,000 employees) this may

not be a very effective strategy, thus sequential planning prevails in these organisations.

Table 4-8 Distribution of planning integration in SMEs and large organisations

	Respondents					
	Small		*Medium*		*Large*	
IS-Business Planning integration	*#*	*%*	*#*	*%*	*#*	*%*
Independent (IS strategy formulation and business strategy formulation are separate, unrelated processes)	7	29.17%	8	22.86%	10	21.43%
Sequential (IS strategy formulation follows and supports business strategy formulation)	**10**	**41.67%**	11	28.57%	**25**	**59.52%**
Simultaneous (IS strategy formulation and business strategy formulation are done concurrently)	7	29.17%	**17**	**48.57%**	9	19.05%
Total	**24**	**100%**	**36**	**100%**	**44**	**100%**

Following the same argument, it could be assumed that small organisations are better suited to a simultaneous strategy due to the small number of employees. The results, however, did not clearly reflect this since sequential scored the highest ratings amongst small organisations. Small organisations, however, the group where the differences between strategies were spread more equally, having independent and simultaneous with the same score (29 per cent) and sequential only 12 per cent higher (41 per cent). This suggests that although small organisations tend slightly towards sequential planning, there is not a clear tendency towards any of these three.

Relevance of Factor Affecting IS Alignment by Planning Integration

Similarly, the relationship between planning integration and the strategic alignment factors was tested with six separate ANOVAs (Appendix A.8), one for each factor. Each of the factors was found to differ significantly by planning integration (Sig. < 0.05), as shown in Table 4-9. Firms that engaged in independent planning rated each strategic alignment factor as less important than firms that engaged in sequential or simultaneous planning did.

Table 4-9 Relevance of factors by organisational size and planning integration

	Mean					*Planning integration ANOVA*	
Factors	*Independent*	*Sequential*	*Simultaneously*	*Global mean*	*Std deviation*	*F*	*Sig.*
Communication	3.33	3.99	3.89	3.80	0.81	F(2,74)=6.06	0.004
Competency/Value measurement	2.99	3.64	3.75	3.52	0.98	F(2,55)=5.29	0.014
Governance	3.26	4.01	4.10	3.86	0.87	F(2,70)=8.99	0.000
Partnership	3.19	3.90	3.85	3.71	0.88	F(2,61)=6.38	0.005
Scope and Architecture	3.37	3.72	3.93	3.70	0.88	F(2,70)=3.02	0.058
Skills	3.13	3.53	3.69	3.48	0.84	F(2,80)=3.40	0.037

At first glance it may be observed that the data matches the current literature in the sense that the value organisations give to the factors increases as the planning strategy evolves. This suggests that the more attention an organisation gives to these factors, the better chance they have of reaching the highest level of planning integration and alignment. The results of this survey showed some interesting findings for academics and practitioners concerned with strategic alignment theories. For example, although small and medium-sized enterprises have different characteristics in terms of resources and IT expertise than large organisations, the factors that have been found relevant to attain alignment seem to be relevant for all organisations regardless of their size. This suggests that, although current studies in alignment have not explored the differences between large and small organisations in much detail, most of the theories around alignment can be applied to small and medium-sized organisations with some confidence. More specifically, it can be said that the strategic alignment model (SAM) proposed by Luftman could be applied to SMEs with an expectation of obtaining similar results to large companies.

The analysis of the results in relation to planning integration strategies rendered more interesting findings. The analysis strongly suggests that companies adopting a simultaneous strategy can improve the chances of making better use of IS, and thus attain enhanced levels of alignment. The results showed, though, that this type of strategy is not common among small companies. Small companies should perhaps reflect on their strategic practices and consider a simultaneous approach as offering the possibility of improved alignment. To support this argument, it can be seen that medium-sized companies tend to adopt a simultaneous approach, and

since these exhibit many similar characteristics to small companies, it may be assumed that this is a feasible approach in the context of small enterprises. In addition, organisations that follow a simultaneous approach scored governance as the most relevant factor. This suggests IT governance is a mechanism that may improve not only alignment but all the other factors. Small companies that have neither an IT manager nor an IT department could find difficult to consider simultaneous planning. However, these results should perhaps change this practice and encourage a better partnership between small organisations and their external IT experts thus leading to simultaneous planning.

4.4 Exploratory Studies Conclusions

The results provide evidence that the factors included on the SAM model (Luftman, 2000) can help organisations to assess their IS alignment at strategic, tactical and operational levels and to identify those areas of concern that need further improvement. However, the recognition and analysis of limitations and problems encountered represents the most significant learning from the exploratory studies and this is discussed below in terms of the implications for methodology, theory and practice.

4.4.1 Implications for the Research Approach

Site selections

All the factors showed equally relevance for small, medium and large organisations. Consequently there may be more confidence in applying the SAM model to any of these types of organisations. However, for the site selection it is important to take into consideration the existence of strategic direction and, if possible, a simultaneous planning integration approach.

Empirical Settings

It was found during the interviews that some of the inconsistencies in results between organisational levels can be explained by the different experience the participants have of IT projects. This suggests that it is important to take into

account the fact that each project may have a different level of alignment, and thus the data obtained can be biased. One possible solution to improve the unit of analysis is to use the same constructs and attributes for strategic, tactical and operational levels but customising the questions according to the level of analysis context. Top managers who are close to the strategy formulation will answer the questions referring general management practice in the organisation. Tactical and operational managers who are closer to the detail of the strategy implementation will answer the questions referring to the actual practices used for specific strategic IT projects. Therefore, the addition of the analysis of total of projects selected may provide a more realistic picture of the level of alignment at tactical and operational levels that can be compared with strategic views.

Despite the fact that the electronic tool has an option to manage participants responses linked with their e-mail plus the fact that each participant was addressed personally before sending them the questionnaire link, it is not possible to ensure who answered the questionnaire which reduces the credibility of data. Additionally, participants were asked to select which organisational level they belonged to and there was no way of validating this information.

To overcome this difficulty face-to-face questionnaire completion is recommended when possible. Additionally, to identify the level of decision-making of the participants the post title and functions should be provided and documentation related to the organisational structure obtained.

Sample Design

The analysis of alignment according to the coevolutionary model presented in Section 1.3.5 involves horizontal (business and IS) and vertical (strategic, tactical and operational) analysis. However, the sample was not well balanced and most of the participants belonged to IS groups at strategic and tactical level. For future design it is important that sample design considers the balance between business and IS participants as well as the balance between participants at strategic, tactical

and operational levels in order to be able to do comparisons of both horizontal and vertical alignment.

Interviews

One limitation of the pilot case study was that only one formal interview was feasible. However, from that interview the relevance of qualitative data to improve the data analysis process was noted. The introduction of formal interviews to discuss the questionnaire results by participants would help to overcome this limitation which also would help to overcome the participants verification of identity mentioned above. Additionally, a group session to discuss the overall results may provide valuable information to gain a better understanding of the alignment phenomena.

Instrument improvement

The main limitation of the pilot case study was the instrument reliability. Although each question was designed from the theoretical constructs proposed in the SAM model, each variable is open to many interpretations and therefore many questions were needed to cover the attributes. The data processing of the questionnaire to calculate the maturity level was also influenced by the interpretation of the researcher as not all the questions have a direct maturity scale 1-5. In order to overcome these difficulties further validation of the constructs and their operationalisation was conducted in exploratory Study 2 reported in Section 4.3.

Exploratory Study 2 validated the attributes with significant relevance to assess each factor and suggested initial relationships between different attributes. The next step was to use this information to improve the instrument to assess IS alignment at strategic, tactical and operational levels. However, by the time the results were ready to initiate the assessment instrument improvements, new literature was available. A validated instrument for the SAM model was published (Sledgianowski et al., 2006). Therefore the author was contacted to obtain the full instrument version in order to evaluate its use as one of the various sources of

information for the testing phase. The analysis of the validated instrument is presented in Section 4.5.

4.4.2 Implications for Theory

Relevance of factors affecting IS alignment

The alignment maturity model proposed by Luftman (2000) gives equal relevance to the six factors in the model. However, the results suggest some factors may have more relevance than others. From participants' views prioritisation showed significant differences. However, it is not clear if these come from the level of analysis (strategic, tactical and operational) or from structural factors like organisational size. Further investigation is needed to reveal the interrelations between the factors and even between specific attributes. The exploratory studies suggest some preliminary interrelationships.

Factors interrelationships

Although all the factors are considered equally relevant to achieve alignment (Luftman, 2000), the exploratory studies suggested business-IS planning integration is a pre-condition for the relevance of the factors. As the organisations evolve their planning integration the factors affecting IS alignment are seen as more relevant. Additionally, organisations that have integrated their planning scored highest the IT governance, communication and partnership. These factors require special attention during the testing phase to identify the impact of relationships. However, IT governance seems to be the mechanism that triggers the improvement in the rest of the factors. Communication and partnership are closely related but it is not clear if any of the attributes have a special impact. Share of risk and rewards attribute that belongs to partnership was identified as highly correlated with IT governance.

Organisational size

As explained in the structural dimension of alignment (Section 1.2.4) there are different aspects that influence alignment such as location of IS decision-making rights, organisational culture, etc. The pilot case study was conducted in an SME

and some questions were not applicable to the SME context suggesting that this needed to be taken in consideration. Therefore, further investigation was needed to evaluate the impact of organisational size on IS alignment factors.

4.4.3 Implications for Practice

Priority of the factors

Results suggest that organisations interested in improving their IS alignment should focus on improving their planning integration process and use IT governance as a mechanism to trigger the improvement of the rest of the factors. Additionally, mechanisms to improve the sharing of risk and rewards between business and IS should be improved to support the impact of IT governance.

Participants' time

Organisations are reluctant to participate in research projects, especially when involves top managers' time. One problem with the instrument was the time it takes to complete. For managers who conscientiously answered each question it took about 1 hr 15 minutes to complete the questionnaire. This could be a reason why they were not willing to participate in follow-up interviews. Any desire to improve the instrument has to take account of the fact that the target audience are top managers and therefore the length of the questionnaire and ease of use are crucial.

Practical results

Designing practical results that represent benefit for organisations participating is critical in obtaining the organisation's approval. The pilot study provides evidence that a once the instrument is improved with the aforementioned considerations, reliable practical results can be obtained to learn more about the organisation, getting feedback for areas of concern and possible actions may be suggested if sufficient support is available.

4.5 Instrument to Assess Maturity of IS Alignment

The validated assessment instrument (SAM instrument) developed by Sledgianowski et al. (2006) to assess the maturity levels of IS alignment was concluded to be a reliable diagnostic tool for organisations. Therefore, both results were compared as shown in Table 4-10. It can be observed that SAM instrument's validation dropped some variables that were not significantly correlated with the corresponding factor resulting in a final total of 22 variables. Most of the remained variables were associated with the variables used in Study 2 in this research and some results were consistent. For example, the planning integration attribute was discarded in both results as not significantly measuring the factor. Conversely to SAM instrument's validation, the data from Study 2 in this thesis found a positive correlation of planning integration suggesting that as organisations evolve their planning integration they give more relevance to the factors affecting IS alignment. Additionally, no correlation was found with organisational size, suggesting the factors are equally relevant for small, medium and large organisations. Therefore, the SAM instrument represents a valuable tool that can be used to extend the analysis of the factors to tactical and operational levels in the context of small, medium and large.

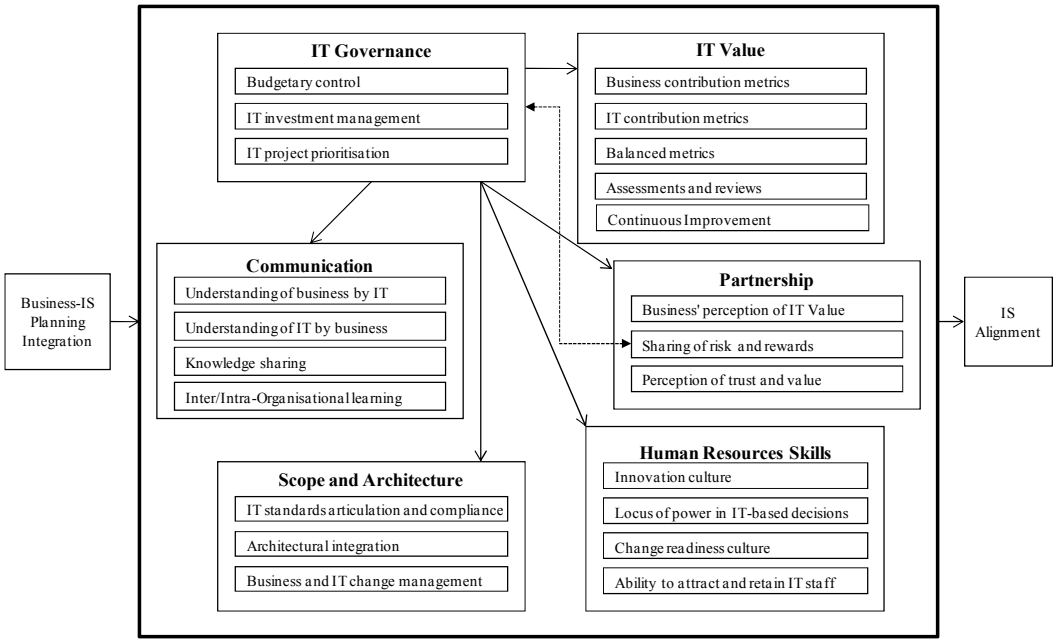
Table 4-10 Attributes comparison

CFA Loading	Factors/Attributes from Validated Instrument for SAM Model Sledgianowski et al. (2006)	Related attribute in this thesis (Study 2: Survey)
	COMMUNICATION	
0.67	Degree of understanding of business by IT	Understanding of business strategies by the IT department
0.67	Degree of understanding of IT by business	Understanding of IT capabilities by the business department
0.64	Degree of knowledge sharing	Knowledge sharing between organisational levels from strategic to operational and with business partners
0.52	Degree of richness of methods used for Inter/Intra-Organisational learning	Conducting regular meetings between IT and business departments to discuss IT priorities, requirements and implementation
Dropped	Communication Style used within the organisation	
Dropped	Use of IT-business liasons	
	PARTNERSHIP	
0.63	Business' perception of the role of IT	Considering IT to be a significant part of business, not just a cost centre for doing business
0.63	Integrating sharing of risk and rewards	Sharing of risk and rewards by IT and business management in relation to IT projects
0.85	Perception of trust and value	Sharing a long-term relationship between IT and business that enables trust
Dropped	Role of IT in strategic business planning	
Dropped	Formality and effectiveness of partnership programs	
Dropped	Reported level of business sponsor/champion	
	VALUE MEASUREMENT	
0.67	Focus business contribution metrics	
0.69	Focus on IT contribution metrics	
0.81	Degree of business and IT metrics integration	Balancing of metrics by linking Business and IT metrics
0.69	Frequency and formality of assessments/reviews	Using selected metrics on a regular basis
0.66	Degree of continuous improvement practices	Making effective use of measurements obtained from the metrics application
Dropped	Degree of service level agrements	
Dropped	Frequency and formality of benchmarking practices	
Dropped	Contribution of IT to strategic goals	
	IT GOVERNANCE	
Dropped	Degree of business strategic planning with IT participation	Set as a precondition for the factors affecting alignment relevance
Dropped	Degree of IT strategic planning with business participation	
0.72	Integration of IT project prioritization	Conducting steering committees to prioritise IT projects
0.76	Basis of IT investment decisions	
0.64	Basis of budgeting IT resources	
Dropped	Frequency formality and effectiveness of IT steering committees	
Dropped	IT function's responsiveness to changing business needs	
	SCOPE AND ARCHITECTURE	
0.71	IT standards articulation and compliance	
0.82	Degree of architectural integration	IT is able to provide integrated information systems across the organisation and with business partners
0.58	Degree of infrastructure transparency	IT is able to provide a flexible infrastructure that enables fast response to changes
Dropped	Degree of infrastructure flexibility	
Dropped	Technology and strategic sophisitication of primary systems/applications	
	HUMAN RESOURCES SKILLS	
0.74	Degree of an innovation culture	Willingness or readiness to adopt technological changes
0.66	Degree of integrated locus of power in IT-based decisions	
0.71	Degree of change readiness culture	
0.68	Ability to attract and retain IT staff with technical and business skills	
Dropped	Degree of opportunity for skills enrichment through job transfer	
Dropped	Degree of opportunity for skills enrichment through cross-training or job rotation	
Dropped	Degree of interpersonal interactions across IT and business	

4.6 Preliminary Model

The SAM model suggests all the factors have the same impact on alignment. However, the exploratory studies suggested there are complex interactions as proposed in the preliminary model illustrated in Figure 4-4. Drawn from the conclusion of the two exploratory studies, the model depicts how business and IS planning integration act as pre-conditions for the factor to be consider relevant and therefore improved. Improvements in the IT governance factor have a positive impact on improvement of the rest of the factors. IT governance in turn seems to be impacted by the level of sharing of risk and rewards. These relationships will be tested in the following chapters.

Figure 4-4 Preliminary model: Interrelationships between the factors affecting IS alignment



4.7 Summary

Two exploratory studies were conducted to be able to propose a preliminary model. A pilot case study allowed better understanding of the factors affecting IS alignment in its environment. Lessons learned from this pilot case study are related to the empirical design, the instrument limitations and the re-conceptualisation of IT projects as the unit of analysis. Then a survey was applied

to address the instrument limitations, to establish the relevance of the constructs and possible interrelationships between the variables.

The key findings for the exploratory studies illustrated on the preliminary model (Figure 4-4) are:

- Business-IS planning integration is a pre-condition for the factors' relevance
- IT governance may be the mechanism that triggers the improvement of the rest of the factors.
- Sharing of risk and rewards is closely related to IT governance.
- Factors are equally relevant for small, medium and large organisations.

These relationships were obtained through the analysis of the exploratory study 1 (survey). However, there data does not reveal the reasons behind those relationships and will be explored during the testing and evaluation phase.

"The strongest arguments prove nothing so long as the conclusions are not verified by experience. Experimental science is the queen of sciences and the goal of all speculation."

Roger Bacon (1214-1294), English Philosopher

Chapter 5 TESTING PHASE: EMPIRICAL DESIGN AND DATA COLLECTION

5.1 Overview

The purpose of this chapter is to test the preliminary model presented in Chapter 4. In doing so, the empirical design involved a process of assessing the IS alignment maturity at strategic, tactical and operational levels, with special focus on the analysis of strategic IT projects. The assessment process is twofold, first, to obtain practical results organisations can use as a roadmap of areas of concern that require attention, second, those areas of concern would provide the researcher with initial insights for the data analysis. Two case studies were conducted using the assessment process and the results are presented.

5.2 Empirical Design Considerations

The exploratory phase provided the preliminary model and various recommendations for the testing phase. These recommendations are incorporated in this chapter in order to be able to answer the following questions:

RQ 8: Which factors/attributes cause high or low levels of IS alignment?

RQ 9: Why are some strategic IT projects more or less aligned with business strategy?

RQ 10: How can practitioners' assess IS alignment and makes use of the results?

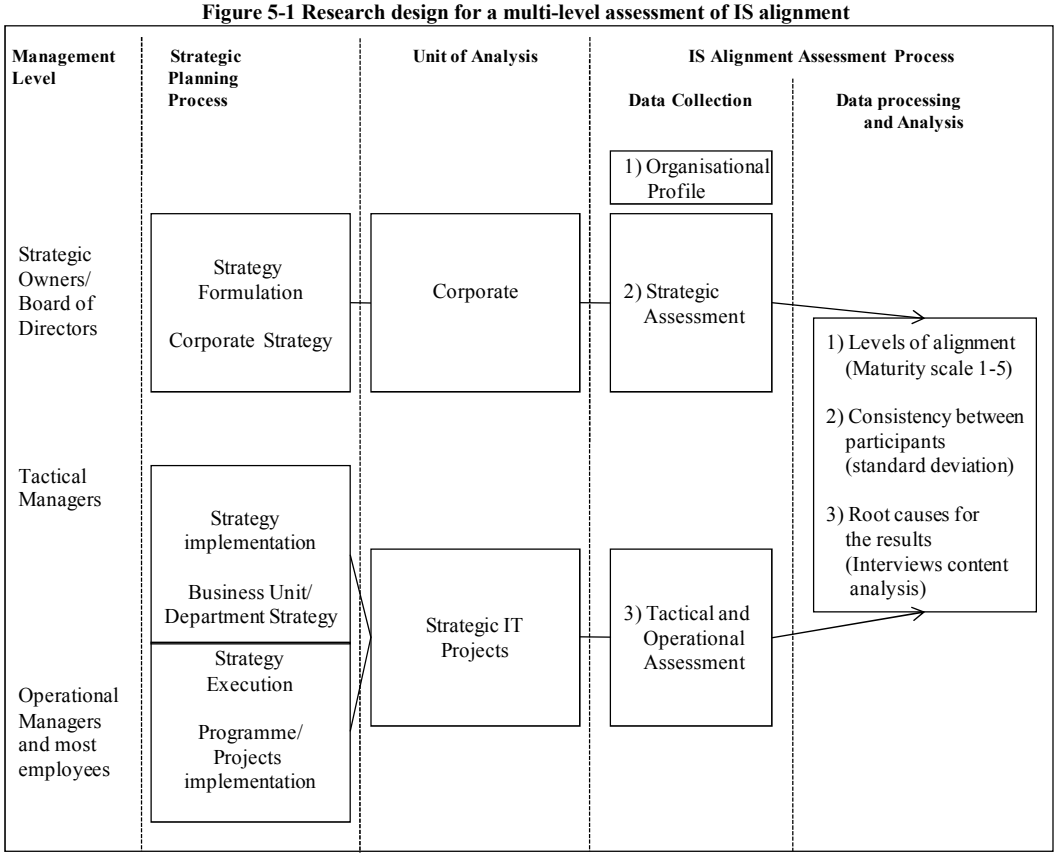
In Chapter 1 it was argued that alignment has been mainly investigated at strategic level leaving a gap at the level of strategy implementation (Lycett et al., 2004; Srivannaboon, 2006). Furthermore, the complexity of projects with high IT involvement makes the connections between strategy formulation and strategy implementation more critical (Sauer and Reich, 2009). Figure 5-1 illustrates the empirical design for the assessment of IS alignment maturity at strategic, tactical and operational levels and the following sections explain the rationale of the design.

5.2.1 Management Views and the Strategic Planning Process

The view of IS alignment as a continuous coevolutionary process at three levels of analysis presented by Benbya and McKelvey (2006) is taken into consideration to analyse the top-down and bottom-up dynamics between business and IS. Therefore a multi-level analysis is incorporated to compare strategic, tactical and operational management views as shown in Figure 5.1. There is a correspondence between the strategic, tactical and operational *management levels* with the *strategic planning process* (formulation, implementation and execution). In

Section 1.1, the different stages of the planning process were explained from strategic formulation to implementation which is mapped with the strategic, tactical and operational levels. At a strategic level, the business environment is constantly scanned to verify the business strategy fits the competitive environment. High levels of business planning are performed and strategic projects are proposed to achieve the business strategy. Then business units/departments perform their own planning process using the corporate strategy as a guide. This stage represents the tactical level and involves a more detailed planning process for strategy implementation. Once strategic projects are accepted and financial resources are allocated, the challenge of implementation is assigned to the project team. At this level (operational), managers are expected to have a good understanding of business strategy at strategic and tactical level in order to implement the project to achieve business goals.

Figure 5-1 Research design for a multi-level assessment of IS alignment



Another important consideration is the unit of analysis. In Section 4.4 the relevance of selecting the appropriate unit of analysis at operational level was explained. Managers at tactical and operational level are closest to the detail of IT projects and therefore able to describe and assess the management practices in place. However, participants' variance in the pilot case study was very high due to the different experiences depending on which projects the participant had been involved in. In order to avoid misleading information strategic IT projects were selected as the unit of analysis.

5.2.2 Enterprise and Strategic IT Projects as the Unit of Analysis

The views of IT projects explained by Sauer and Reich (2009) in Section 1.4.3 influence the dynamics between business and IS and their relationship with managers at strategic and tactical levels. Previous alignment assessment studies collect data mainly from strategic and tactical managers. In those studies the *unit of analysis* is the enterprise, managers assess the general organisation's management practices. For this investigation the general management practices are collected only at strategic level where the senior managers have a broad view of the whole enterprise. Consequently the SAM instrument for the *strategic assessment* is used as proposed by (Sledgianowski et al., 2006). For tactical and operational levels the unit of analysis is strategic IT projects, which reflect management practices during the implementation. The SAM instrument was adapted for this purpose as explained in the following section.

5.2.3 Instrument Design Considerations

The validated assessment instrument (SAM instrument) developed by Sledgianowski et al. (2006) to assess the maturity levels of IS alignment was concluded to be a reliable diagnostic tool for organisations and Section 4.5 discussed the appropriateness of using this validated instrument as one of the sources of information for the assessment process. The instrument is applied in a similar way to the author's approach for the assessment at strategic level.

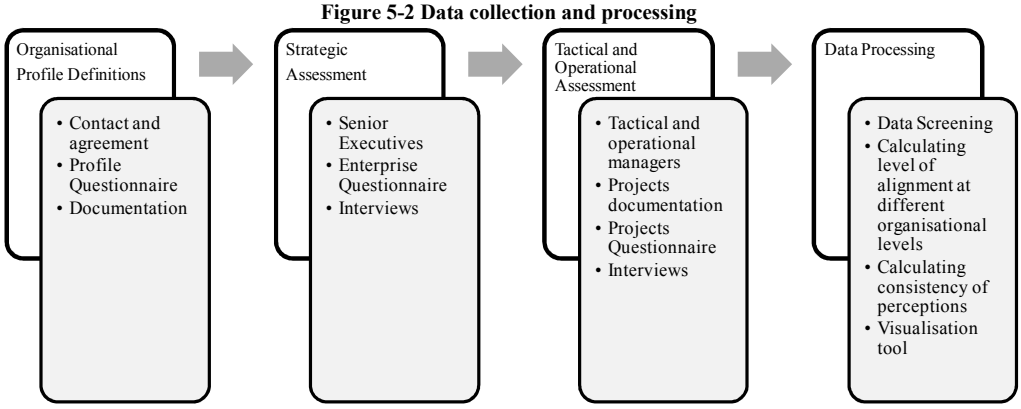
However, the questions were re-worded for the tactical and operational levels, where the IT projects are the unit of analysis.

The instrument structure has seven sections and examples of the original and adapted questions are included in Appendix B. The first section includes the participants profile and the following six sections correspond to each of the factors under investigation: communication, IT value, IT governance, partnership, scope & architecture, human resources skills. The original questions were given to senior managers and their views represent the whole organisation. For the tactical and operational level the questions were slightly adapted to focus the participant on actual practices they face during the implementation of specific projects. Each option given represents a level of maturity. Therefore the results at strategic levels are comparable with the results at tactical and operational levels.

5.2.4 IS Alignment Assessment Process

The *IS alignment assessment process* involves four stages as depicted in Figure 5-4, the initial stages are concentrated on data collection and the last one is the data processing and analysis. The methods used for data collection included questionnaire application, semi-structured interviews and the gathering of additional information from the project documentation. The rest of this section explains the objective of each stage.

Figure 5-2 Data collection and processing



IS alignment profile definition

In this stage the business environment for the study is identified. Data is collected regarding the organisation's industry, size, age, business and IS objectives, organisational structure, decision processes, culture, planning integration type and planning time horizon. Possible participants and strategic project(s) to be included are identified or requested.

Strategic Assessment

Stage two involved the assessment of IS alignment considering the organisation's general management practices. Data collected identifies the alignment from both business and IS senior executives' perspectives through an enterprise questionnaire and semi-structured interviews.

Tactical and operational Assessment

In the final stage key strategic projects are selected as the unit of analysis to identify management practices for the strategy implementation. Data collected identifies the alignment from both business and IS managers' perspectives who have both tactical and operational roles. Project documentation, project questionnaires and semi-structured interviews are used for this stage.

Data Processing

The different sources of information are processed to calculate the level of maturity of the organisation at strategic, tactical and operational levels. From the maturity level high and low scores are analysed and compared with the consistency between the participants in each factor. Documentation and interview analysis provide in-depth understanding to provide the organisation with a roadmap of potential areas of improvement.

To facilitate the identification of areas of concern due to low maturity or inconsistency between participants a colour coded visualisations technique was developed. There are two criteria for the coding: the level of maturity and the participants' standard deviation. Firstly, given an overall level of alignment maturity, score ranges are selected. For each case study the score ranges are

customised and Table 5-1 shows an example of ranges for an organisation with an overall maturity of 3.2. All the factor/attributes in level three or above are considered strong and coded green. Those attributes that range from 2.9 to 2.6 imply a half level of maturity below and therefore a warning yellow colour was assigned. A red colour was assigned to those attributes that are at level 2.5 of maturity or below as they represent almost a whole level of difference with the overall maturity and represent an area of concern. Secondly, for the standard deviation, if the participants' perception depicted high standard deviation this reflects inconsistency between the participants and a similar colour code was assigned to identify in red those attributes where the participants show a high discrepancy, through a standard deviation greater than 1.5. A project may obtain a high level of maturity but the participants may disagree and consequently the attribute requires further analysis.

Table 5-1 Example of scores used to visualise IS maturity and consistency

	Score Ranges		
Criteria	Average	Marginal	Low
Business-IT Alignment Maturity Level	Green >=3.0	Yellow 2.9 - 2.6	Red <= 2.5
Consistency of participants perception (StaDev)	Green 0.3-0.9	Yellow 1.0-1.5	Red >= 1.6

5.3 Case Study 1: SME UK

Exploratory phase conclude all the factors were equally relevant for small, medium and large organisations. Case Study 1 was conducted in a small organisation and these sections describe the application of the same assessment and results.

The company is an SME based in the UK (SME UK) that specialises in Facility Services. Although it is a relatively new (seven years) and small company, it handles large accounts and its expansion over the previous years has been exponential. Various partners around the world provide the services that are delivered. Thus, the company has a global clientele ranging in value from thousands to millions of US dollars. The major function of the company is as a consultancy, since it serves as a central hub for the various partners and clients. The clients initially communicate with the company, which consequently provides

all the necessary information needed and assigns the appropriate partners who will provide the actual service. Due to the nature of their service, information is the major asset of the company and IT is essential since it is used for communication, financial control and preparation of the service to be provided. Furthermore, IT is used for knowledge sharing and to provide a pool for information gathering. The company uses a matrix organizational structure, where all employees, except the directors, are engaged in cross-function projects. For example, a person from IT might also be engaged in a sales function, or even an accounting function. Decision-making is highly centralized, with decisions made only by top management and approved by the executive team. Finally, the executive team also makes the decisions relating to IS. The study was conducted over 3 months.

5.3.1 Data Collection

The methods used for data collection included questionnaires and semi-structured interviews. Eight questionnaires were applied and three semi-structured interviews were conducted. In this case, the organisation does not have an IT function. Therefore two participants from the external IT experts were included in the study to obtain the IS perspective. Participants were classified for this study according their positions as follows:

- **Strategic**. The strategic level category included participants that are closest to the corporate strategy and have director positions (2 participants).
- **Tactical**. For this category participants in charge of the strategy implementation with manager position were selected and also one external IT expert who is the director of the IT consultancy company was included (4 participants).
- **Operational**. This category included a tactical manager who is in charge of liaison with external IT experts and one external IT expert in charge of

the implementation of the project selected for the study. These two participants are closest to the details of the project (2 participants).

5.3.2 Results

The overall alignment maturity obtained for SME UK is 2.20 as it can be seen in Table 5-2. This result is lower than the average maturity alignment obtained by other organisations in the services industry (3.2) where similar assessment was applied (Luftman and Kempaiah, 2007a).

Table 5-2 IS alignment by maturity level

Factors affecting alignment	IS Alignment Assessment			Overall IS alignment maturity
	Strategic (2 participants)	Tactical (4 participants)	Operational (2 participants)	
COMMUNICATION	2.1	2.1	2.1	2.1
IT GOVERNANCE/IT VALUE	2.4	2.0	1.6	2.0
PARTNERSHIP	3.1	2.6	2.5	2.7
SCOPE AND ARCHITECTURE	1.8	2.0	1.4	1.7
HUMAN RESOURCES SKILLS	2.4	2.9	2.0	2.4
Overall business-IT alignment maturity	**2.3**	**2.3**	**1.9**	**2.2**

5.3.3 Project Analysis

An important observation is that despite the organisation recognising the relevance of IT, there was no IS representation in the executive team, and the executives did not have adequate IS knowledge. This resulted in many projects being started and later abandoned. For example, in 2005 a financial database was initiated in which all the partners were supposed to input their monthly financial information. The project was initiated by the executive team, but due to lack of knowledge and expertise, it was later put on hold, and the data became outdated and incomplete. Furthermore, the person that was employed to be in charge of IT had very little decision-making authority and had to go through several different levels to get a suggestion approved. The company faced many problems due, in part, to the fact that IT was not represented in top-level management or the executive team. Although information is the major asset of the company, no initiatives had been taken to enable knowledge sharing or management. Moreover, the information systems were outdated and data was unreliable. The structure of

the company and the fact that employees involved in IT were not dedicated to this function greatly lowered the importance of IT decisions and projects. An incident that was observed and was enlightening in this study, was the starting of a project regarding knowledge sharing. The person responsible for IT had suggested to the executive team the purchase of a knowledge-sharing solution to enable the sharing of information from various projects. The project was approved through the defined decision-making structure but on the day that the project was scheduled to start the decision was changed by one of the executive team members. A new solution was proposed, creating frustration and delays in the project. Finally, it was generally observed that due to the structure of the company and due to the fact that IT was not part of top-level management, and because skills were not utilized effectively, IT projects were usually late or abandoned, suggestions that could enable alignment were neglected, and IS could not assist in the development of strategies.

Figure 5-3 Factors/attributes results by business and IS groups

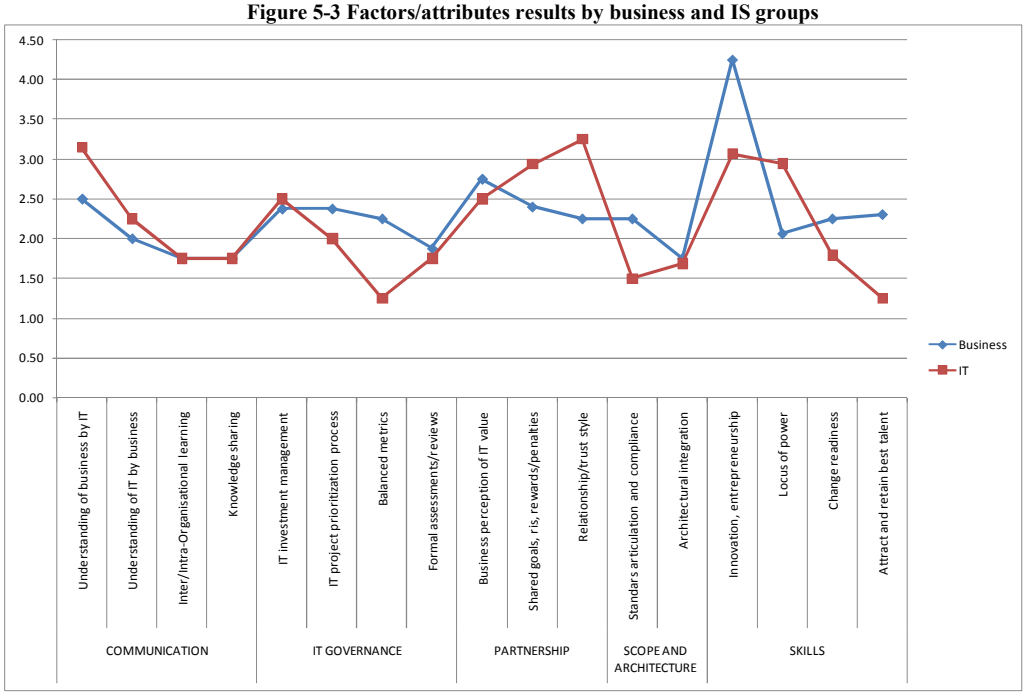
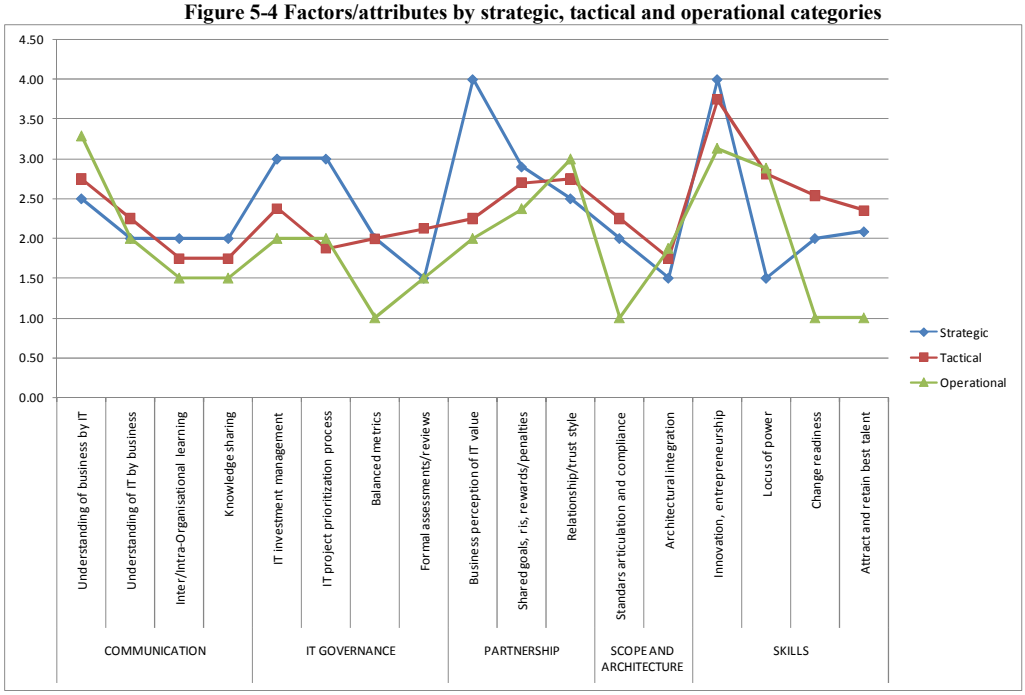


Figure 5-4 Factors/attributes by strategic, tactical and operational categories



5.3.4 Visualisation Tool

Results indicated the organisation had very low IS alignment maturity. In Section 5.2.5 the visualisation tool was explained and Table 5-3 indicate the score ranges used for SME UK.

Table 5-3 Score ranges for SME UK

	Score Ranges		
Criteria	Average	Marginal	Low
Business-IT Alignment Maturity Level	Green >=2.0	Yellow 1.9 - 1.6	Red <= 1.5
Consistency of participants perception (StaDev)	Green 0.0-0.5	Yellow 0.6-1.0	Red >= 1.0

The data is presented in Table 5-4. Despite the strategic level regarding IT as a valuable asset, the overall low levels of alignment suggest the organisation was not mature enough as their IT investment decisions are focused on productivity and efficiency rather on competitive advantage and therefore business and IS planning integration does not exist. This confirms that business and IS planning integration enables organisations to consider IS as strategy enabler.

Table 5-4 IS Alignment by maturity level by consistency of perception

		IS Alignment Maturity Level			Consistency of participants perception (StaDev)		
Factors	**Attributes**	**Strategic**	**Tactical**	**Operational**	**Strategic**	**Tactical**	**Operational**
COMMUNICATION	Understanding of business by IT	2.5	2.8	3.3	0.7	0.5	1.0
	Understanding of IT by business	2.0	2.3	2.0	0.0	0.5	0.0
	Inter/Intra-Organisational learning	2.0	1.8	1.5	0.0	1.0	0.7
	Knowledge sharing	2.0	1.8	1.5	0.0	1.0	0.7
IT GOVERNANCE / VALUE	IT investment management	3.0	2.4	2.0	1.4	1.1	0.0
	IT project prioritisation process	3.0	1.9	2.0	0.0	0.9	0.0
	Balanced metrics	2.0	2.0	1.0	0.0	0.8	0.7
	Formal assessments/reviews	1.5	1.5	1.0	0.7	0.8	0.0
PARTNERSHIP	Business perception of IT value	4.0	2.3	2.0	0.0	1.3	0.0
	Shared goals, risk, rewards/penalties	2.9	2.7	2.4	1.0	1.0	0.5
	Relationship/trust style	2.5	2.8	3.0	0.7	1.0	0.0
SCOPE AND ARCHITECTURE	Standards articulation and compliance	2.0	2.3	1.0	1.4	1.5	0.0
	Architectural integration	1.5	1.8	1.9	0.7	1.0	0.2
HUMAN RESOURCES SKILLS	Innovation, entrepreneurship	4.0	3.8	3.1	1.4	1.3	1.6
	Locus of power	1.5	2.8	2.9	0.7	0.9	0.2
	Change readiness	2.0	2.5	1.0	0.0	0.6	0.0
	Attract and retain best talent	2.1	2.4	1.0	0.1	0.8	0.0
	Overall matury per project	**2.3**	**2.3**	**1.9**			

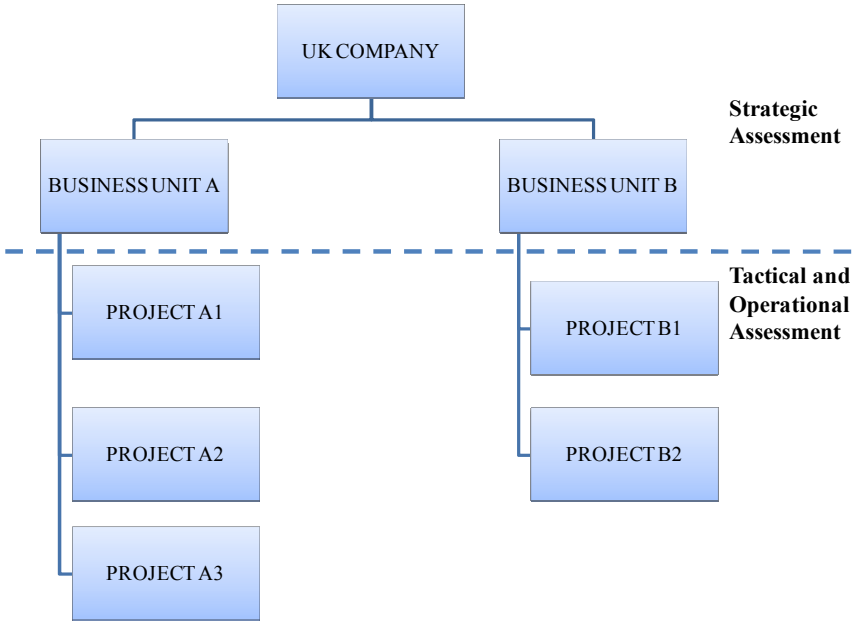
5.3.5 Case Study 1 Conclusions

SME UK behaves quite similarly to organisations at Level 2. However, two main differences were identified in the scope/architecture and skills factors. Organisations with levels 2 or 3 give less attention to the scope/architecture factor; conversely, organisations in level 4 have considered IT infrastructure as a resource to enable a faster response to the changing marketplace (Luftman and Kempaiah, 2007a). Due to the high level requirements of collaboration between SME UK and external partners, it is critical to develop an infrastructure that enables the same level of collaboration. Perhaps, leveraging IT infrastructure would advantage the level of communication in the organisation. Whilst the organisations is interested in obtaining business value from their IT investments, the low level of alignment in the SME, especially in IT governance, made difficult to obtain enough information. These results corroborate the IS alignment factors have no relevance when senior managers do not have clear strategic objectives for IS.

5.4 Case Study 2: UK COMPANY

This study was conducted in a large company in the insurance and finance sector (UK COMPANY). UK COMPANY is a wholly owned subsidiary that operates in the UK and Ireland, and occupies a leading position in its main markets: life insurance, health insurance and general insurance. With more than 13,000 employees, UK COMPANY has been a well-established organisation for 200+ years. The organisation has recently started efforts to improve IS alignment and agreed to participate in the study involving two business units (A and B). Five strategic IT projects were selected within the business units as shown in Figure 5-7. The study was conducted over a period of eight months.

Figure 5-5 Study scope: Business units and related projects



5.4.1 Data Collection

The methods used for data collection included questionnaires, semi-structured interviews and the gathering of additional information from the project documentation. Twenty seven face-to-face questionnaires were applied, semi-structured interviews were conducted with the same participants to analyse five strategic IT projects. One senior manager was interviewed at the end of the study

to discuss the research outcomes. A total of 28 participants were involved in the case study. There is a balanced representation of business and IS participants who were classified for this study according their positions as follows:

- **Strategic**. The strategic level category includes participants who are closest to the corporate strategy and have director/head positions at corporate or business unit level (4 participants).
- **Tactical**. Participants in charge of the strategy implementation with director/head positions within the sub-business unit were selected for this category (8 participants).
- **Operational**. This category included managers who are closest to the detailed projects (16 participants). Their positions vary from project managers, IT managers, senior IT developer, product manager, customer service manager, project sponsor.

5.4.2 Results

The results were processed using two methods, in order to provide practical results by defining a level of maturity and reasons behind the level obtained. Firstly, descriptive analysis of the questionnaire results was carried out to detect missing data and outlier effects as well as identify demographic characteristics of the sample. Once the data was cleaned a maturity level was obtained for each attribute using a 1-5 scale (where 5 is the highest maturity). Secondly, a correlation of the factors and root causes were derived through content analysis from the semi-structured interviews using a tool (NVivo). Content analysis provides a structured means of coding the relationships from the chain of argument employed in describing each situation within the IS alignment factors. The relationship between constructs is assumed to take form of explanations and consequences and offer positive, negative or neutral reinforcement.

Descriptive analysis

Factors affecting IS alignment from the aforementioned Strategic Alignment Maturity Model, were rated in a five-level maturity model, where Level 5 is the highest level of maturity. The overall alignment maturity obtained for UK COMPANY is 3.3 as it can be seen in Table 5-5. This result is slightly higher than the average maturity alignment obtained by other organisations in the insurance industry (3.15) and finance industry (2.9) where similar assessment has been applied (Luftman and Kempaiah, 2007).

Table 5-5 IS alignment maturity per assessment and overall

	Strategic Assessment	Tactical and Operational Assessment					Overall IS alignment maturity
	Enterprise	Business Unit A			Business Unit B		
Factors affecting alignment	(3 participants)	Project A1 (8 participants)	Project A2 (4 participants)	Project A3 (4 participants)	Project B1 (4 participants)	Project B2 (4 participants)	
COMMUNICATION	2.7	3.9	3.2	3.3	2.9	2.8	3.0
IT GOVERNANCE/IT VALUE	3.5	4.4	3.8	3.5	3.5	3.3	3.6
PARTNERSHIP	2.9	4.2	3.5	3.0	3.7	3.0	3.3
SCOPE AND ARCHITECTURE	2.7	3.8	3.7	3.4	3.4	2.9	3.0
HUMAN RESOURCES SKILLS	2.6	3.7	3.3	3.1	2.9	2.7	2.9
Overall business-IT alignment maturity	**2.9**	**4.0**	**3.5**	**3.2**	**3.2**	**3.0**	**3.2**

From the results it can be seen that each factor varies in relation to the level of maturity. Figures 5-8 and 5-9 demonstrate there are different views between business and IS participants, however, those are less accentuated than the differences depicted within the organisational levels categories used for this study (strategic, tactical and operational). Therefore it is important to identify the specific aspects at each level that need to be leveraged to bring all the factors to a sustainable Level 3. The graph in Figure 5-8 suggests the traditional gap between business and IS has been reduced whilst the coordination between managers at different levels represents a challenge as illustrated in Figure 5-9. Additionally, it can be observed in Figure 5-9 that tactical managers rate the factors higher than strategic and operational managers. This trend is taken into consideration for the qualitative analysis of each project to find out the possible reason for these differences.

Figure 5-6 Factors/attributes results by business and IS groups

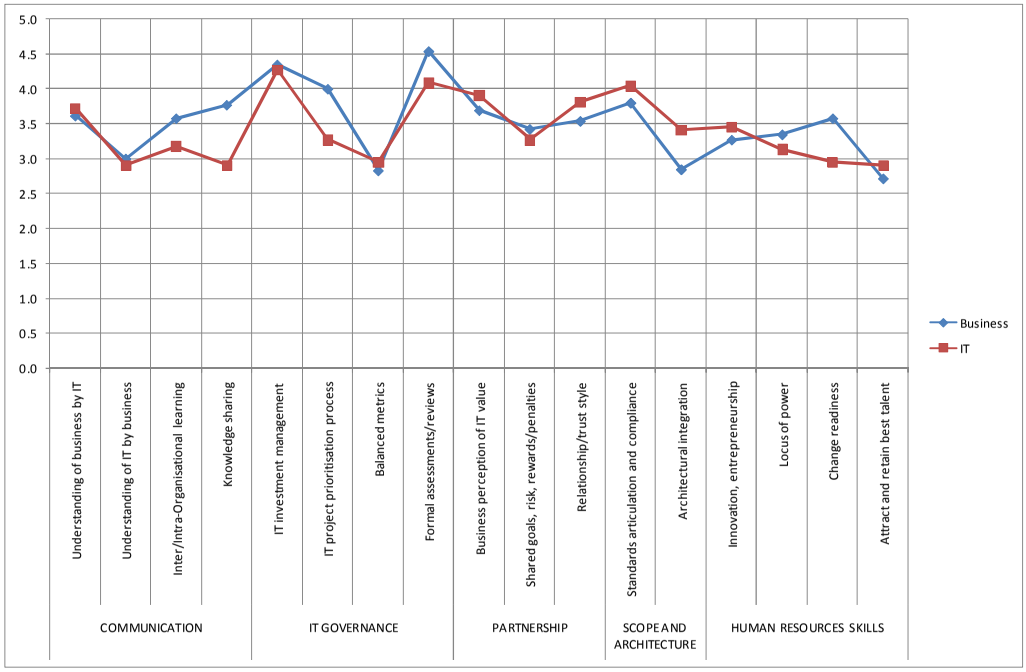
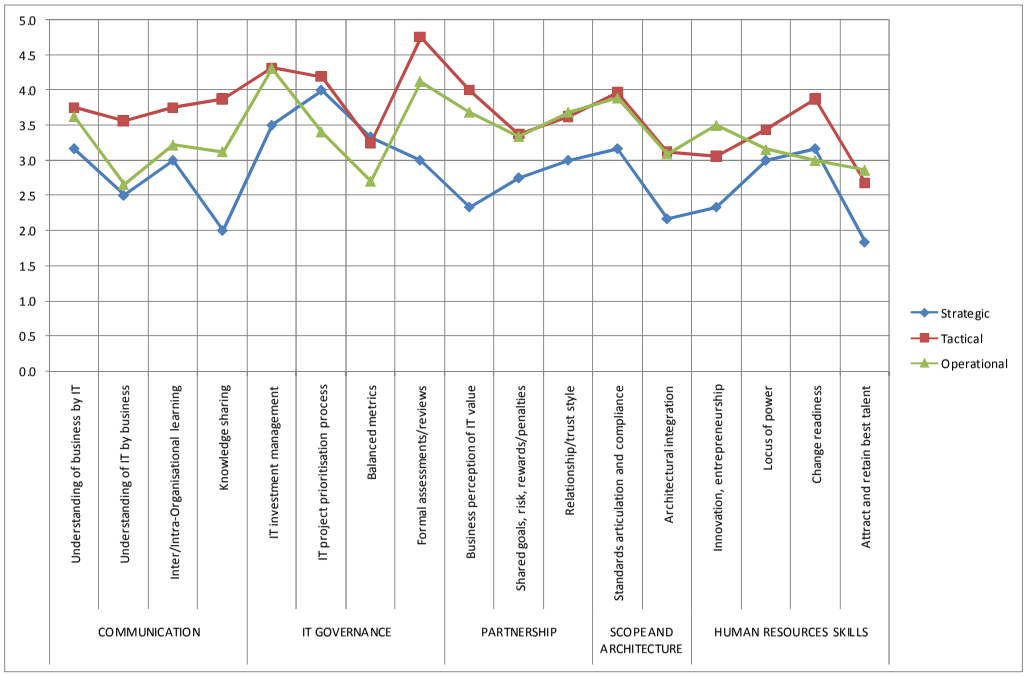


Figure 5-7 Factors/attributes by strategic, tactical and operational categories



5.4.3 Projects Analysis

As explained at the beginning of Section 5.4 the case study involved two business units (A and B). Three projects belong to Business Unit A, namely Project A1, A2 and A3 respectively. Two projects belong to Business Unit B, namely Project B1 and Project B2 as illustrated in Figure 5-7. The description of each project is provided below. The right sign outlines positive aspects of the project and the cross sign refers to the aspects that need improvement.

Project A1

Project A1 is a financial business proposition that includes a technological solution as one of its key elements. The project is at an early stage and eight participants completed the alignment maturity questionnaire. This project achieves the highest maturity alignment within UK COMPANY. The elements of success seen as important by the participants were:

- ✓ Business managers have a higher level of IT environment understanding than in other projects.
- ✓ The business case represents a balanced metric that brings together business and IS.
- ✓ Business and IS work together to develop the business case as a team enhancing understanding and partnership.
- ✓ Top managers have a clear intention to promote partnership between all the participants in the projects, including people from IS central function and third parties.
- ✓ There is a clear message and actions to "remove the supplier-customer relationship between the IT and business function".
- ✓ The organisational structure was designed to bring business and IS together.
- ✓ Co-allocation of business and IS in the same physical areas allows better integration and interaction.

For this project, participants differ slightly in their views on the following issues:

- × Despite the high level of face-to-face interaction, formal knowledge sharing is only just starting to emerge.
- × Tactical managers have a slightly lower perception of almost all the factors except for partnership and scope & architecture.
- × Tactical mangers range scope & architecture from level 2, integrated within the business unit to level 5, integrated across business units and evolving with business partners.
- × Tactical managers are aware of the relevance of integration across the business unit and at corporate level but recognise that they do not integrate very much at the moment.

Project A2

Project A2 is quite a technical project that aims to simplify and improve the IT infrastructure. The project is at an early stage and four participants completed the questionnaire. Overall Project A2 is positioned as the second most mature project, however, huge inconsistencies were found between the participants. Drawing on the interviews the core elements related to the differences are:

- × Business perception of IT value ranged from 1 (cost of doing business) to 5 (a partner with the business that co-adapts/improvises in bringing value to the firm).
- × IS is seen as a service provider due the centralised IT model.
- × Merging of two cultures remains an issue (Business Unit A acquisition of other company).
- × Complicated IT landscape due the merger.
- × Conflicts in coordination with other areas within the business unit.

Project A3

Project A3 involves a system development for a new financial product. The project was in the final stage and four participants gave their opinions. Despite the adoption of similar mechanisms to those in Project A1 in order to improve the partnership between business and IS, the results show significant differences and

conflict between business and IS. From participants' views the following aspects were identified as contributing to the low partnership and communication:

× Business managers mainly consider IS as the cost of doing business.
× Business is just starting to get more involved in understanding the IT environment which is critical for decision-making processes.
× IS also recognises they are not perceived as partners.
× Risks and rewards are not shared.
× Conflicts in coordination within the business unit and also with integration at corporate level.
× Business cases are only used as a mechanism to approve the project and control the progress rather than as a means of bringing business and IS together.

Project B1

This project addresses legacy systems problems by developing front-end system to process customers' claims. The project had finished and the system is currently in use. Four participants completed the questionnaire and no significant inconsistency was found among the participants. Through the interviews the following issues were identified:

✓ Partnership was ranked higher for this project than others as people that participated had worked for a long time for UK COMPANY and had high personal commitment, reflected as high trust relationships within the project team.
× Tactical managers do not get very involved in IS decisions and few understand the core IT environment.
× Risks and rewards are not shared.
× Despite the high level of governance, each area employs its own metrics.
× Business cases are only used as a mechanism to approve the project and control the progress rather than as a means of bringing business and IS together.

Project B2

This project is a front-end system for the quotation process. The project had been launched and four participants completed the questionnaire. Similar to Project B1, two main areas of concern were limited understanding of IT by business and no clear metrics to measure IT contribution. However for this project knowledge sharing was also very low. Drawing from the interviews the key aspects of this project are:

✓ Partnership developed as the project progressed.

× Risks and rewards are not shared.

× Interaction was complicated due different location of business and IS teams.

✓ People overcome the location problem as they knew each other from other projects.

× Business cases are only used as a mechanism to approve the project and control the progress rather than as a means of bringing business and IS together.

5.4.4 Visualisation Tool

Results indicated there were challenges for both strategic and tactical/operational levels during the implementation of strategic IT projects. In Section 5.2.5 the visualisation tool was explained and Table 5-6 indicate the score ranges used for UK COMPANY.

Table 5-6 Score ranges for UK COMPANY

	Score Ranges		
Criteria	Average	Marginal	Low
IS Alignment Maturity Level	Green >=3.0	Yellow 2.9 - 2.6	Red <= 2.5
Consistency of participants perception (StaDev)	Green 0.3-0.9	Yellow 1.0-1.5	Red >= 1.6

The data is presented in Table 5-7 and allows the identification of areas of strength or concern either by the maturity level obtained or by the consistency between the participants' views.

Drawn from common areas of concern and interviewees explanations the main aspects that contribute to low maturity are:

- Limited understanding of IT by business, 52% of the participants from both business and IS agree there is limited understanding of IT.

- No balanced metrics: 44% of the participants agree they have business and IT metrics but they are not linked.
- No sharing of risk, rewards/penalties: 52% of the participants agree there is no sharing or it is only starting to emerge, especially the risk element. 25% agree there is a positive sharing of risk and rewards.
- Lack of formal knowledge sharing: 37% of the participants consider the organisation needs to improve this aspect. However, 14% of these regard knowledge sharing as the interaction between business and IS to share each other domains and only 11% regard knowledge sharing as a formal process to document the individual knowledge that need to be shared at business unit and corporate level. Consequently, the differences are partially due to low maturity and also to the context in which the interviewee used the knowledge sharing concept.
- IS is not a partner with the business: 26% of the participants' perceive IT as the cost of doing business and emerging as an asset, whilst 26% state IT is emerging as a enabler of business strategy.

Table 5-7 Alignment by maturity level and consistency of participants perceptions

		IS Alignment Maturity Level						Consistency of participants perception (StaDev)					
		Strategic Assessment	Tactical and Operational Assessment					Strategic Assessment	Tactical and Operational Assessment				
			Business Unit A			Business Unit B			Business Unit A			Business Unit B	
Factors	Attributes	Enterprise	Project A1	Project A2	Project A3	Project B1	Project B2	Enterprise	Project A1	Project A2	Project A3	Project B1	Project B2
COMMUNICATION	Understanding of business by IT	3.2	4.3	3.3	3.5	3.3	3.5	1.3	0.9	1.0	0.6	1.0	0.6
	Understanding of IT by business	2.5	3.7	3.3	2.4	2.4	2.4	0.5	1.1	1.0	0.5	0.5	0.5
	Inter/Intra-Organisational learning	3.0	3.6	3.0	3.8	3.3	3.3	0.0	1.0	1.6	0.5	0.3	0.5
	Knowledge sharing	2.0	4.3	3.3	3.6	2.8	2.1	1.0	1.0	1.5	1.3	1.3	1.4
IT GOVERNANCE / IT VALUE	IT investment management	3.5	4.8	4.1	4.4	3.8	4.1	0.9	0.4	1.0	0.5	1.0	0.9
	IT project prioritisation process	4.0	4.3	3.4	3.0	3.8	3.3	1.0	0.9	1.6	0.0	0.5	0.5
	Balanced metrics	3.3	3.5	3.5	2.3	2.5	2.0	0.6	0.7	1.0	0.5	0.4	0.0
	Formal assessments/reviews	3.0	4.9	4.0	4.3	4.0	4.0	1.0	0.4	0.8	1.0	0.0	0.8
PARTNERSHIP	Business perception of IT value	2.3	4.4	3.5	3.6	3.8	3.1	0.8	0.9	1.9	1.7	1.0	1.2
	Shared goals, risk, rewards/penalties	2.8	4.2	3.8	2.5	2.8	2.8	1.3	0.9	1.0	1.0	1.0	1.0
	Relationship/trust style	3.0	4.1	3.4	2.8	4.5	3.3	0.5	0.9	1.3	0.3	0.6	0.5
SCOPE AND ARCHITECTURE	Standards articulation and compliance	3.2	4.1	4.2	4.2	3.8	3.1	0.8	0.8	0.4	0.2	0.5	0.6
	Architectural integration	2.2	3.5	3.3	2.6	3.0	2.8	1.3	0.9	1.5	1.1	0.8	0.5
HUMAN RESOURCES SKILLS	Innovation, entrepreneurship	2.3	3.9	3.5	3.5	2.4	3.0	0.6	0.8	1.3	0.6	0.8	0.8
	Locus of power	3.0	3.6	3.8	3.3	2.8	2.6	0.0	0.5	1.3	0.5	0.5	0.8
	Change readiness	3.2	3.9	2.8	2.6	3.5	3.0	0.3	1.1	1.5	0.5	1.0	1.4
	Attract and retain best talent	1.8	3.5	3.3	2.8	3.0	2.0	0.8	1.0	1.5	0.9	0.8	0.0
	Overall matury per project	**2.9**	**4.0**	**3.5**	**3.2**	**3.2**	**3.0**						

Content analysis

The visualisation tool results highlighted three areas of low maturity and two areas of inconsistency (Table 5-8). Drawn from the interviews, texts were reduced to categories that represent the reasons for low maturity or inconsistency as shown in Figure 5-10. The relationships between the categories were then explored to identify root causes.

Business and IS recognise there is a good understanding of business by IT. Both groups again agree the business understanding of IT is good but only at a high level and restricted to the business unit environment. The main reasons that this view emerged are:

- Business managers recognise the importance of IT but consider they do not have to know development details.
- IT is perceived as the cost of doing business, consequently business managers are less committed to spending time understanding the core elements of IT.
- Business and IS have their own metrics reducing the commitment for the overall project as their interaction is mainly related to the budget and not towards understanding each other's environment.

Balanced metrics is the second area of concern and the reasons identified as the root cause of low maturity are:

- Business and IS are different business units and each business unit has its own mechanism to measure performance.
- IS is a separate team from the shared services. Therefore the business pays for the IT solution that was defined in the quotation IS provided. IT is seen as the cost of doing business.
- A business case is a common procedure across UK COMPANY for obtaining project approval from corporate level. However, there are

projects where business and IS do not work as a team to develop the business case. The business case is developed by business and then IS provides the cost of the IT solution.

Sharing of risks and rewards were related to balanced metrics as the following aspects emerged:

- Business and IS are different business units and have different reward systems.
- IS is a separate team from the shared services, which is committed to the project but is the business unit that takes all the risks and rewards. IT is seen as the cost of doing business.
- IS recognises that is the business unit that takes the risks and rewards as IS does not benefit if the project is successful.

For knowledge sharing there were no areas of concern, though there were slight differences between the participants:

- At strategic level, maturity results are low because senior managers recognise formal tools for documenting knowledge are not available.
- The consistency between the participants at the operational level is also affected by this reason. Some interviewees refer to formal documentation of knowledge and others to the interaction between business and IS to share each other's environments, therefore the high standard deviation

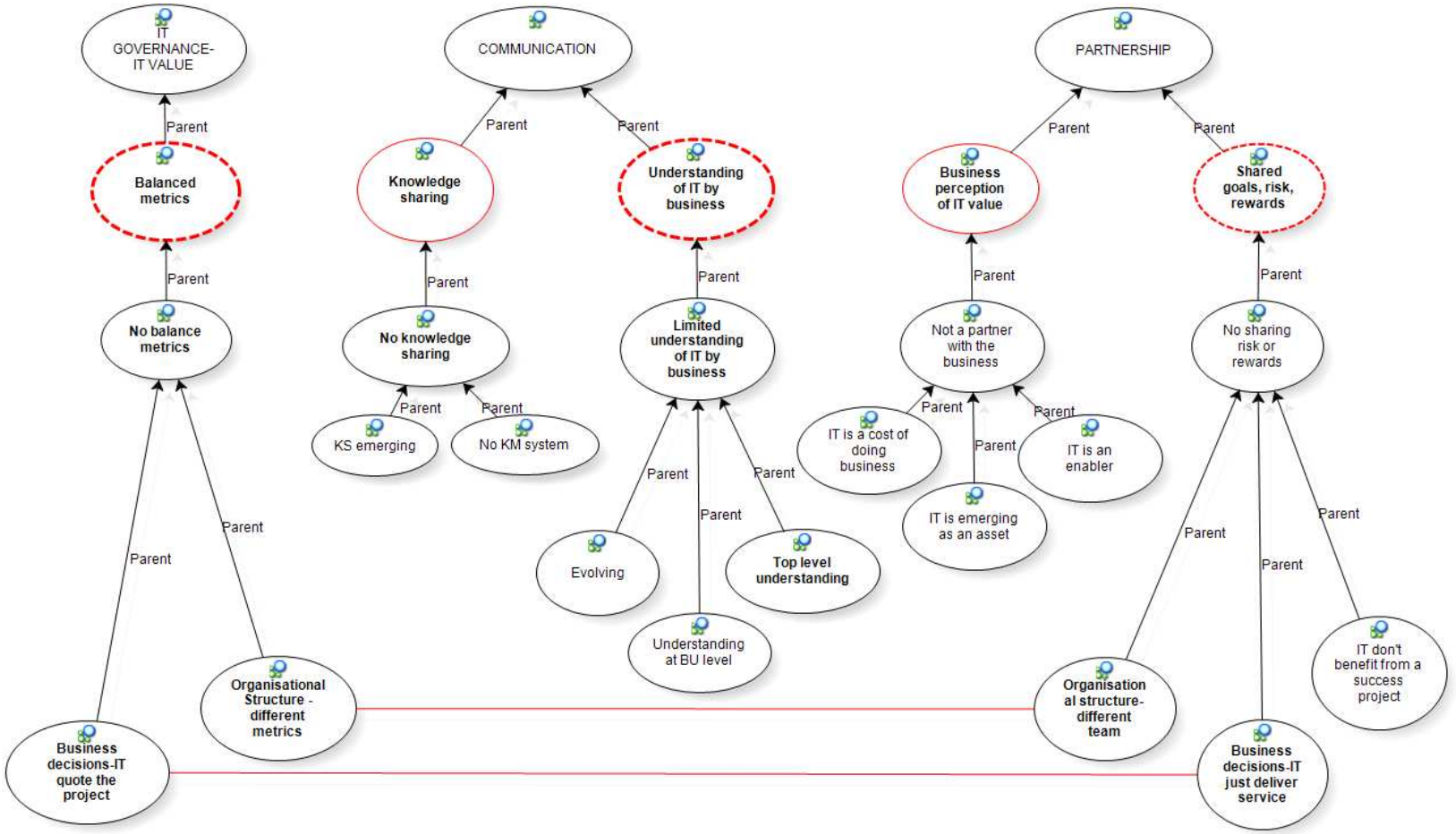
Another attribute from partnership with an average level of maturity but significant inconsistency between the participants' views is business perception of IT. Although most of the participants agreed the IT investment decisions were primarily made to improve business effectiveness and create competitive advantage, there were still areas that regarded IT as the cost of doing business instead of being a partner. Among the reasons identified were:

- All the participants recognised the strong planning processes the organisation has, but there was only one project where 75% of the participants expressed the view that the project contributed not only to the business unit objectives but to the overall corporate strategy. Consequently, corporate strategies that regard IT as an enabler of business strategy have less impact at operational level.
- Due the IT organisational structure and budgetary control style, IT is seen as a very expensive resource which reduces the partnership element.
- IS has corporate objectives that sometimes conflict with the business unit objectives, which slows down effective negotiations and reduces partnership.
- IS has a good understanding of the business environment, however, their mindset is still focused on gathering business requirements and addressing technical issues. Therefore their contribution to the planning process and strategy formulation is limited and focused on budgetary aspects.

Common causes of low level of IS maturity alignment mentioned are the organisational structure and business perception of IT value which have a direct impact on:

- Level of interaction between business and IS is focused on budgetary control.
- Limited understanding of IT by business.
- Sharing of goals, risk and rewards.

Figure 5-8 Root causes of low alignment for UK COMPANY



5.4.5 Case Study 2 Conclusions

This study has examined the level of IS alignment maturity at strategic, tactical and operational within two business units in UK COMPANY. The factors were related to communication, IT governance, partnership, scope and architecture and human resources skills. Broadly speaking, the principal findings of the case study 2 are that (1) gaps in communication and partnership have been highly influenced by the organisational structure that is evolving from a centralised to federated model and (2) the business perception of IT value is limited to that of the cost of doing business. The impact of these two issues is reflected in low maturity in the following attributes in the business and IS relationship: (a) limited understanding of IT by business, (b) limited sharing of risk and rewards, (c) no linked business-IT metrics, (d) lack of formal knowledge sharing.

Although all the factors included in the study are considered important, this case study revealed the high impact of communication and partnership. Together with IT governance, communication and partnership influence investment decisions on infrastructure and human resources skills. Even when communication is highly encouraged in organisations, its effectiveness is reduced when partnership is low. Partnership cannot be created overnight, therefore continued interaction between business and IS managers should be enabled to allow its development. Finally, the study demonstrated the relevance of assessing the level of IS alignment at strategic, tactical and operational levels as it allows better understanding of areas of concern where the organisation require further actions.

The aim of IS alignment is to improve the two-way commitment between business and IS managers to use IT as a business strategy enabler. Therefore all the factors analysed should be leveraged to allow managers' commitment to both areas from strategy formulation to its implementation. This study provides a roadmap for improving IS capabilities and management practices that, in turn, will enable IS alignment which has been identified as linked to business performance.

5.5 Summary

This chapter tested the model by designing the empirical setting and data collection that were applied in two case studies. The design included an alignment assessment process that provided practical results for the organisation and allowed the collection of data from different sources of information. The empirical setting assumed the factors under study were found relevant for both SMEs and large organisations, therefore one case study was conducted in an SME and the second in a large organisation. Whilst both organisations expressed their interest in obtaining business value from their IT investments, the low level of alignment in the SME, especially in IT governance, made it difficult to obtain enough support for the proposed model. However, the case study conducted in a large organisation provided data from different sources such as assessment questionnaires (organisational profile, corporate and IT project assessments), semi-structured interviews and project documentation. A comparison of results between the five projects in the large organisation allowed identification of areas of strength and concern across strategic, tactical and operational levels.

This research brings a practical perspective to IS alignment by incorporating the strategic alignment maturity model (SAM) proposed by Luftman (2000). The validated SAM instrument developed to assess IS alignment maturity (Sledgianowski, et al., 2006) was used to assess the strategic level of IS alignment and the instrument was adapted to assess IT projects' alignment. In doing so, the assessment process designed for the data gathering is improved, while validating its use at strategic, tactical and operational level.

Another practical aspect is the coloured-coded visualisation technique developed to facilitate the identification of areas of concern due low maturity or inconsistency between participants. Tables 5-4 and 5-7 illustrate how the visualisation technique facilitates interpretation of the assessment results. The IS alignment assessment process also facilitates the identification of root causes of low levels of alignment that can assist managers in the design of specific plans of action.

"The real voyage of discovery consists not in seeking new landscapes but in having new eyes."

Marcel Proust (1871-1922), French Novelist

Chapter 6 EVALUATION PHASE: DATA ANALYSIS AND DISCUSSION

6.1 Overview

This chapter elaborates on the model testing results, reporting and discussing the analysis of data obtained from the two case studies. The connections between the key findings obtained in previous phases are delineated in Section 6.2. Then the final model is presented summarising the two major categories of factors proposed. Finally, an in-depth analysis of each of the factors in the model is presented to better understand the rationale of the two categories proposed. The analysis provides the main relationships between the attributes, the reasons for changing attributes as factors and the reasons for eliminating some attributes.

6.2 Delineating the Current Research

The relevance of IS alignment is highlighted in Chapter 1 by describing the problem of delivering business value from IT investments. Despite efforts to integrate business and IS strategic plans, organisations are not delivering the expected benefits from IS investment which suggests a gap between strategy

formulation and strategy implementation. Chapter 1 also presents the coevolutionary IS alignment view (Figure 1-4) which emphasises the mutual adaptation and change that results from the dynamic interplay of coevolving interactions, interrelationships and effects among the components of alignment at three levels of analysis. Therefore, this view does not aim for harmony or balance between the components of IS alignment since the lack of balance due to changes in the environment drives improvements and innovations to adapt the components to the new situation. In addition, in Chapter 1, a broader conceptualisation of IT projects was presented in the multiple process view of IT projects (Figure 1-6) that changes the IT projects focus on traditional cost-time-quality to the value creation. IT projects are highly influenced by the strategic decisions and the collaboration between business and IS. Strategic IT projects are thus defined for this research as corporate initiatives that support the business strategy and have IT as a key component. These two perspectives (coevolutionary IS alignment and multiple process views of IT projects) are taken in consideration for the investigation of the dynamic interrelationships between the factors affecting IS alignment.

Chapter 2 explained the research phases conducted to propose, test and evaluate a model of interrelationships between the factors affecting IS alignment. An interpretative approach was adopted in this research that combines quantitative and qualitative methods for data gathering and analysis. Chapter 3 contributes to better understanding of the constructs based on literature focused on IS alignment assessment approaches. The strategic alignment model (SAM) was selected to explore its applicability at operational level. The SAM model includes the factors of communication, IT value, IT governance, partnership, scope & architecture and human resources skills. During the exploratory phase (Chapter 4) these factors were used to conduct a pilot study and a survey that allowed the identification of some interrelations between the factors that are presented in the preliminary model of factors affecting IS alignment (Figure 4-4). The preliminary model highlights the fact that business planning integration is a pre-condition for the factors' relevance. It is also proposed that IT governance may be the mechanism

that triggers the improvement of the rest of the factors. Finally, from the exploratory phase it was found the factors are equally relevant for small, medium and large organisations. In Chapter 5, the preliminary model was tested in two organisations. Whilst both organisations (one SME and one large) are interested in obtaining business value from their IT investments, the low level of alignment in the SME, especially in IT governance, made difficult to obtain enough support for the proposed model in the SME's context. However, the sample for the case study conducted in a large organisation is integrated by a balanced representation of 28 business and IS managers at strategic tactical and operational levels and a variety of data sources were obtained such as assessment questionnaires (organisational profile, corporate and IT projects assessment), semi-structured interviews and project documentation to support the analysis and evaluate the model. Therefore, the following section refers to the data collected from case study 2 (UK COMPANY) to be able to answer the final research questions:

RQ 11: Why do some projects receive higher or lower scores and why do participants have consistent or inconsistent views regarding these factors?

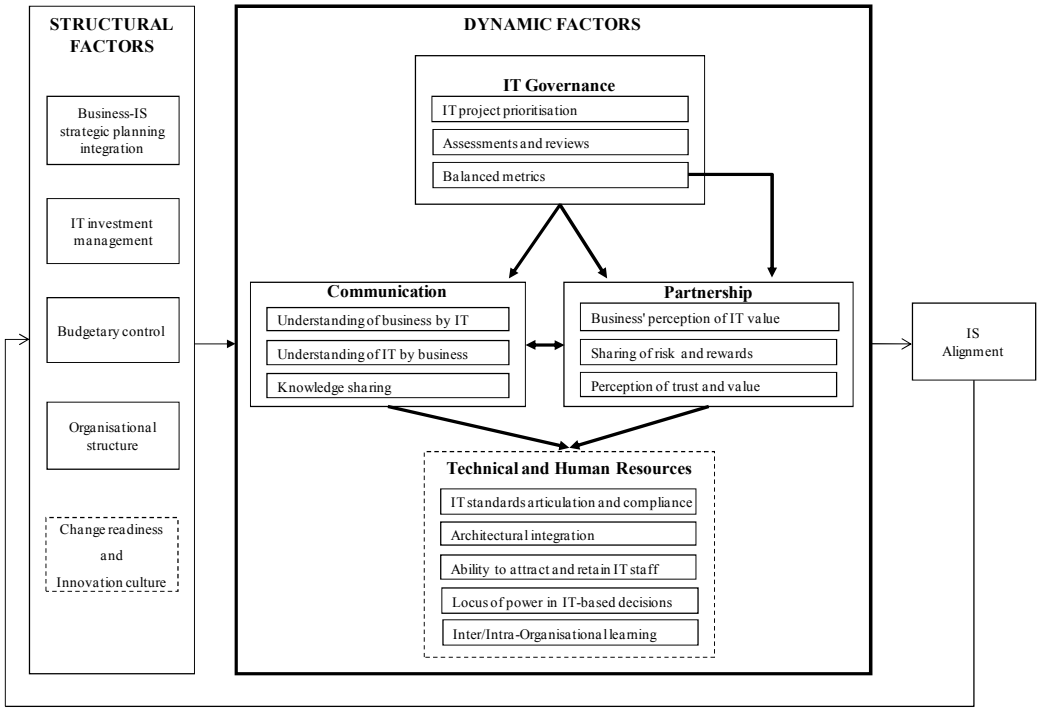
RQ12: What is the relationship between the factor/attributes that affect IS alignment?

6.3 Factors affecting IS Alignment: Final model

The strategic alignment model (SAM) that includes the factors communication, IT value, IT governance, scope and architecture and human resources skills suggests all the factors impact equally on IS alignment (Figure 4-3). This research proposes a preliminary model of interrelationships between the factors affecting IS alignment (Figure 4-4), the factors were tested in a large organisation through an IS alignment assessment process. The evaluation of the interrelationships between the factors reveals some interrelationships that led to the classification of the factors into two main categories as illustrated in Figure 6-2: dynamic factors and structural factors. *Structural factors,* refers to those cultural and structural forces

that determine whether information systems is or is not seen as a partner to deliver business value from IT investments. On the other hand, the *dynamic factors* refers to those aspects that impact on IS alignment as a result of the dynamic interaction between the people involved during the strategy formulation and implementation.

Figure 6-1 Final model: Inter-relationships between the factors affecting IS alignment



6.3.1 Structural Factors Affecting IS Alignment

Chan and Reich (2007) explained that structural alignment is influenced by the location of IS decision-making rights, reporting relationships, (de)centralisation of IT and the deployment of IS personnel. In light of this structural view of alignment a category is proposed named structural factors. *Structural factors* refer to those cultural and structural forces that determine whether the information systems function is or is not seen as a partner to deliver business value from IT investments. This factor cannot be changed in the short-term. This set of factors is related to the way the organisation's context and culture have influenced IS as much as to technical and economic factors (Orlikowski and Barley, 2001).

Organisational structure

Although organisational structure was not included in the original factors taken from the SAM model, organisational structure emerged as a root cause of low partnership and lack of balanced metrics to measure the business value of IT. The organisation originally had decentralised its IT structure which created a complex IT infrastructure with multiple applications that resulted in high IT costs. Therefore a centralised IT structure was designed to standardise and improve the infrastructure and update legacy systems. Consequently, IS staff were moved from the business units and teams were allocated depending on specific needs. IS people were involved in more than one project and they report to the IT director not to the business unit they support. IT centralisation helped the organisation to establish standards and redefine their architectural integration. However, centralisation has a direct impact on communication and partnership creating an IT service supplier relationship. IS is paid to deliver an IT solution rather than being a partner in developing a business solution supported by technology. As a result, during the last year the organisation has started a restructure to keep the IS function centralised but has assigned IS staff to each business unit who will report directly to the business manager and not to the central IS function. However, they recognise that it will take time to formalise this new structure.

In Project A1 they created a different structural model even with the people that were assigned by the central IS function, as expressed below by an IS manager:

> *"I'm an interesting test case because my salary is paid by shared services (central IS function) but I effectively work for the managing director of this unit as part of the management team accountable for the overall business change program that we run here and a large number of IT and business people work for me. That's one of the things we are trying to do in this sub-business unit, is remove the supplier-customer relationship that exists in big corporations between the IT function and the business function and make them one*

for the organisation ... effectively I have two bosses. I have an IT boss and I have business boss".

In this scenario, the partnership strategy the business director has adopted allowed them to overcome the difficulties of the IT organisational structure. However, for the rest of the projects the scenario is not the same which have a direct impact on IT governance, communication and partnership.

Business-IS Planning integration.

Business-IS planning integration is seen as an evolutionary process and adaptation is the result of frequent cycles of planning reviews with broad participation of business and IS (Benbya and McKelvey, 2006). From the exploratory studies, planning integration was identified as a pre-condition determining the relevance of the factors affecting IS alignment, the factors were rated higher as organisations reported more integrated business and IS planning processes. During the screening of the data collected for the alignment assessment in a large organisation, this variable was rated at level 4 (Formal strategic planning at the functional unit level and across the enterprise that involves both business and IS areas) by 70% of the participants and 18% rated it at level 3 (Formal strategic business planning at the functional unit levels with some IS participation). Therefore, this variable was removed from the descriptive analysis and analysed from a qualitative perspective. Reich and Benbasat (2000) found that clear business plans influence both short-term and long-term alignment. The case study revealed business plans were clear and IS participation was emerging, moreover, the selected strategic projects were all conceived and supported by senior managers at strategic level. However, during the implementation tactical managers had problems aligning the business unit strategy with the corporate strategy. The director of one business unit with the highest aligned project expressed it as follows:

"Historically one of the big problems I believe UK COMPANY has is the lack of cohesion between strategic agenda and the interaction between that

strategic agenda and different parts of the business ... the way UK COMPANY operates there is a lack of alignment between business and IT globally and we suffer some of the consequence of that".

Although planning integration has improved, the organisation faces challenges to communicate and align the corporate strategy with the business unit strategy. This has a direct impact on IT projects' implementation. From the five IT projects under study, three of them (Project A3, Project B1 and Project B2) revealed several areas of concern. All the projects with areas of concern were finished systems developments and the only project that clearly overcame the alignment difficulties was characterised by clear awareness and commitment from all the participants regarding the connection between the business unit strategy and corporate strategy. Therefore, understanding of business strategy is the key component during the implementation stage to increase commitment to corporate initiatives.

The attributes IT investment management, budgetary control, change readiness and innovation culture were included as structural factors as explained in Section 6.4 due their impact is similar to the planning integration impact. These factors cannot be easily changed in short time.

6.3.2 Dynamic Factors Affecting IS Alignment

Dynamic factors refer to those aspects that impact on IS alignment as a result of the dynamic interaction between the people involved during the strategy formulation and implementation. Therefore, these factors evolve through the interaction between business and IS and need constantly to be monitored and leveraged to achieve a positive effect on IS alignment. Although Campbell et al. (2005) and Reich and Benbasat (2000) identified communication as a key antecedent to alignment, the model emphasis that IT governance have a highest impact on the rest of the factors. Improvements on IT governance prepare the organisation for better communication and partnership which, in turn, facilitates

decision-making regarding technical and human resources as illustrated in Figure 6-2.

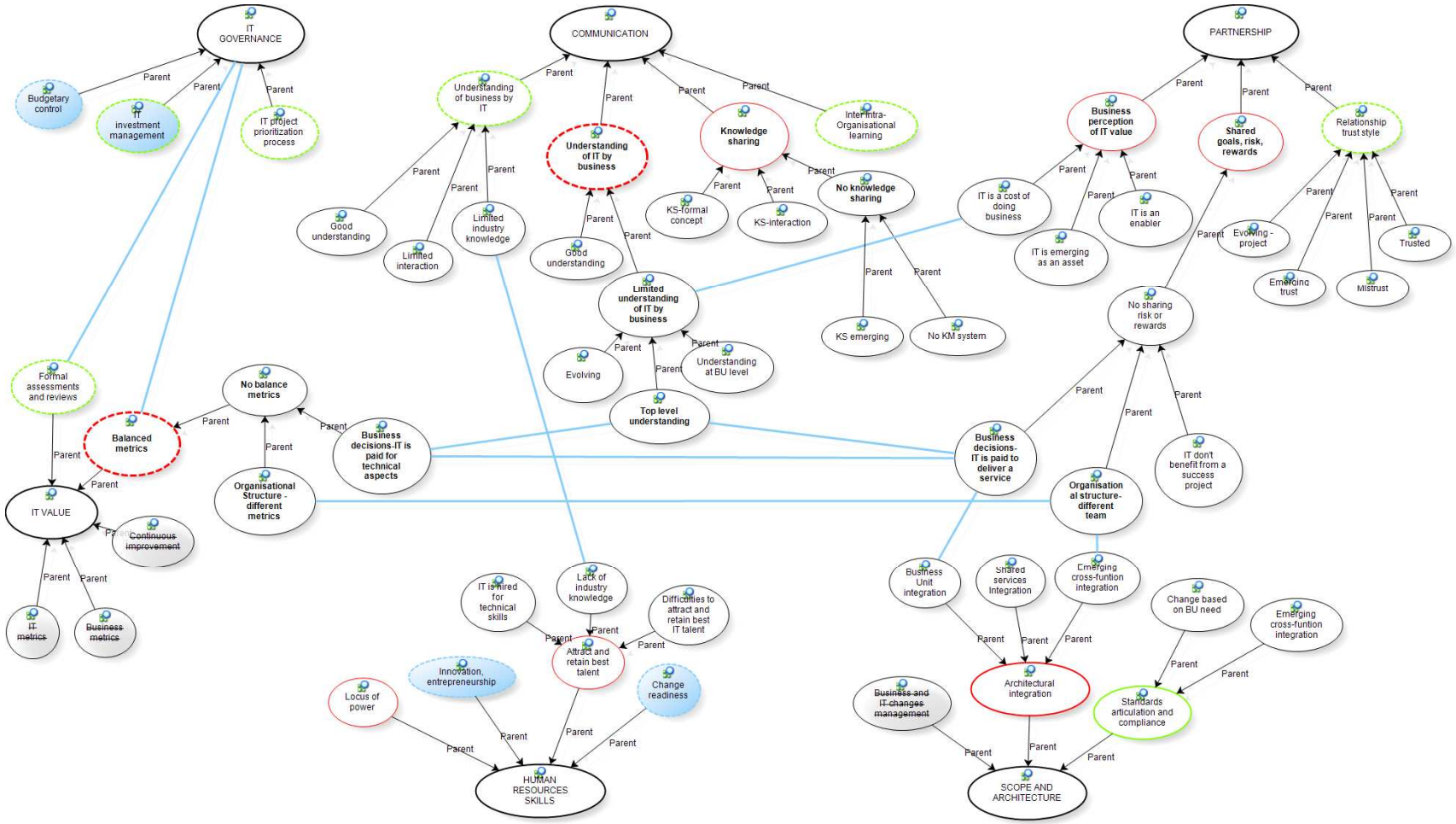
IT governance is seen as the mechanism to formally establish a continuous interaction between business and IS through project prioritisation, balanced metrics and IT investment assessments and reviews. From the survey results, IT governance was identify as the most relevant factor as the organisations improve their planning integration, consistently for the large organisation case study, IT governance obtained high levels of maturity associated with a strong prioritisation process and IT investment management (moved as structural factor). However, one attribute of IT value, balanced metric receive low level of alignment caused by the IT service supplier relationship explained above in the organisational structure factor. IT governance then is seen as a mechanism that would allow business and IS to gradually develop an understanding of each other's domains and coordinate actions related to continually sustaining IS alignment. The continuous adjustments between the two entities would allow organisations to achieve a sustained IS. Otherwise, "if Business and IS strategies change, and Business and IS departments are not aligned, business executives' ignorance of the potential contributions of IS, and the IS executives lack of knowledge about Business strategy, might lead to an effort to align IS with an obsolete Business strategy, not with the new one" (Benbya and McKelvey, 2006, pp. 289). Therefore, the dynamic factors in the model assume all the components are the responsibility of both business and IS across strategic, tactical and operational levels. The overall impact of the dynamic factors represents an environmental change that triggers adaptations in the structural factors. Figure 6-2, illustrates with dotted lines those factors/attributes that require further analysis as this research was only able to identify basic interrelationships, to classify them as either structural or dynamic factors.

6.4 Analysis of the Factors Affecting IS Alignment

Figure 6-1 illustrates the root causes and relationships drawn from the interview coding process elaborated with the assistance of QRS NVivo 8 software. The

interview coding process (Figure 6-1) contains the six factors and attributes being scrutinised: IT governance, IT value, communication, partnership, scope and architecture and human resources skills. The attributes that were identified in Chapter 5 as areas of concern are highlighted in red. The attributes that were rated highest are in depicted in green. Emergent interrelationships are denoted by blue lines as well as the attributes that were found with a major impact in the overall model. Finally, the strikethrough attributes were eliminated from the final model. The following sections provide a detailed explanation of the analysis derived from the interview coding process and explain the rationale for those relationships and changes.

Figure 6-2 Root causes and relationships drawn from the interview coding process



6.4.1 IT Governance

IT governance is defined as the authority to make IS decisions, set IS priorities and allocate IS resources. The following attributes were used to operationalise IT governance.

Budgetary Control

This attribute has similar impact to planning integration in the sense that it was identified as a constant by most of the participants. They agreed the budget was assigned from corporate level and therefore they have little influence on how it is managed. At tactical level few managers consider the budget for the project is treated as an investment whilst at strategic and operational levels the budget is a cost centre. This attribute is crucial at strategic and tactical level as it impacts how the partnership relationship between business and IS drills down to the operational level. A participant from IS at strategic level (Business Unit B) explained:

> *"The big issue is that we have to charge back to the business that is seen as a massive locker every time we size the project, ... we are seen as an expensive team so, if we could leave away the charge model that we have for the moment, I think suddenly the relationship will improve dramatically"*

Although each project has an assigned budget, IS faces problems covering the overall cost of IT and design mechanisms to overcome those problems by overcharging some projects that allow them to recover the whole cost of IT as explained by the same participant (IS at strategic level, Business Unit B):

> *"What we do is that we operate at the moment as a cost centre by functional organisation but the budget assigned is not enough... as an IT function we overcharge our projects ... so we end with what we call sourcing savings that allow us to cover the whole cost of IT ... it is an incredibly complex structure, the most complex I've seen in the IT*

world and I'd worked in different companies I was hoping to become more simple but it just became more complex."

At operational level neither business nor IS has a clear knowledge of how the budget is managed. However a service provider relationship is promoted as all the participants perceive that any IT resource used has to be charged to the business. Nevertheless, how the budget is managed seems to have less impact on the project's alignment compared with the impact that shared risk and rewards have as it will be explained later. Consequently, budgetary control was removed from the IT governance attributes and it is suggested as part of the structural factors. Further investigation would help to better understand its impact and more importantly to design simple and effective mechanism to manage the IT budget.

IT investment management

This refers to the IT investment decision based on the IT's ability to reduce cost, increase productivity, business effectiveness or to create competitive advantage and increase profit. This attribute receive high ratings at all levels, however, it was interesting that tactical and operational managers rated it even higher than strategic managers. This reflects the fact that the organisation have improved the IS alignment at business unit level, although, there is a bigger gap to align the business units with corporate strategy.

Another important fact to note here is how *business managers* from strategic and tactical levels react to the idea of IT as a process driver or business strategy enabler. Most of them give emphasis to idea of IT is an enabler of business strategy more than a driver, even when the question never suggests that. A business participant expressed this as follows:

"Within the IT function they regard themselves as an asset. I do not like the word driver; to me IT shouldn't be a driver. It should be an enabler rather than a driver. It's our customers and market place that drive our strategy not technology".

This reaction is related to individuals' resistance to IT as explained by Benbya and McKelvey (2006). Business groups regard themselves as primarily not having anything to do with the computer environment and they only use computers as support for their professional interaction with others. Only when business become competent using and understanding IS, will they be able to see new ways of doing things with IS without been feeling threatened by IT. This attribute represents a critical aspect that impacts on how IT governance and IT value is arranged and therefore is considered to have a higher impact similar to planning integration. Consequently this attribute was moved to the structural factors category, together with business-IS planning integration and budgetary control.

IT project prioritisation

The fact the organisation is moving their use of IS from reducing cost to business effectiveness triggers a change in the project prioritisation process. Therefore it is clear that the organisation has started to recognise the relevance of integrating the business and IS strategic plans. A tactical IS manager (Business Unit A) expressed it as follows:

> *"Historically, if you go back probably a year or two, the IT department was very reactive to the business saying we need to do this change. Now we have started to structure ourselves and get the business talking about that it is fine, there is a place for been reactive, but every time we react we complicate the landscape and that became more costly to maintain".*

A central business prioritisation process guides the business units on what projects will be supported. However, each business unit have its own way of addressing their priorities and send the proposal (business case) to senior managers for support and funding. In Business Unit B they have an special committee that links their priorities with the corporate level as explained by an IS participant at strategic level:

> *"A committee with about 12 representatives looks at every project that comes through and looks at the business case, cost of IT, impact for the customers and looks at the benefits to the Sigma scores they have got to produce and to improve customer service and determine whether they want to do the project or not. I think that is something that I believe is not in place in the other business units but it's been in this business unit (Business Unit B) for some time. That committee links all the projects that IT does with the business strategy".*

For Business Unit B the integration of the corporate strategy and the business unit strategy have had a positive impact during the implementation. Participants demonstrated a full commitment to the project as they have a full picture of the project's contribution not only to their business unit strategy but also to the corporate strategy.

6.4.2 IT Value

IT value or value measurement refers to the metrics used to demonstrate the contribution of IT to the business the attributes for this factor are:

Business contribution metrics and IT contribution metrics

Overall the participants were able to describe the metrics used in their areas to measure their effectiveness but recognised they do not know the metrics in other units. This reflects the fact that business and IS do not have specific metrics that bring them together to deliver business value and they are more concerned with the effectiveness of their own activities regardless the impact that may have on business performance. These two attributes were removed from the model as the existence of business and IT metrics do not enhance alignment as is the case of balanced metrics explained below.

Balanced metrics

Most of the participants said they did not have linked metrics. However, it was interesting that some participants, especially those in the projects with the highest levels of alignment, identify the business case as a mechanism that brings together business and IS. When business and IS work together to develop the business case as a team, participants improve their understanding of each other's areas and enhance the partnership as all the participants share the same goals and metrics. From the strategic perspective the business case is used to approve a project and allocate the funding:

> *"... we manage the projects from the centre. They are monitored ... with the financial business case ... The approval process of the business case ... has a lot of different gates you go through ... cost setting, the benefits, spending, etc."*

Comparing two different scenarios (Project A1 and Project A3) within Business Unit A completely different approach can be observed that highlight the relevance of balanced metrics.

Project A1:

Business view:

> *"Another thing that makes a difference is that we don't typically use the normal life cycle process for development ... this is different we say this is the market challenge we got the business and IT people to redefine the business, building the proposition so we start to get involved to come up with a solution ..."*

IT view:

> *"The success of this business is based around the business case. The business case is a very much an IT and business related case. We are not actually saying this business has a value and IT makes a part of it. What we are saying is business and IT are one..."*

Project A3:

Business view:

> *"This is a business lead process and IT involvement in the strategy will be limited ... We get a quote for what we want to build, they build it and we pay them"*

IT view:

> *"From an IT perspective, although we see we contribute to deliver a solution which then provides some benefits to the business we don't actually measure the benefits that sits with the business ... we provide them with the IT data but we are not actually accountable for measuring it once it's in place. The metrics that we have though are more concerned with our development processes..."*

From these two scenarios the impact of the prioritisation process can be seen but more importantly the business perception of IT value. For Project A1, managers have adopted a partnership style with IS and they share the responsibility of delivering the business case benefits. Conversely, for Project A3, the IS function is perceived as a service provider. The original proposal for Project A3 was rejected at the corporate level as they saw it as too complex, too expensive and not strategic. Consequently, different mechanisms were established to promote partnership between business and IS. By the end of the Project A3, when the alignment assessment was conducted, the partnership was still low and the project had been put on hold by corporate level.

Balanced metrics have a close relationship with developing communication and partnership between business and IS, especially in sharing risk and rewards. Governance, through the project prioritisation process and continuous assessment and review of the investment influence how the participants align their proposal to the corporate strategy.

Assessments and reviews

This attribute refers to the formality and frequency the organisation reviews IT investment. For this organisation, the IT investment was clearly stated in the business case and most of the participants agree there is a regular process in place to report the investment management at project level that is reviewed at strategic level as well.

> *"Very regularly and formally, we go back to the formal steering group to keep updated with the estimates and constantly check the process. The IT process and the business change process are constantly reviewing the business case. The regularity varies depending on the stage of the project".*

Continuous improvements

This attribute was removed from the assessment as it emerged as not applicable for the context of the IT project under development. Despite the relevance of continuous improvement practices, the case studies data has not revealed a clear impact on IS alignment and further investigation is needed.

Most of the attributes that belong to IT value were removed or changed as structural factor. The two remaining attributes of IT value are formal assessment reviews and balanced metrics which are closely related to IT governances. Consequently, formal assessment reviews and balanced metrics are presented together with TI governances in the final model.

6.4.3 Communication

This refers mainly to the mutual understanding of each other's environment and the methods and structures in place to facilitate and permeate communication:

Understanding of business by IT

This attribute was rated highly by both business and IS. Various business managers compliment IS on having a great understanding of the business processes:

> *"I was always enormously impressed by the way IT guys have a great understanding of the business processes".*

However, the mindset of IS people still causes problems at strategic level as expressed by a business manager:

> *"We will form groups that involve IT people at the start and they come along but sometimes they are silent as their level of understanding of the business is limited and they cannot contribute"*

IS managers find it difficult to address the uncertainty that prevails in the business environment and expect clear specifications requirements:

> *"My strategy team here have regular sessions with the IT strategy team and one of the frustrations that come out from these sessions is that IT people want more clarity than exists. They want to know what we have decided about this and we haven't decided yet!"*

This explains why most of the IS managers at strategic level come from the business areas in UK COMPANY case study. Despite IS has a better understanding of the business, their mindset for the strategic process is limited. This finding is related to the human resources skills factor regarding the

organisation's ability to attract and retain IS professionals, which was ranked with the lowest level of IS alignment maturity by the strategic managers.

Understanding of IT by business

All the participants, especially business managers invariably reacted with a laugh when they were asked about this attribute, since they have already made judgments about the business understanding by IT. They openly recognise their understanding of IT was less than the IT understanding of the business. This was a pattern observed even for the project with higher scores in this attribute (Project A1). The reasons for having top level understanding of IT were explained by their perception that it is enough to understand the importance of IT for their business. However, the understanding is limited in terms of the capabilities and constraints around their IT environment. Business managers consider that going further in the understanding of IT implies learning very technical aspects as expressed by the strategic manager of the business unit:

> *"On the business side my suspicion is, senior and middle level business managers have a good understanding of the importance of IT to our business ... Do the business managers understand the programming languages, the infrastructure? NO".*

This statement reflects the position of many managers whilst others simply accept:

> *"We probably think we have a good understanding but realistically I think we have a limited understanding".*

A possible explanation of this contradiction between considering IT relevant but not enough to get fully involved is the lack of mechanisms to identify what is the critical IS knowledge that business managers should have. As this information is not known, it is more convenient to delegate the responsibility to the IS function.

The reaction to this question can be interpreted then as business managers recognising they had been delegating this responsibility to IS.

Previously, Project A1 and Project A3 were compared to illustrate the impact of balanced metrics on the level of IT project alignment. Drawing from similar analysis and examples it was found that business and IS interactions promoted by the IT governance and IT value attributes result in better understanding of IT potential. A business manager in Project A1 explained:

> *"I would say again the understanding of IT by all the employees is encouraged and promoted by senior managers ... you can go quite far down the organisation and the business can still talk with people who understand there are IT potentials and understand what they are".*

For the rest of the projects low levels of IT understanding by business represents a common area of concern at strategic, tactical and operational levels. Finally, another reason for having top level understanding of IT is explained by the business perception of IT as the cost of doing business. As the IT is a cost, business managers have to pay for the technical aspects and therefore they do not have to get involved in as it is the responsibility of IS to deliver the service.

Knowledge sharing

This attribute refers to the extent intellectual understanding and appreciation of problems and opportunities are shared between business and IS. The organisation recognises there is a culture of collaboration and formal and informal face-to-face knowledge sharing is constant at all levels. However, few participants identify knowledge sharing as a formal process to document the individual knowledge that needs to be shared at business unit and corporate level. From above discussion on limited understanding of IT by the business, it could be interpreted that knowledge sharing acts more as a mechanism to improve each other's domain understanding than a factor impacting IS alignment. However, there is not enough support for changing, removing or altering this attribute and further research is proposed.

Inter/Intra-organisational learning

The organisation rates highly the aspect that refers to the methods the organisation use to communicate experiences, problems, objectives, etc. For most of the areas electronic and face-to-face methods are in place. However, whilst all these methods promote a collaborative environment, more specific methods are needed to ensure business and IS understand each other's environment as is the case with knowledge sharing. This attribute was then considered to be more related to how human resources skills are developed.

6.4.4 Partnership

Whilst for the rest of the factors, there are mechanisms available that can be used explicitly to improve them, for partnership the constant interaction plays an important role as partnership contains emotional aspects such as attitude, commitment, and trust. This factor reflects the effectiveness of practices in place for IT governance and communication. The operationalisation of partnership includes three attributes:

Business's perception of IT value

As business-IS planning integration evolves and IT investment management is more focused on delivering business value, this attribute has the potential to be improved. However, as discussed above, the limited understanding of IT by business has a negative impact on the IT value perception that is mainly consider a cost of doing business as expressed by a strategic business manager:

> *"I would say that is probably traditional, a cost of doing business ... it's probably how senior business managers would generally perceive IT. Personally, I've been looking more into the category of fundamental enabler of future business activity but that's what I think it should be not how it is".*

Sharing of goals, risk and rewards

This attribute reveal the impact that balanced metrics have on partnership resulting in sharing of risk and rewards as the main reason for low partnership. Two common causes were identified for low levels of shared goals, risk and rewards. Although all the projects are considered strategic, some managers see the IT component as the cost of doing business, and instead of considering IS as a partner they treat IS as a service provider responsible for delivering the IT component they pay for. Another reason that caused low sharing of risk and rewards is the organisational structure. IS staff are allocated by the central IS function and this position is reinforced by the service provider relationship which inhibits effective communication between business and IS. Business and IT are different business units and therefore they have different reward systems. IS recognised that is the business unit that takes the risks and rewards as IS does not benefit if the project is successful. A business participant from Project A3 express:

> *"I'm not aware of any share of risk or reward ... for example if you are talking about a product that is amazingly successful IT won't benefit from that. I mean the business take all the risks and the rewards. We get a quote for what we want to build, they build it and we pay them so. We take the risk of the product been successful and if the product is amazingly successful we take the profit of that, we don't share it with IT".*

Finally, due the organisational structure IS have dual goals, the business unit they report and the business unit they are allocated to provide support. If the business unit strategy is not well aligned with the corporate strategy IS can be driven in different directions. In Figure 6-1 it can be seen how these reasons for low sharing of goals, risk and rewards are common with the causes of no balanced metrics. Therefore the organisational structure emerges as a structural factor affecting IT value and partnership.

Perception of trust and value

The relationship of trust and value between business and IS was rated the highest of the three attributes. From the IS alignment assessment this result seems contradictory. However, all the participants developed this relationship during the project as many of the participants express:

> *"... at the beginning of the project I would say there was no relationship with IT, ... because we haven't worked together before. I think the relationship grew very quickly during the project, the communication is very good. At the end of the project I think we built up a strong relationship with IT"*

Another component that was identified as a source of the strong trust relationship was that many of the participants had been with the organisation for a long time and some of the IS staff allocated to the project had belonged to the business unit earlier when they had a decentralised structure of IT. A positive impact of the trust relationship is observed in Project B1. Whilst Project A3 have similar difficulties than Project B1, only the latter was able to overcome the difficulties through the constant interaction between business and IS and the commitment to the corporate strategy that allowed a trust relationship to develop as they learnt from each other and shared a common goal. A tactical manger describes a situation that illustrates this:

> *"... the IT program manager of this Project (B1) was brilliant, he spent most of his time, especially during the implementation, looking to the people ... so he was so involved and you hardly see any other IT guy that involved in the business ... it makes a big difference".*

For this same project, they also expressed the difficulties they faced around IT integration with the corporate strategy. Different from Project A3, the business managers were committed to the corporate strategy and instead of delegating the

responsibility of sorting out the infrastructure aspect to IS, they worked together to find out the best solution as expressed by a tactical business manager:

> *"From a central perspective we were encouraged to re-use IT infrastructure across the group so we looked at what other areas have... decided that from the systems point of view we can re-use quite a big chunk of the code from another system, it looked sensible for us to do that ... As we got into more detail obviously some of that changed ... actually ended up with a system that look very similar but has been tailored to our business"*

This exemplifies why it is important that business and IS coevolve during project's implementation. Projects never occur as planned and collaborative solutions to the emergent situations enable the participant to focus on the business value realisation. Whilst this project (B1) ended with an independent system, they were able to re-use the infrastructure in place. Although the system had been in production for only a short time, by the time the IS alignment assessment was conducted they already had the figures to support the business case of the project had been achieved.

6.4.5 Scope and architecture

Organisations are under constant change and a flexible IT infrastructure has been reported as a critical element to achieve IS alignment. From the case study it was observed that business managers have recognised its importance. However, decisions taken on IT infrastructure investment depend on the levels of communication and partnership as illustrated below. The extent to which business managers understand the IS capabilities benefits and constraints, are the key to planning a flexible and simple IT infrastructure that enable the organisation to react easily to business changes. Project A2 aims to simplify and improve the IT infrastructure for Business Unit A that has been complicated by mergers and acquisitions.

"There are a number of key business units and none of the existing operating companies within them operate in the same manner and effectively. What we are doing is we are trying to deliver a service to a subset of businesses with different goals until actually you get those people, those individuals in the group entities to line up it is actually quite difficult to achieve, you know, better communication and deliver the value that IT can deliver ... there is always a mindset of what we are delivering here to be sure that is appropriate for the wider audience and not only working for a small group".

IT standards articulation and compliance

This attribute refers to the existence and reinforcement of IT standards:

"We have got some agreed architecture principles and many of those IT principles are just followed automatically. One of them, for example, in our IT architecture we can do things that are tactical in line but to do so governance becomes stricter ... I would say the standards are defined at functional level with emerging coordination across functional units."

Architectural integration

Similar to other attributes, the organisation has managed to integrate at business unit level and there is an emerging process to integrate at corporate level that has started with the shared financial applications as an example.

"Inside the business units there is a target architecture so a new development fits to that architecture, if it doesn't we then see why ... I see each business unit at independent level and how much it can be done at infrastructural level, more transversal..."

Business and IT change management

This attribute was removed from the model since the projects used as the unit of analysis were ongoing projects or have just been finished. In these circumstances there was considerable disruption and this attribute received very low ratings that do not reflect the organisation's practices on change management in reality. This attribute is more relevant at strategic level where the unit of analysis is the enterprise. A business strategic manager describes it as follows:

> *"We had a development in 2006 that was very disruptive... we become very cautious making regression testing, extent quality assurance and that sort of things to make sure this does not happen again"*

Therefore the organisation has change management and quality assurance processes in place to support any change in the organisation, however, for this research the attribute was removed as it is not applicable for IT project's assessment and there was not enough data to identify specific relationships or impact of this attribute on IS alignment.

6.4.6 Human Resources Skills

Innovation culture and Change readiness culture

The organisation is considered conservative and entrepreneurship is moderately encouraged but limited by resources. However, there are exceptions like Project A1 that is a completely different and innovative business model. All the business units have their change management director. A strategic participant expressed it thus:

> *"I think the organisation is so used to change ... size, new systems coming in... There are so many change projects ... it's part of the culture actually... and this is extended to the corporate level".*

These attributes were identified as more related to the organisational culture and the participants refer to them as something they cannot change which suggests a higher impact at structural level. However, there is not enough support and therefore a dotted line is used in the final model to indicate a possible relationship that required further investigation.

Locus of power in IT-based decisions

This refers to who make the important IS decisions. Whilst this is closely related to IT governance the attribute was kept in the resources factor as the decisions are shared between business and IS across different organisational levels as a result of the improvements in communication and partnership. For example, in Business Unit B there is an internal committee formed by business and IS that reviews all projects and make decisions. Such decisions have to be ratified by the directors of the business unit as explained by an IS manager:

> "*...those recommendations would have to be ratified by the directors of the business unit but most of the time the decision to go ahead with the project will be made at that level within that group of people.*"

Ability to attract and retain IT staff

A critical aspect that manifested itself for business and IS managers was the difficulty of attracting and retaining IS professionals who are mainly hired on the basis of their technical skills. This was related to the aforementioned limited understanding of business by IT. Although this represents the mindset of IS's need to evolve to focus on delivering business value it is also important for business to coevolve with IS. Together, business and IS should continually adapt to the competitive environment that require integration of various types and levels of expertise.

For scope and architecture as well as for human resources skills, it was noted that managers make decisions on this aspects depending on their level of communication and partnership and therefore are proposed as one integrated

factor called technological and human resources. In the model it is presented in dotted lines as their impact and interrelationships requires further investigations.

6.5 Summary

This chapter started by delineating the results obtained in previous phases as the context for an in-depth analysis of each attribute. The relationships were evaluated by comparing the results by organisational levels or across different projects. As a result a final model of interrelationships between the factors affecting IS alignment is proposed that includes two categories of factors.

Structural factors have been identified as prerequisites for the dynamic factors to become relevant. However, through small adaptations to the dynamic factors is it feasible to create adaptations to the structural factors. In order to trigger adaptations to the dynamic factors, IT governance mechanisms can be used to enforce collaboration between business and IS facilitates. Communication and partnership would be improved by the collaboration, especially if balanced metrics are defined. For example, the development of business cases is common practice in organisations to obtain authorisation for a project by senior managers.

This research has found business case as a mechanism to improve communication and partnership when:

- Business managers included IS from the inception of the business case development as integrates their mutual knowledge.
- IS managers to improved their strategic skills and focus on IT business value.
- Business and IS managers to share responsibility for delivering the expected business benefits rather than delegating technical and business aspects respectively.

Gradually, through the improvement of communication and partnership, informed decisions between business and IS can be made to allow technical and human

resources to evolve aligned to the business strategy. It is important to emphasis the communication factor is defined as the level of understanding of each other's domains and the mechanisms used to share this knowledge.

Finally, this research identifies the key reasons business managers have for delegating the responsibility of making important IT investment decisions to the IS function. Among the identified reasons limited knowledge of IT potential and regarding IT as the cost of doing business. Thus, if the business managers pays for the service provided by a different functional area, then they feel it is appropriate to delegate the technical aspects to the IS function.

"I think and think for months and years. Ninety-nine times, the conclusion is false. The hundredth time I am right."

Albert Einstein (1879-1955), Theoretical Physicist

Chapter 7 CONCLUSIONS AND FURTHER RESEARCH

7.1 Overview

This chapter draws together the research findings to present an understanding of the inter-relationships between the factors affecting business IS alignment. The chapter starts with an overall summary of the research. Then it will relate the key research findings with the conclusions. Contributions from the research findings will be discussed. Finally, the chapter will present the research limitations and suggests potential future research directions.

7.2 Research Summary

This thesis opened with an overview of the motivation for the research and its scope as described in **Chapter 1**. It has been identified in the literature that IS alignment has been mainly investigated at strategic level and argue the IS alignment commitment between business and IS should be pursue as well at tactical and operational levels. Consequently, this research proposes a model that depicts the *dynamic interrelationships between the factors affecting IS alignment taking in consideration the consideration the impact of those factors across strategic, tactical and operational levels.* The proposed model represents an integration of relevant perspectives on coevolutionary and complexity theories (Benbya and McKelvey, 2006) and multiple process views of IT projects (Sauer and Reich, 2009) as follows.

IS alignment is seen as a continuous coevolutionary process in which organisations are constantly adapting to the environment. Business and IS coevolve during the adaptation process and both views were included in this research. Other studies have aimed to find an equilibrium that has proved difficult to achieve. This research adopts a coevolutionary perspective that seems a more realistic approach. The reconciliation between top down 'rational designs' and bottom-up 'emergent processes' across different organisational levels is taken into consideration by including the views not only of strategic managers who formulate the strategy but also of tactical and operational managers who implement the strategy. Current literature focuses mainly on strategy formulation using top executives as informants and this research extends the analysis to tactical and operational levels. The traditional view of IT projects focused on cost, time and quality is not sufficient to deal with the complexity of IT projects that support business strategy. The focus on value creation, increase the strategic and operational importance of IT projects, consequently IT projects are exposed to more changes due the competitive business environment and their direct link with business success. This research adopts a broader view of IT projects focusing on business value creation by using strategic IT projects as the unit of analysis for the tactical and operational analysis. Current literature has identified the relevance of using IT projects to mediate the relationship between business and IS and the effects of IT. However, IT projects have not been used as the unit of analysis on IS alignment studies as proposed in this research.

Chapter 2 illustrate the interpretative approach used in this thesis that involved quantitative and qualitative methods during the three main research phases: (a) exploratory phase, (b) testing phase and (c) evaluation phase. The rationale and justification for the specific methods and techniques selected in each phase was also explained in this chapter. The **exploratory phase** started with the literature review (**Chapter 3**) which provided the main constructs to investigate. From the models of factors affecting alignment found in literature the SAM model was found the most comprehensive model that includes the factors communication, IT

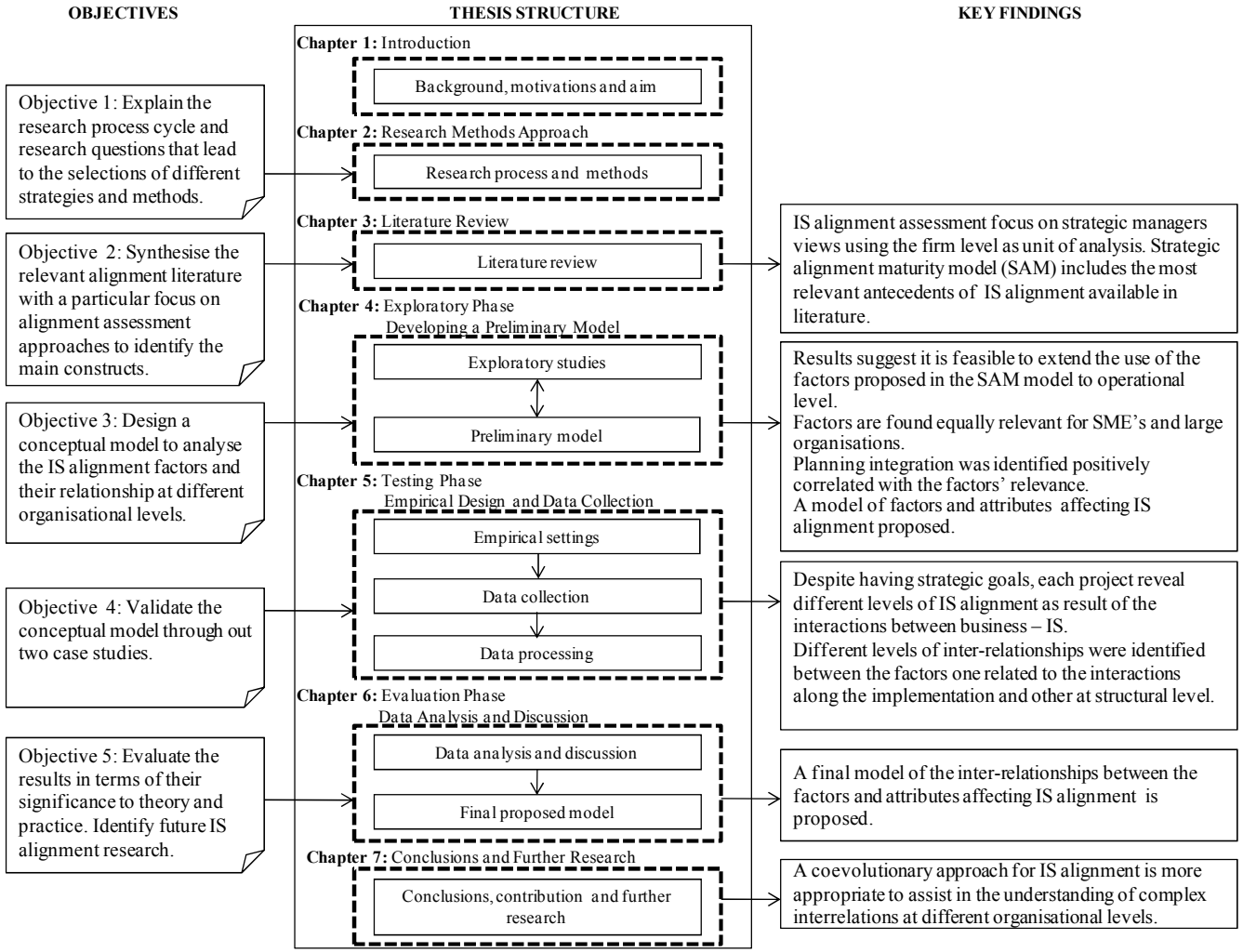
governance, IT value, partnership, scope & architecture and human resources skill. However, these factors have been mainly analysed at strategic level and whilst other models that have found some dependencies and interrelationship between the factors, the SAM model consider all the factor equally influence IS alignment. Therefore two exploratory studies (**Chapter 4**) were undertaken in order to be able to better understand the IS alignment in its context and identify initial relationships to propose a preliminary model. A pilot case study was conducted to gain a better understanding of the constructs and how IT projects could be used as a unit of analysis. Lessons learned from the pilot case study were used for the empirical design in testing phase. Then a survey was applied to identify the relevance of the constructs and initial relationships between the factors and attributes.

The **testing phase** was related to the empirical design setting and data collection to validate the preliminary model presented and is presented in **Chapter 5**. The empirical setting assumed that the factors under study were relevant for both SMEs and large organisations and two case studies were conducted. An IS alignment assessment process was designed to collect data from different sources and be able to offer tangible results to the participant organisations. Whilst both organisations are interested in obtaining business value from their IT investments, the low level of alignment in the SME, especially in IT governance, made difficult to obtain enough support for the proposed model. However, the case study conducted in a large organisation provided data from different sources such as assessment questionnaires (organisational profile, corporate and IT project assessments), semi-structured interviews and projects documentation. A comparison of results between the five projects in the large organisation allowed identification of areas of strength and concern across strategic, tactical and operational levels.

For the **evaluation phase** further analysis was performed to modify the preliminary model in light of the empirical results (**Chapter 6**). In this chapter it is explained how the analysis of root causes and interrelationships between the

factors led to the identification of two categories: dynamic factors and structural factors. *Structural factors* refer to those cultural and structural forces that determine whether IS is seen as a partner in delivering business value from IT investments. On the other hand, the *dynamic factors* refer to those aspects that impact on IS alignment as a result of the dynamic interaction between the people involved during strategy formulation and implementation. Whilst all the dynamic factors are important, the research suggested that high collaboration between business and IS to establish mechanisms to improve IT governance and IT value have a positive impact on communication and partnership, especially the establishment of balanced metrics that focus on business value. An improvement in communication and partnership raises the levels of understanding and trust required to make informed decisions regarding technical and human resources.

Figure 7-1 From objectives to key findings



7.3 Conclusions

This research set out to meet a number of objectives described in Chapter 1, which were accomplished as summarised in Figure 7-1. The findings from the different research phases emphasis:

- The value of examining IS alignment beyond the strategic level that is typically addressed considering the mutual influences between business and IS across different organisational levels.

- Business-IS planning integration is positively correlated with the factor's relevance and the factors were found equally relevant for SMEs and large organisations.

- Key relationships between: planning integration, organisational structure, IT governance, communication and partnership.

Alignment has been mainly researched through the views of senior managers, and whilst they represent the most informed participants in organisations, the views of managers at tactical and operational level reflect the reality people face in day-to-day implementation of the strategies. Both views need to be understood to reduce the gap between strategy formulation and strategy implementation. The integration of business strategy with IS strategy has been analysed and identified in literature and the survey results revealed that organisations that have evolved and developed their business and IS planning processes together rather than independently have a positive correlation with the factor's relevance perception. The survey also provided evidence to support the fact that although IT governance, communication and partnership have all been identified as relevant to achieving IS alignment, there is a critical interrelation between them. The results suggest that improving IT governance triggers the involvement of IS in the strategic planning process and therefore enables improved communication between business and IS. The survey result found that the factors were equally relevant regardless of the organisation's size, except for governance. The IT governance factor varied significantly from large organisations that place more

emphasis on this factor than do medium and small organisations. This suggests that, although current studies in alignment have not explored the differences between large and small organisations in much detail, most of the theories around alignment can be applied to small and medium-sized organisations with some confidence.

IS managers have started to be recognised as knowledgeable about business by business managers. However, both business and IS managers recognise that the understanding of IT by business is rather less evident. The key reasons identified are, first, they consider that further understanding of IT would mean learning extremely technical information. Second, despite the fact that they consider IT relevant for the business, IT is also seen as the cost of doing business. Third, as business is paying for the IT services they delegate important IS decisions to the IS function. The understanding of IT by business is closely related to the IT value factor and the results identify a key attribute for this factor. Balanced metrics received either low rates or the participants had a high variance in their views. Projects where IS was included at the inception of the project in order to understand and contribute to the business case development resulted in higher maturity. The reason for this effect is that participants from both business and IS increase their understanding of each other's environment and develop ownership of the business case goals. Consequently, levels of communication and partnership improve. A key element in this partnership improvement is the relationship of trust required for the project team to deliver business value.

This research assumed that IS alignment is an evolutionary process and this evolution is also evident during the lifetime of the project. The analysis of the data showed that projects at an early stage of implementation obtained higher maturity than finished projects that have had to deal with all the difficulties encountered during project execution. In the early stages the assessment process allowed identification of possible areas of risk. Whereas in completed projects a key element that was identified was the development of trust between participants in the team. This trust relationship allowed them to overcome the limited

understanding of IT by business and a lack of balanced metrics mentioned above. At the earliest stage it is important that participants' mindset is aligned to ensure the team will evolve and overcome difficulties. Of the five projects studied, two (projects A1 and A2) were at an early stage and obtained high levels of IS alignment maturity. However, the magnitude of the project can impact on the levels of consistency between participants' views. The scale of Project A1 was smaller (approximately 150 people) than project A2 that impacted on more than 1000 people. Consequently, there were more variations that need adjustment to avoid a negative impact. On the other hand, three of the projects analysed (projects A3, B1 and B2) had been completed at the time of the assessment, and all of these obtained lower levels of IS alignment maturity. One of these completed projects (B1) was considered very successful as it has achieved the expected business benefits defined in the business case. A key element that was identified in this successful project was the relationship of trust developed between the core team during the implementation phase and the close interaction and clear connections between the business unit and corporate strategy. Constant interaction with and commitment to the main goal (corporate strategy) allowed the team to overcome the limited understanding of IT by business and lack of balanced metrics. Whilst ownership of the business case improves levels of trust, not sharing rewards at the same level inhibited full commitment and partnership between business and IS.

From the above discussion it can be concluded that an organisation instead of aiming for equilibrium as other models propose, should be aware of the different impact the structural and dynamic factors have in their organisations. *Dynamic factors* evolve through the interaction between business and IS and need constantly to be monitored and leveraged to achieve a positive effect on IS alignment. In order to initiate adaptations to the dynamic factors, IT governance mechanisms can be used to enforce collaboration between business and IS. Communication and partnership would be improved by the collaboration, especially if balanced metrics are defined and would facilitate decision-making regarding technical and human resources. *Structural factors* have been identified

as prerequisites for the dynamic factors to become relevant. However, through small adaptations to the dynamic factors is it feasible to create adaptations to the structural factors.

This research demonstrates the fact that the relationship between business and IS evolves as the project progresses but also the level of alignment is impacted by problems faced during the project's execution. By identifying the areas of concern at different stages of the project, managers can leverage the factors to produce a positive adaptation.

7.4 Research Contributions

The principal contributions derived from this thesis are:

- Identification of two categories (structural and dynamic) of interrelationships between the factors affecting IS alignment in the proposed model.

- Analysis of root causes behind the maturity assessment results and identification of patterns across the different projects and levels of analysis that allow depth understanding of the factors affecting IS alignment

- An IS alignment assessment process that extend the analysis to tactical and operational levels incorporating IT projects as units of analysis.

The final model shown in Figure 6-2 represents a contribution as it emphasises the constant adaptation between the components instead of aiming for their equilibrium as other models do. The differentiation between structural and dynamic factors is important to understand the nature and form of alignment. In the short-term, organisations might focus on the dynamic factors to monitor how business and IS evolve across strategic, tactical and operational levels. A gradual improvement of the dynamic factors would create conditions for long-term modifications (structural factors) in the organisation. Structural factors have been identified as prerequisites for the dynamic factors to become relevant. However, it could be difficult to justify making such changes or it is possible an organisation is not ready for structural changes if the dynamic factors are not mature enough. In this context planning integration plays a major role in initiating such modifications. To trigger adaptations to the dynamic factors, the model proposes that IT governance is a critical element that influences how business and IS collaborate to improve communication and partnership. Finally, the improvements on communication and partnership raises the levels of understanding and trust required to make informed decisions regarding technical and human resources.

The content analysis used to identify root causes for the results has not been used in combination with quantitative methods in previous assessment processes. This represents a contribution towards investigating not only the factors affecting alignment but their interrelationships and reasons behind them. Survey has been the main research approach used to investigate alignment, which provides statistical analysis of large samples that help to generalise findings. However, it does not provide depth understanding of alignment in the organisational context. While it is important to obtaining a value for the level of maturity an organisation has, knowing the reasons behind those results enable the organisation to better understand their situation and articulate appropriate action plans. The results presented from the content analysis and the patterns identified for both, high and low levels of alignment may help organisations to relate results to their own situations.

The assessment of IT projects' alignment with business strategy represents an empirical contribution that has not been integrated before in IS alignment assessment processes. The basis for this integration was initially inspired by the approach used by Avison et al. (2004) to determine the degree of alignment between business and IS strategies based on their completed projects. However, the aim was to assess strategic direction rather than assess the IT projects alignment. Coevolutionary and complexity theories (Benbya and McKelvey, 2006) together with multiple process views of IT projects (Sauer and Reich, 2009) provided the theoretical foundations for integration of all the components and the relevance of IT projects as units of analysis.

7.5 Research Limitations

It is impossible to generalise from one case study despite the rigorous process followed for its design. Future empirical work is needed to demonstrate that the findings are not unique to the sample of five projects. Although all the projects were selected for their strategic impact, a limitation in the sample is that not all the project shared similar characteristics related to lifespan, scope and nature. For example, projects at early stages rated higher than finished projects. The nature of the project might also impact on how the participants rate the project, for example, one of the projects represented an innovative business model which could have biased participants' to score higher than participants in more traditional projects such as a system development.

A limitation during the data collection was that the first four factors in the instrument (communications, IT governance, IT value and partnership) took up most of the interview time leaving scope & architecture and human resources skills with limited data for analysis. As a result, the seven attributes indicated on dotted lines in the final model (Figure 6-2) require further investigation. For the model it was only possible to suggest the category of factors to which they belong. It is important to recognise this research represents an empirical introduction to analyse IS alignment considering the nature of alignment as proposed in the coevolutionary IS alignment model (Benbya and McKelvey, 2006).

7.6 Further Research Directions

From IT projects to strategic projects

Any investment in IT presumes an organisation will obtain benefits that may vary from operational to strategic benefits. Traditional approaches to IT project management focus on controlling budget, time and scope. However, those projects that aim to bring strategic benefits have proved to be more complex given a degree of uncertainty and a changing environment. Further research is proposed to investigate the evolution of IT project alignment focused on value creation or

business benefit delivery and an analysis of variables like project lifespan, scale and nature.

Aligning the projects with corporate strategy

This research analysed IT projects alignment with business strategy. It emerged, not surprisingly, that large organisations have a number of levels of management decisions between the corporate and the operational levels. Whilst this research grouped directors at corporate level and directors of business units at strategic level, further research is suggested to specifically address the complexity of aligning business unit strategies with corporate strategies that this research has found critical in order to improve overall IS alignment in an organisation.

IT organisational structure

This research emphasises the impact of IT organisational structure. Therefore, further research is suggested to identify how organisations can adapt and evolve their IT organisational structure in order to improve their current levels of alignment. Understanding more about the impact of centralised, decentralised and federated structures in organisations, depending on other structural factors such as organisational size, industry, planning integration etc, would help to identify evolutionary patterns.

The gap between participants at different organisational levels is bigger than the traditional gap between business and IS.

A comparison of participants' perceptions at strategic, tactical and operational levels showed a more accentuate gap than the traditional gap between business and IS. Whilst this may imply that organisations find it challenging to align business and IS across different organisational levels, it does not necessarily mean less effort is needed as regards business and IS relationships. Research focused on the dynamics between the different organisational levels is another area for further research.

Tactical managers rate the factors higher than strategic and operational managers

In chapter 5, for UK COMPANY it was identified that tactical managers rated the factors more highly than strategic and operational managers. A possible explanation is that strategic managers, having a wider view of the whole organisation, are aware of the challenges in aligning business units' strategies with corporate strategy, and are thus disinclined to rate the factors highly, even where some business units are more aligned than others. On the other hand, operational managers also rated the factors lower, possibly because they have to face difficulties during implementation and, more importantly, the impact of limited understanding of IT by business. Tactical managers, whilst closer to both ends of the spectrum are more biased towards performance in their specific business unit as observed in the large organisation and, influenced by this fact, rate the factors higher. This research does not have enough evidence to support this finding and further research is suggested.

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APPENDIX A: EXPLORATORY PHASE APPENDIX

A.1 Instrument for pilot study

Q1 Check the classification most appropriate for your organisation:
Education/ManufacturingRetailGovernment or Public AdministrationBanking/Finance
Insurance/Construction/Health/Pharmaceutical/Business Services (includes IT services)/Other

Q2 How many employees are there in total in your organisation?

Q3 Where is your organisation located?

Q4 In which of the following groups do your main activities fit?
Business group/Information Technology group/Other

Q5 What organisational level your main activities belong to?
Strategic/Tactical/Operational

Q6 What is the level in which the business strategic planning is developed in your organisation?
Ad-hoc planning for some projects
Basic planning at the functional level
Some inter-organisational planning
Managed across the enterprise
Integrated across and outside the enterprise

Q7 What is the level in which the IT strategic planning is developed?
Ad-hoc planning for some projects
Basic planning at the functional level
Some inter-organisational planning
Managed across the enterprise
Integrated across and outside the enterprise

Q8 At what level are the business and IT strategic planning integrated?
At the functional level
Business process
Inter-organisational
Across the enterprise
Integrated across and outside the enterprise

Q9 How are IT projects prioritized?
Reactive to the current needs
Guided by the business strategic planning
Guided by the IT strategic planning

Through steering committees
Partnership between business and IT

Q10 Answer the following section from your experience on projects that require IT to some degree. How many people involved in the IT projects could answer the following questions. Check all that apply.

	None	Executive management	IT department	Project leader	All the participants
Which business strategies are supported by the IT projects?					
Which business processes are impacted by the IT projects?					
What are the main business benefits of the IT projects?					
What IT are your competitors using, compared to the IT projects in your organisation?					

Q11 What level of applications is your organisation using? Check all that apply.
Desktop suites (e.g. Word processing, productivity)
Communication systems (e.g. groupware, e-mail)
Transactional systems for accounting, finance, marketing, etc.
Decision support systems for accounting, finance, marketing, etc.
Enterprise systems (ERP, CRM)
Interorganisational Information systems (EDI, Electronic Business)
Other

Q12 Application integration refers to the level of data communication between the different applications used to acomplish a business process.
What is the level of applications integration?
No formal integration
Early attempts at integration
Emerging enterprise standard
Enterprise standards
Inter-enterprise standards

Q13 Are the IT applications supporting the organisations business processes?
No/Not well/A little/Mostly/Yes

Q14 How many people involved in the IT projects could answer the following questions. Check all that apply.

	None	Executive management	IT department	Project leader	All the participants
Which IT supports the business strategies?					
Which IT is used in the functional areas?					
Which IT is used in the business processes?					
What are the IT benefits for your organisation?					
What IT are your competitors using, compared to the IT on your organisation?					

Q15 Answer the following section from your experience on projects that require IT to some degree. Rate your level of agreement of each of the following statements:

	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree
There are regular meetings to assess the achievement of results for IT projects					
Problems are discussed in a team that involves business and IT people					
Any participant could speak freely					
The organisation has a learning together approach					

There are mechanisms to pervade the learning together approach in all the organisational levels.					

Q16 To what extend do you believe the following statements are valid in your organisation:

	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree
The decision making process is informal rather than command and control					
There are formal liaisons between IT and business units at all organisational levels					
The trust style between IT and business units is considered as valued partnership					
There are formal steering committee(s) to prioritise the IT projects.					
The CIO reports to CEO in the organisation structure					

Q17 Please select the appropriate level of agreement for each of the following statements.

	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree
There is a formal process to prioritises the IT projects					
The CIO reports directly to the CEO					
There are regular meetings to assess if the IT project is aligned to the business objectives					
The role of CIO is to execute the business goals but he does not participate in the business					

planning					
There are formal assessment of IT projects that are carried out by IT and business areas in partnership					
The IT department enables the business strategies					

Q18 Select the appropriate level for each of the following questions.

	None	Departmental	Across several departments	Across the organization	Between trading partners
At what level is the IT aligned with the business objectives?					
At what level is there a shared understanding of the IT business value?					
At what level have the use of IT and systems resources been utilized to support the business process?					
At what level is formal IT training provided?					
At what level is the impact of IT assessed?					
At what level are goals, risk, rewards and penalties shared between business and IT areas?					

Q19 To your knowledge which of the following type of metrics are defined and used in your organisation for IT projects:
Technical metrics
Business metrics
Business and IT metrics unlinked
Business and IT metrics linked
Business, partners and IT metrics linked
Other

Q20 Are any of the following used in your organisation to measure the benefits of IT in your organisation? Check all that apply.
Key performance indicators (KPIs)
ROI/TCO type measurements
Balanced scorecard (BSC)
EFQM (European Foundation for Quality Management) Excellence Model
Activity base costing
Share holder value added
Competitive benchmarking
Other

Q21 Are your employees evaluated on achieving the IT project goals that are aligned with the business goals?
Not at all/Not well/A little/Very well/Unknown

Q22 How often do you use the following types of metrics?

	Never	Rarely	Some	Often	Always
Cost reduction					
Customer satisfaction					
Quality					
Efficiency					
Strategy					

Q23 Are the people impacted by any IT project receiving training programs?
No
Planning to but not implemented yet
Ad-hoc training
Basic training
Fully planned and implemented

Q24 Do you know if your IT projects are successful?
Yes/No

Q25 If your IT projects are successful, were the business goals achieved?
Yes/No/Don't know

Q26 If the business goals were achieved, did the IT add value to the organisation?
Yes/No/Don't know

Q27 Which of the following is the most relevant factor to be improved in your organisation to ensure a better alignment between business and IT people? Rank values must be between 1 and 6, where 1 is the most relevant.
Communications (across organisational level between IT and business people)
Metrics to assess the IT business value
Governance (how the authority for resources, risk, conflict resolution and responsibility is manage)
Partnership ((how the authority for resources, risk, conflict resolution and responsibility is share)
Architecture (infrastructure and technology policies)
Skills (H/R consideration to support the business-IT alignment)

A.2 Instrument for survey

Part I: Background Information

Q1

Please answer the following general questions.

How many employees are there in total in your organisation?

- 1-100
- 101-250
- 251-1000
- 1001-5000
- >5000

Q2

Tick the classification most appropriate for your organisation:

- Education
- Manufacturing
- Retail
- Government or Public Administration
- Banking/Finance
- Insurance
- Pharmaceutical
- Construction
- Health
- Petroleum
- Business services
- Other

Q3

Where is your organisation located? _____

Q4

To which of the following business units do you belong?

- Business
- IT
- Both

Q5

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

How would you rate the level of integration within your organization? Choose one.

- **Independen**t (IS strategy formulation and business strategy formulation are separate, unrelated processes)
- **Sequential** (IS strategy formulation follows and supports business strategy formulation)

- **Simultaneous** (IS strategy formulation and business strategy formulation are done concurrently)

Part II: Prioritisation 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.

Q6

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).

- Understanding of business strategies by the IT department
- Understanding of IT capabilities by the business department
- Knowledge sharing between organisational levels from strategic to operational and with business partners (e.g. other commercial entities such as suppliers, customers, etc)
- Creating a communication environment that promotes freedom to express opinions about business and IT strategies in a flexible and informal way
- Conducting regular meetings between IT and business departments to discuss IT priorities, requirements and implementation

Q7

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).

- Selection of appropriate metrics for the organisation
- Balancing of metrics by linking Business and IT metrics
- Application of metrics at different organisational levels
- Making effective use of measurements obtained from the metrics application
- Using selected metrics on a regular basis

Q8

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).

- Integrating the enterprise's business plan and IT plan
- Linking IT projects with the integrated business-IT plan
- Reviewing business priorities before adopting any IT project
- Conducting steering committees to prioritise IT projects
- Evaluating IT investments before and after implementation

Q9

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).

- Involving IT department in developing business strategies
- Sharing of risk and rewards by IT and business management in relation to IT projects
- 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
- Sharing a long-term relationship between IT and business that enables trust

Q10

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).

- IT is able to provide integrated information systems across the organisation and with business partners
- IT is able to provide a flexible infrastructure that enables fast response to changes
- IT is able to evaluate and apply emerging technologies effectively
- IT is able to enable or drive business processes and strategies with a broad scope of information systems
- IT is able to provide information security

Q11

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).

- Providing formal opportunities to learn both IT and business skills
- Providing formal training before implementing a new IT project
- Providing career crossover opportunities among business departments
- Willingness or readiness to adopt technological changes
- Trusting social and political culture

A.3 Survey Descriptive Statistics and Normality Tests

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
COMM1	104	100.0%	0	.0%	104	100.0%
COMM2	104	100.0%	0	.0%	104	100.0%
COMM3	104	100.0%	0	.0%	104	100.0%
COMM4	104	100.0%	0	.0%	104	100.0%
COMM5	104	100.0%	0	.0%	104	100.0%
VALUE1	104	100.0%	0	.0%	104	100.0%
VALUE2	104	100.0%	0	.0%	104	100.0%
VALUE3	104	100.0%	0	.0%	104	100.0%
VALUE4	104	100.0%	0	.0%	104	100.0%
VALUE5	104	100.0%	0	.0%	104	100.0%
GOV1	104	100.0%	0	.0%	104	100.0%
GOV2	104	100.0%	0	.0%	104	100.0%
GOV3	104	100.0%	0	.0%	104	100.0%
GOV4	104	100.0%	0	.0%	104	100.0%
GOV5	104	100.0%	0	.0%	104	100.0%
PART1	104	100.0%	0	.0%	104	100.0%
PART2	104	100.0%	0	.0%	104	100.0%
PART3	104	100.0%	0	.0%	104	100.0%
PART4	104	100.0%	0	.0%	104	100.0%
PART5	104	100.0%	0	.0%	104	100.0%
ARCH1	104	100.0%	0	.0%	104	100.0%
ARCH2	104	100.0%	0	.0%	104	100.0%
ARCH3	104	100.0%	0	.0%	104	100.0%
ARCH4	104	100.0%	0	.0%	104	100.0%
ARCH5	104	100.0%	0	.0%	104	100.0%
SKILL1	104	100.0%	0	.0%	104	100.0%
SKILL2	104	100.0%	0	.0%	104	100.0%
SKILL3	104	100.0%	0	.0%	104	100.0%
SKILL4	104	100.0%	0	.0%	104	100.0%
SKILL5	104	100.0%	0	.0%	104	100.0%

Descriptive Statistics

	Mean	Std. Deviation	N
COMM1	4.0962	1.02890	104
COMM2	3.7308	.96774	104
COMM3	3.7212	.99958	104
COMM4	3.7981	1.11808	104
COMM5	3.6731	1.09227	104
VALUE1	3.4904	1.14904	104
VALUE2	3.4712	1.14023	104
VALUE3	3.3654	1.07086	104
VALUE4	3.7019	1.17316	104
VALUE5	3.5865	1.10261	104
GOV1	4.1058	1.01368	104
GOV2	3.9615	.97466	104
GOV3	3.9519	1.04630	104
GOV4	3.6635	1.11138	104
GOV5	3.6346	1.16634	104
PART1	3.5096	1.16582	104
PART2	3.3846	1.14322	104
PART3	3.8846	.91702	104
PART4	3.9519	1.11808	104
PART5	3.8462	1.05912	104
ARCH1	3.9038	1.02890	104
ARCH2	3.7212	1.07448	104
ARCH3	3.4423	1.12195	104
ARCH4	3.4904	1.11473	104
ARCH5	3.9808	1.08816	104
SKILL1	3.6635	1.04844	104
SKILL2	3.6635	1.12008	104
SKILL3	3.1827	1.06820	104
SKILL4	3.6635	1.00107	104
SKILL5	3.2692	1.11678	104

Descriptives

			Statistic	Std. Error
COMM1	Mean		4.0962	.10089
	95% Confidence Interval for Mean	Lower Bound	3.8961	
		Upper Bound	4.2962	
	5% Trimmed Mean		4.1624	
	Median		4.0000	
	Variance		1.059	
	Std. Deviation		1.02890	
	Minimum		2.00	
	Maximum		5.00	
	Range		3.00	
	Interquartile Range		2.00	
	Skewness		-.741	.237
	Kurtosis		-.745	.469
COMM2	Mean		3.7308	.09489
	95% Confidence Interval for Mean	Lower Bound	3.5426	
		Upper Bound	3.9190	
	5% Trimmed Mean		3.7671	
	Median		4.0000	
	Variance		.937	
	Std. Deviation		.96774	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.75	
	Skewness		-.285	.237
	Kurtosis		-.585	.469
COMM3	Mean		3.7212	.09802
	95% Confidence Interval for Mean	Lower Bound	3.5268	
		Upper Bound	3.9155	
	5% Trimmed Mean		3.7671	
	Median		4.0000	
	Variance		.999	
	Std. Deviation		.99958	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.75	
	Skewness		-.423	.237
	Kurtosis		-.339	.469
COMM4	Mean		3.7981	.10964
	95% Confidence Interval for Mean	Lower Bound	3.5806	
		Upper Bound	4.0155	

	5% Trimmed Mean		3.8632	
	Median		4.0000	
	Variance		1.250	
	Std. Deviation		1.11808	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		2.00	
	Skewness		-.610	.237
	Kurtosis		-.510	.469
COMM5	Mean		3.6731	.10711
	95% Confidence Interval for Mean	Lower Bound	3.4607	
		Upper Bound	3.8855	
	5% Trimmed Mean		3.7244	
	Median		4.0000	
	Variance		1.193	
	Std. Deviation		1.09227	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		2.00	
	Skewness		-.363	.237
	Kurtosis		-.635	.469
VALUE1	Mean		3.4904	.11267
	95% Confidence Interval for Mean	Lower Bound	3.2669	
		Upper Bound	3.7138	
	5% Trimmed Mean		3.5427	
	Median		4.0000	
	Variance		1.320	
	Std. Deviation		1.14904	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.309	.237
	Kurtosis		-.730	.469
VALUE2	Mean		3.4712	.11181
	95% Confidence Interval for Mean	Lower Bound	3.2494	
		Upper Bound	3.6929	
	5% Trimmed Mean		3.5235	
	Median		4.0000	
	Variance		1.300	
	Std. Deviation		1.14023	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	

	Interquartile Range		1.00	
	Skewness		-.408	.237
	Kurtosis		-.576	.469
VALUE3	Mean		3.3654	.10501
	95% Confidence Interval for Mean	Lower Bound	3.1571	
		Upper Bound	3.5736	
	5% Trimmed Mean		3.3932	
	Median		3.0000	
	Variance		1.147	
	Std. Deviation		1.07086	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.149	.237
	Kurtosis		-.627	.469
VALUE4	Mean		3.7019	.11504
	95% Confidence Interval for Mean	Lower Bound	3.4738	
		Upper Bound	3.9301	
	5% Trimmed Mean		3.7457	
	Median		4.0000	
	Variance		1.376	
	Std. Deviation		1.17316	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		2.00	
	Skewness		-.426	.237
	Kurtosis		-1.048	.469
VALUE5	Mean		3.5865	.10812
	95% Confidence Interval for Mean	Lower Bound	3.3721	
		Upper Bound	3.8010	
	5% Trimmed Mean		3.6175	
	Median		4.0000	
	Variance		1.216	
	Std. Deviation		1.10261	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.401	.237
	Kurtosis		-.878	.469
GOV1	Mean		4.1058	.09940
	95% Confidence Interval for Mean	Lower Bound	3.9086	
		Upper Bound	4.3029	

	5% Trimmed Mean		4.1731	
	Median		4.0000	
	Variance		1.028	
	Std. Deviation		1.01368	
	Minimum		2.00	
	Maximum		5.00	
	Range		3.00	
	Interquartile Range		2.00	
	Skewness		-.729	.237
	Kurtosis		-.747	.469
GOV2	Mean		3.9615	.09557
	95% Confidence Interval for Mean	Lower Bound	3.7720	
		Upper Bound	4.1511	
	5% Trimmed Mean		4.0128	
	Median		4.0000	
	Variance		.950	
	Std. Deviation		.97466	
	Minimum		2.00	
	Maximum		5.00	
	Range		3.00	
	Interquartile Range		2.00	
	Skewness		-.563	.237
	Kurtosis		-.706	.469
GOV3	Mean		3.9519	.10260
	95% Confidence Interval for Mean	Lower Bound	3.7484	
		Upper Bound	4.1554	
	5% Trimmed Mean		4.0128	
	Median		4.0000	
	Variance		1.095	
	Std. Deviation		1.04630	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		2.00	
	Skewness		-.680	.237
	Kurtosis		-.511	.469
GOV4	Mean		3.6635	.10898
	95% Confidence Interval for Mean	Lower Bound	3.4473	
		Upper Bound	3.8796	
	5% Trimmed Mean		3.7030	
	Median		4.0000	
	Variance		1.235	
	Std. Deviation		1.11138	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	

	Interquartile Range		2.00	
	Skewness		-.423	.237
	Kurtosis		-.848	.469
GOV5	Mean		3.6346	.11437
	95% Confidence Interval for Mean	Lower Bound	3.4078	
		Upper Bound	3.8614	
	5% Trimmed Mean		3.7030	
	Median		4.0000	
	Variance		1.360	
	Std. Deviation		1.16634	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		2.00	
	Skewness		-.483	.237
	Kurtosis		-.626	.469
PART1	Mean		3.5096	.11432
	95% Confidence Interval for Mean	Lower Bound	3.2829	
		Upper Bound	3.7363	
	5% Trimmed Mean		3.5662	
	Median		4.0000	
	Variance		1.359	
	Std. Deviation		1.16582	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.417	.237
	Kurtosis		-.649	.469
PART2	Mean		3.3846	.11210
	95% Confidence Interval for Mean	Lower Bound	3.1623	
		Upper Bound	3.6069	
	5% Trimmed Mean		3.4274	
	Median		3.5000	
	Variance		1.307	
	Std. Deviation		1.14322	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.366	.237
	Kurtosis		-.600	.469
PART3	Mean		3.8846	.08992
	95% Confidence Interval for Mean	Lower Bound	3.7063	
		Upper Bound	4.0630	

	5% Trimmed Mean		3.9274	
	Median		4.0000	
	Variance		.841	
	Std. Deviation		.91702	
	Minimum		2.00	
	Maximum		5.00	
	Range		3.00	
	Interquartile Range		2.00	
	Skewness		-.383	.237
	Kurtosis		-.713	.469
PART4	Mean		3.9519	.10964
	95% Confidence Interval for Mean	Lower Bound	3.7345	
		Upper Bound	4.1694	
	5% Trimmed Mean		4.0235	
	Median		4.0000	
	Variance		1.250	
	Std. Deviation		1.11808	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		2.00	
	Skewness		-.796	.237
	Kurtosis		-.418	.469
PART5	Mean		3.8462	.10386
	95% Confidence Interval for Mean	Lower Bound	3.6402	
		Upper Bound	4.0521	
	5% Trimmed Mean		3.8953	
	Median		4.0000	
	Variance		1.122	
	Std. Deviation		1.05912	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		2.00	
	Skewness		-.586	.237
	Kurtosis		-.650	.469
ARCH1	Mean		3.9038	.10089
	95% Confidence Interval for Mean	Lower Bound	3.7038	
		Upper Bound	4.1039	
	5% Trimmed Mean		3.9808	
	Median		4.0000	
	Variance		1.059	
	Std. Deviation		1.02890	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	

	Interquartile Range		2.00	
	Skewness		-.895	.237
	Kurtosis		.382	.469
ARCH2	Mean		3.7212	.10536
	95% Confidence Interval for Mean	Lower Bound	3.5122	
		Upper Bound	3.9301	
	5% Trimmed Mean		3.7885	
	Median		4.0000	
	Variance		1.154	
	Std. Deviation		1.07448	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.75	
	Skewness		-.712	.237
	Kurtosis		-.068	.469
ARCH3	Mean		3.4423	.11002
	95% Confidence Interval for Mean	Lower Bound	3.2241	
		Upper Bound	3.6605	
	5% Trimmed Mean		3.4915	
	Median		3.5000	
	Variance		1.259	
	Std. Deviation		1.12195	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.484	.237
	Kurtosis		-.232	.469
ARCH4	Mean		3.4904	.10931
	95% Confidence Interval for Mean	Lower Bound	3.2736	
		Upper Bound	3.7072	
	5% Trimmed Mean		3.5449	
	Median		4.0000	
	Variance		1.243	
	Std. Deviation		1.11473	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.426	.237
	Kurtosis		-.403	.469
ARCH5	Mean		3.9808	.10670
	95% Confidence Interval for Mean	Lower Bound	3.7691	
		Upper Bound	4.1924	

	5% Trimmed Mean		4.0556	
	Median		4.0000	
	Variance		1.184	
	Std. Deviation		1.08816	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		2.00	
	Skewness		-.837	.237
	Kurtosis		-.232	.469
SKILL1	Mean		3.6635	.10281
	95% Confidence Interval for Mean	Lower Bound	3.4596	
		Upper Bound	3.8674	
	5% Trimmed Mean		3.7244	
	Median		4.0000	
	Variance		1.099	
	Std. Deviation		1.04844	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.625	.237
	Kurtosis		-.050	.469
SKILL2	Mean		3.6635	.10983
	95% Confidence Interval for Mean	Lower Bound	3.4456	
		Upper Bound	3.8813	
	5% Trimmed Mean		3.7244	
	Median		4.0000	
	Variance		1.255	
	Std. Deviation		1.12008	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		2.00	
	Skewness		-.568	.237
	Kurtosis		-.478	.469
SKILL3	Mean		3.1827	.10475
	95% Confidence Interval for Mean	Lower Bound	2.9750	
		Upper Bound	3.3904	
	5% Trimmed Mean		3.2030	
	Median		3.0000	
	Variance		1.141	
	Std. Deviation		1.06820	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	

	Interquartile Range		2.00	
	Skewness		-.082	.237
	Kurtosis		-.555	.469
SKILL4	Mean		3.6635	.09816
	95% Confidence Interval for Mean	Lower Bound	3.4688	
		Upper Bound	3.8581	
	5% Trimmed Mean		3.7244	
	Median		4.0000	
	Variance		1.002	
	Std. Deviation		1.00107	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.817	.237
	Kurtosis		.395	.469
SKILL5	Mean		3.2692	.10951
	95% Confidence Interval for Mean	Lower Bound	3.0520	
		Upper Bound	3.4864	
	5% Trimmed Mean		3.2991	
	Median		3.0000	
	Variance		1.247	
	Std. Deviation		1.11678	
	Minimum		1.00	
	Maximum		5.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.425	.237
	Kurtosis		-.470	.469

Tests of Normality

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
COMM1	.291	104	.000	.790	104	.000
COMM2	.196	104	.000	.881	104	.000
COMM3	.206	104	.000	.884	104	.000
COMM4	.206	104	.000	.864	104	.000
COMM5	.183	104	.000	.881	104	.000
VALUE1	.181	104	.000	.900	104	.000
VALUE2	.207	104	.000	.900	104	.000
VALUE3	.182	104	.000	.909	104	.000
VALUE4	.206	104	.000	.859	104	.000
VALUE5	.252	104	.000	.874	104	.000
GOV1	.292	104	.000	.792	104	.000
GOV2	.218	104	.000	.841	104	.000
GOV3	.226	104	.000	.840	104	.000
GOV4	.225	104	.000	.877	104	.000
GOV5	.190	104	.000	.883	104	.000
PART1	.201	104	.000	.896	104	.000
PART2	.205	104	.000	.905	104	.000
PART3	.223	104	.000	.860	104	.000
PART4	.239	104	.000	.825	104	.000
PART5	.231	104	.000	.855	104	.000
ARCH1	.258	104	.000	.845	104	.000
ARCH2	.256	104	.000	.870	104	.000
ARCH3	.190	104	.000	.892	104	.000
ARCH4	.195	104	.000	.898	104	.000
ARCH5	.239	104	.000	.826	104	.000
SKILL1	.241	104	.000	.881	104	.000
SKILL2	.233	104	.000	.880	104	.000
SKILL3	.183	104	.000	.914	104	.000
SKILL4	.295	104	.000	.855	104	.000
SKILL5	.215	104	.000	.900	104	.000

a Lilliefors Significance Correction

A.4 Correlations

		COMM1	COMM2	COMM3	COMM4	COMM5
COMM1	Pearson Correlation	1	.572(**)	.517(**)	.498(**)	.443(**)
	Sig. (2-tailed)		.000	.000	.000	.000
	Sum of Squares and Cross-products	109.038	58.692	54.788	59.019	51.269
	Covariance	1.059	.570	.532	.573	.498
	N	104	104	104	104	104
COMM2	Pearson Correlation	.572(**)	1	.554(**)	.461(**)	.412(**)
	Sig. (2-tailed)	.000		.000	.000	.000
	Sum of Squares and Cross-products	58.692	96.462	55.192	51.346	44.846
	Covariance	.570	.937	.536	.499	.435
	N	104	104	104	104	104
COMM3	Pearson Correlation	.517(**)	.554(**)	1	.618(**)	.538(**)
	Sig. (2-tailed)	.000	.000		.000	.000
	Sum of Squares and Cross-products	54.788	55.192	102.913	71.144	60.519
	Covariance	.532	.536	.999	.691	.588
	N	104	104	104	104	104
COMM4	Pearson Correlation	.498(**)	.461(**)	.618(**)	1	.621(**)
	Sig. (2-tailed)	.000	.000	.000		.000
	Sum of Squares and Cross-products	59.019	51.346	71.144	128.760	78.135
	Covariance	.573	.499	.691	1.250	.759
	N	104	104	104	104	104
COMM5	Pearson Correlation	.443(**)	.412(**)	.538(**)	.621(**)	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	Sum of Squares and Cross-products	51.269	44.846	60.519	78.135	122.885
	Covariance	.498	.435	.588	.759	1.193
	N	104	104	104	104	104

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

		VALUE1	VALUE2	VALUE3	VALUE4	VALUE5
VALUE1	Pearson Correlation	1	.741(**)	.642(**)	.729(**)	.736(**)
	Sig. (2-tailed)		.000	.000	.000	.000
	Sum of Squares and Cross-products	135.990	99.971	81.365	101.202	96.087
	Covariance	1.320	.971	.790	.983	.933
	N	104	104	104	104	104
VALUE2	Pearson Correlation	.741(**)	1	.764(**)	.672(**)	.658(**)
	Sig. (2-tailed)	.000		.000	.000	.000
	Sum of Squares and Cross-products	99.971	133.913	96.096	92.606	85.260
	Covariance	.971	1.300	.933	.899	.828
	N	104	104	104	104	104
VALUE3	Pearson Correlation	.642(**)	.764(**)	1	.683(**)	.623(**)
	Sig. (2-tailed)	.000	.000		.000	.000
	Sum of Squares and Cross-products	81.365	96.096	118.115	88.327	75.712
	Covariance	.790	.933	1.147	.858	.735
	N	104	104	104	104	104
VALUE4	Pearson Correlation	.729(**)	.672(**)	.683(**)	1	.797(**)
	Sig. (2-tailed)	.000	.000	.000		.000
	Sum of Squares and Cross-products	101.202	92.606	88.327	141.760	106.183
	Covariance	.983	.899	.858	1.376	1.031
	N	104	104	104	104	104
VALUE5	Pearson Correlation	.736(**)	.658(**)	.623(**)	.797(**)	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	Sum of Squares and Cross-products	96.087	85.260	75.712	106.183	125.221
	Covariance	.933	.828	.735	1.031	1.216
	N	104	104	104	104	104

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

		GOV1	GOV2	GOV3	GOV4	GOV5
GOV1	Pearson Correlation	1	.731(**)	.636(**)	.402(**)	.460(**)
	Sig. (2-tailed)		.000	.000	.000	.000
	Sum of Squares and Cross-products	105.837	74.423	69.529	46.702	56.019
	Covariance	1.028	.723	.675	.453	.544
	N	104	104	104	104	104
GOV2	Pearson Correlation	.731(**)	1	.712(**)	.606(**)	.628(**)
	Sig. (2-tailed)	.000		.000	.000	.000
	Sum of Squares and Cross-products	74.423	97.846	74.808	67.654	73.538
	Covariance	.723	.950	.726	.657	.714
	N	104	104	104	104	104
GOV3	Pearson Correlation	.636(**)	.712(**)	1	.654(**)	.550(**)
	Sig. (2-tailed)	.000	.000		.000	.000
	Sum of Squares and Cross-products	69.529	74.808	112.760	78.317	69.173
	Covariance	.675	.726	1.095	.760	.672
	N	104	104	104	104	104
GOV4	Pearson Correlation	.402(**)	.606(**)	.654(**)	1	.653(**)
	Sig. (2-tailed)	.000	.000	.000		.000
	Sum of Squares and Cross-products	46.702	67.654	78.317	127.221	87.212
	Covariance	.453	.657	.760	1.235	.847
	N	104	104	104	104	104
GOV5	Pearson Correlation	.460(**)	.628(**)	.550(**)	.653(**)	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	Sum of Squares and Cross-products	56.019	73.538	69.173	87.212	140.115
	Covariance	.544	.714	.672	.847	1.360
	N	104	104	104	104	104

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

		PART1	PART2	PART3	PART4	PART5
PART1	Pearson Correlation	1	.595(**)	.591(**)	.518(**)	.536(**)
	Sig. (2-tailed)		.000	.000	.000	.000
	Sum of Squares and Cross-products	139.990	81.615	65.115	69.548	68.154
	Covariance	1.359	.792	.632	.675	.662
	N	104	104	104	104	104
PART2	Pearson Correlation	.595(**)	1	.552(**)	.584(**)	.587(**)
	Sig. (2-tailed)	.000		.000	.000	.000
	Sum of Squares and Cross-products	81.615	134.615	59.615	76.923	73.154
	Covariance	.792	1.307	.579	.747	.710
	N	104	104	104	104	104
PART3	Pearson Correlation	.591(**)	.552(**)	1	.591(**)	.641(**)
	Sig. (2-tailed)	.000	.000		.000	.000
	Sum of Squares and Cross-products	65.115	59.615	86.615	62.423	64.154
	Covariance	.632	.579	.841	.606	.623
	N	104	104	104	104	104
PART4	Pearson Correlation	.518(**)	.584(**)	.591(**)	1	.707(**)
	Sig. (2-tailed)	.000	.000	.000		.000
	Sum of Squares and Cross-products	69.548	76.923	62.423	128.760	86.231
	Covariance	.675	.747	.606	1.250	.837
	N	104	104	104	104	104
PART5	Pearson Correlation	.536(**)	.587(**)	.641(**)	.707(**)	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	Sum of Squares and Cross-products	68.154	73.154	64.154	86.231	115.538
	Covariance	.662	.710	.623	.837	1.122
	N	104	104	104	104	104

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

		ARCH1	ARCH2	ARCH3	ARCH4	ARCH5
ARCH1	Pearson Correlation	1	.687(**)	.491(**)	.651(**)	.475(**)
	Sig. (2-tailed)		.000	.000	.000	.000
	Sum of Squares and Cross-products	109.038	78.212	58.423	76.904	54.808
	Covariance	1.059	.759	.567	.747	.532
	N	104	104	104	104	104
ARCH2	Pearson Correlation	.687(**)	1	.659(**)	.658(**)	.519(**)
	Sig. (2-tailed)	.000		.000	.000	.000
	Sum of Squares and Cross-products	78.212	118.913	81.827	81.221	62.442
	Covariance	.759	1.154	.794	.789	.606
	N	104	104	104	104	104
ARCH3	Pearson Correlation	.491(**)	.659(**)	1	.524(**)	.540(**)
	Sig. (2-tailed)	.000	.000		.000	.000
	Sum of Squares and Cross-products	58.423	81.827	129.654	67.442	67.885
	Covariance	.567	.794	1.259	.655	.659
	N	104	104	104	104	104
ARCH4	Pearson Correlation	.651(**)	.658(**)	.524(**)	1	.576(**)
	Sig. (2-tailed)	.000	.000	.000		.000
	Sum of Squares and Cross-products	76.904	81.221	67.442	127.990	71.981
	Covariance	.747	.789	.655	1.243	.699
	N	104	104	104	104	104
ARCH5	Pearson Correlation	.475(**)	.519(**)	.540(**)	.576(**)	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	Sum of Squares and Cross-products	54.808	62.442	67.885	71.981	121.962
	Covariance	.532	.606	.659	.699	1.184
	N	104	104	104	104	104

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

		SKILL1	SKILL2	SKILL3	SKILL4	SKILL5
SKILL1	Pearson Correlation	1	.572(**)	.654(**)	.557(**)	.435(**)
	Sig. (2-tailed)		.000	.000	.000	.000
	Sum of Squares and Cross-products	113.221	69.221	75.394	60.221	52.423
	Covariance	1.099	.672	.732	.585	.509
	N	104	104	104	104	104
SKILL2	Pearson Correlation	.572(**)	1	.571(**)	.539(**)	.360(**)
	Sig. (2-tailed)	.000		.000	.000	.000
	Sum of Squares and Cross-products	69.221	129.221	70.394	62.221	46.423
	Covariance	.672	1.255	.683	.604	.451
	N	104	104	104	104	104
SKILL3	Pearson Correlation	.654(**)	.571(**)	1	.494(**)	.593(**)
	Sig. (2-tailed)	.000	.000		.000	.000
	Sum of Squares and Cross-products	75.394	70.394	117.529	54.394	72.885
	Covariance	.732	.683	1.141	.528	.708
	N	104	104	104	104	104
SKILL4	Pearson Correlation	.557(**)	.539(**)	.494(**)	1	.473(**)
	Sig. (2-tailed)	.000	.000	.000		.000
	Sum of Squares and Cross-products	60.221	62.221	54.394	103.221	54.423
	Covariance	.585	.604	.528	1.002	.528
	N	104	104	104	104	104
SKILL5	Pearson Correlation	.435(**)	.360(**)	.593(**)	.473(**)	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	Sum of Squares and Cross-products	52.423	46.423	72.885	54.423	128.462
	Covariance	.509	.451	.708	.528	1.247
	N	104	104	104	104	104

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

A.5 Factor Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings(a)
	Total	Variance	%	Total	Variance	%	Total
1	15.228	50.760	50.760	15.228	50.760	50.760	9.588
2	2.033	6.775	57.535	2.033	6.775	57.535	9.478
3	1.191	3.970	61.505	1.191	3.970	61.505	5.369
4	1.066	3.554	65.060	1.066	3.554	65.060	9.995
5	1.061	3.536	68.595	1.061	3.536	68.595	8.025
6	0.939	3.131	71.726				
7	0.824	2.747	74.473				
8	0.752	2.506	76.979				
9	0.714	2.380	79.360				
10	0.602	2.007	81.367				
11	0.548	1.827	83.194				
12	0.503	1.676	84.870				
13	0.475	1.582	86.451				
14	0.427	1.424	87.875				
15	0.404	1.345	89.221				
16	0.398	1.325	90.546				
17	0.352	1.175	91.721				
18	0.336	1.120	92.841				
19	0.289	0.965	93.806				
20	0.272	0.907	94.713				
21	0.256	0.853	95.565				
22	0.212	0.707	96.272				
23	0.202	0.675	96.947				
24	0.193	0.645	97.592				
25	0.182	0.606	98.198				
26	0.145	0.485	98.682				
27	0.115	0.384	99.067				
28	0.110	0.367	99.433				
29	0.103	0.344	99.777				
30	0.067	0.223	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

A.6 Reliability

Reliability Statistics for COMMUNICATION

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

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
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

Reliability Statistics for IT VALUE

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

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
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

Reliability Statistics for IT GOVERNANCE

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.881	0.884	5

Inter-Item Correlation Matrix

	GOV1	GOV2	GOV3	GOV4	GOV5
GOV1	1.000	0.731	0.636	0.402	0.460
GOV2	0.731	1.000	0.712	0.606	0.628
GOV3	0.636	0.712	1.000	0.654	0.550
GOV4	0.402	0.606	0.654	1.000	0.653
GOV5	0.460	0.628	0.550	0.653	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
GOV1	15.2115	13.392	0.646	0.579	0.871
GOV2	15.3558	12.620	0.814	0.698	0.835
GOV3	15.3654	12.448	0.768	0.622	0.843
GOV4	15.6538	12.539	0.690	0.571	0.862
GOV5	15.6827	12.296	0.679	0.513	0.866

Reliability Statistics for PARTNERSHIP

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

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
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

Reliability Statistics for SCOPE AND ARCHITECTURE

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

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
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

Reliability Statistics for HUMAN RESOURCES SKILLS

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

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
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

A.7 ANOVA by Organisational Size

Descriptives

						for Mean			
		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
COMMUNICATION MEAN	SME	24	3.8000	0.85669	0.17487	3.4383	4.1617	2.40	5.00
	Medium	36	3.7111	0.74442	0.12407	3.4592	3.9630	2.40	5.00
	Large	44	3.8818	0.86731	0.13075	3.6181	4.1455	1.60	5.00
	Total	104	3.8038	0.81965	0.08037	3.6444	3.9632	1.60	5.00
VALUE & MEASUREMENT MEAN	SME	24	3.3667	1.13546	0.23178	2.8872	3.8461	1.00	5.00
	Medium	36	3.4278	0.92106	0.15351	3.1161	3.7394	1.80	5.00
	Large	44	3.6864	0.94736	0.14282	3.3983	3.9744	1.20	5.00
	Total	104	3.5231	0.98545	0.09663	3.3314	3.7147	1.00	5.00
GOVERNANCE MEAN	SME	24	3.7500	0.93483	0.19082	3.3553	4.1447	2.40	5.00
	Medium	36	3.7000	0.85055	0.14176	3.4122	3.9878	2.00	5.00
	Large	44	4.0591	0.84587	0.12752	3.8019	4.3163	2.00	5.00
	Total	104	3.8635	0.87656	0.08595	3.6930	4.0339	2.00	5.00
PARTNERSHIP MEAN	SME	24	3.7167	0.99024	0.20213	3.2985	4.1348	2.00	5.00
	Medium	36	3.5389	0.84016	0.14003	3.2546	3.8232	1.60	4.60
	Large	44	3.8591	0.85571	0.12900	3.5989	4.1193	2.00	5.00
	Total	104	3.7154	0.88557	0.08684	3.5432	3.8876	1.60	5.00
SCOPE & ARCHITECTURE MEAN	SME	24	3.7083	0.89439	0.18257	3.3307	4.0860	2.00	5.00
	Medium	36	3.5222	0.88966	0.14828	3.2212	3.8232	1.00	5.00
	Large	44	3.8591	0.86329	0.13015	3.5966	4.1216	1.40	5.00
	Total	104	3.7077	0.88347	0.08663	3.5359	3.8795	1.00	5.00
SKILL MEAN	SME	24	3.5333	0.73583	0.15020	3.2226	3.8440	1.80	4.60
	Medium	36	3.3278	0.91982	0.15330	3.0166	3.6390	1.00	5.00
	Large	44	3.5955	0.82911	0.12499	3.3434	3.8475	1.40	5.00
	Total	104	3.4885	0.84248	0.08261	3.3246	3.6523	1.00	5.00

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
COMMUNICATION MEAN	0.358	2	101	0.700
VALUE & MEASUREMENT MEAN	0.675	2	101	0.511
GOVERNANCE MEAN	0.277	2	101	0.759
PARTNERSHIP MEAN	0.728	2	101	0.485
SCOPE & ARCHITECTURE MEAN	0.126	2	101	0.882
SKILL MEAN	0.576	2	101	0.564

ANOVA

		Squares	df	Square	F	Sig.
COMMUNICATION MEAN	Between Groups	0.577	2	0.289	0.425	0.655
	Within Groups	68.621	101	0.679		
	Total	69.198	103			
VALUE & MEASUREMENT MEAN	Between Groups	2.087	2	1.044	1.076	0.345
	Within Groups	97.937	101	0.970		
	Total	100.025	103			
GOVERNANCE MEAN	Between Groups	2.955	2	1.477	1.959	0.146
	Within Groups	76.186	101	0.754		
	Total	79.141	103			
PARTNERSHIP MEAN	Between Groups	2.030	2	1.015	1.302	0.277
	Within Groups	78.745	101	0.780		
	Total	80.775	103			
SCOPE & ARCHITECTURE MEAN	Between Groups	2.247	2	1.123	1.452	0.239
	Within Groups	78.147	101	0.774		
	Total	80.394	103			
SKILL MEAN	Between Groups	1.482	2	0.741	1.045	0.356
	Within Groups	71.625	101	0.709		
	Total	73.106	103			

Robust Tests of Equality of Means

		Statistic(a)	df1	df2	Sig.
COMMUNICATION MEAN	Welch	0.444	2	57.951	0.644
	Brown-Forsythe	0.424	2	84.224	0.656
VALUE & MEASUREMENT MEAN	Welch	1.056	2	55.604	0.355
	Brown-Forsythe	1.011	2	73.733	0.369
GOVERNANCE MEAN	Welch	1.993	2	56.829	0.146
	Brown-Forsythe	1.896	2	80.907	0.157
PARTNERSHIP MEAN	Welch	1.398	2	56.114	0.256
	Brown-Forsythe	1.239	2	76.742	0.295
SCOPE & ARCHITECTURE MEAN	Welch	1.441	2	57.861	0.245
	Brown-Forsythe	1.438	2	85.958	0.243
SKILL MEAN	Welch	0.937	2	60.436	0.398
	Brown-Forsythe	1.084	2	93.601	0.342

a. Asymptotically F distributed.

A.8 ANOVA by Planning Integration

Descriptives

		N	Mean	Std. Deviation	Std. Error	for Mean Lower Bound	for Mean Upper Bound	Minimum	Maximum
COMMUNICATION MEAN	Independent	25	3.3360	0.90133	0.18027	2.9639	3.7081	2.00	5.00
	Sequential	46	3.9957	0.81047	0.11950	3.7550	4.2363	1.60	5.00
	Simultaneous	33	3.8909	0.63066	0.10978	3.6673	4.1145	2.40	5.00
	Total	104	3.8038	0.81965	0.08037	3.6444	3.9632	1.60	5.00
VALUE & MEASUREMENT MEAN	Independent	25	2.9920	1.29805	0.25961	2.4562	3.5278	1.00	5.00
	Sequential	46	3.6478	0.86634	0.12774	3.3906	3.9051	1.80	5.00
	Simultaneous	33	3.7515	0.71420	0.12433	3.4983	4.0048	2.20	5.00
	Total	104	3.5231	0.98545	0.09663	3.3314	3.7147	1.00	5.00
GOVERNANCE MEAN	Independent	25	3.2640	0.96388	0.19278	2.8661	3.6619	2.00	5.00
	Sequential	46	4.0174	0.87516	0.12904	3.7575	4.2773	2.20	5.00
	Simultaneous	33	4.1030	0.57035	0.09929	3.9008	4.3053	3.00	5.00
	Total	104	3.8635	0.87656	0.08595	3.6930	4.0339	2.00	5.00
PARTNERSHIP MEAN	Independent	25	3.1920	1.08240	0.21648	2.7452	3.6388	1.60	5.00
	Sequential	46	3.9000	0.83772	0.12352	3.6512	4.1488	2.20	5.00
	Simultaneous	33	3.8545	0.61293	0.10670	3.6372	4.0719	2.80	5.00
	Total	104	3.7154	0.88557	0.08684	3.5432	3.8876	1.60	5.00
SCOPE & ARCHITECTURE MEAN	Independent	25	3.3760	1.01869	0.20374	2.9555	3.7965	1.00	5.00
	Sequential	46	3.7217	0.93569	0.13796	3.4439	3.9996	1.40	5.00
	Simultaneous	33	3.9394	0.60101	0.10462	3.7263	4.1525	3.00	5.00
	Total	104	3.7077	0.88347	0.08663	3.5359	3.8795	1.00	5.00
SKILL MEAN	Independent	25	3.1360	0.89391	0.17878	2.7670	3.5050	1.00	4.20
	Sequential	46	3.5304	0.87658	0.12924	3.2701	3.7907	1.40	5.00
	Simultaneous	33	3.6970	0.67846	0.11810	3.4564	3.9375	2.40	5.00
	Total	104	3.4885	0.84248	0.08261	3.3246	3.6523	1.00	5.00

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
COMMUNICATION MEAN	3.179	2	101	0.046
VALUE & MEASUREMENT MEAN	9.849	2	101	0.000
GOVERNANCE MEAN	6.500	2	101	0.002
PARTNERSHIP MEAN	6.885	2	101	0.002
SCOPE & ARCHITECTURE MEAN	4.009	2	101	0.021
SKILL MEAN	1.153	2	101	0.320

ANOVA

		Squares	df	Square	F	Sig.
COMMUNICATION MEAN	Between Groups	7.414	2	3.707	6.060	0.003
	Within Groups	61.784	101	0.612		
	Total	69.198	103			
VALUE & MEASUREMENT MEAN	Between Groups	9.489	2	4.745	5.293	0.007
	Within Groups	90.536	101	0.896		
	Total	100.025	103			
GOVERNANCE MEAN	Between Groups	11.968	2	5.984	8.997	0.000
	Within Groups	67.173	101	0.665		
	Total	79.141	103			
PARTNERSHIP MEAN	Between Groups	9.055	2	4.528	6.376	0.002
	Within Groups	71.720	101	0.710		
	Total	80.775	103			
SCOPE & ARCHITECTURE MEAN	Between Groups	4.531	2	2.266	3.016	0.053
	Within Groups	75.863	101	0.751		
	Total	80.394	103			
SKILL MEAN	Between Groups	4.621	2	2.311	3.408	0.037
	Within Groups	68.485	101	0.678		
	Total	73.106	103			

Robust Tests of Equality of Means

		Statistic(a)	df1	df2	Sig.
COMMUNICATION MEAN	Welch	4.808	2	56.985	0.012
	Brown-Forsythe	5.908	2	74.452	0.004
VALUE & MEASUREMENT MEAN	Welch	3.463	2	53.796	0.038
	Brown-Forsythe	4.636	2	55.163	0.014
GOVERNANCE MEAN	Welch	7.563	2	56.039	0.001
	Brown-Forsythe	8.833	2	69.679	0.000
PARTNERSHIP MEAN	Welch	4.342	2	54.966	0.018
	Brown-Forsythe	5.888	2	61.488	0.005
SCOPE & ARCHITECTURE MEAN	Welch	3.169	2	56.056	0.050
	Brown-Forsythe	2.975	2	70.113	0.058
SKILL MEAN	Welch	3.389	2	58.133	0.041
	Brown-Forsythe	3.424	2	80.906	0.037

a. Asymptotically F distributed.

APPENDIX B: TESTING PHASE APPENDIX

B.1 Organisational Profile

Please provide your personal details below. However, NO information that you submit about you and your company will be published without written permission. Your responses will be kept strictly confidential and data from this research will be reported only in the aggregate.

Name:

Company:

Title and function:

E-mail:_____

What is the sector most appropriate to your organisation?

- □ Education
- □ Manufacturing
- □ Retail
- □ Government or Public
- □ Other _____
- □ Banking
- □ Finance
- X Insurance
- □ Construction
- □ Health
- □ Pharmaceutical
- □ Business Services (includes IT services)
- □ Administration

How many employees are there in total in your organisation? _____

How long has the organisation been established? _____

Which of the following business strategies better apply to your organisation?

- □ We concentrate on a stable and predictable niche in the industry by offering high quality but standard product or services at low prices.
- □ We continuously seek new product/market opportunities, and we are the creators of change in the market.
- □ We maintain a stable domain of core products/services, while seeking new product/market opportunities.
- □ Other _____

What is the average planning horizon in your organisation? 3 years, 5 years, etc. _____

What is the formal organisational structure (ie. What is the form of your organisational chart)?

- Functional (divided into production, marketing etc.)
- Divisional (division by product/service produced/offered)
- Matrix (mixture of the above, subordinates report to different managers, take part in cross function projects)
- Networked (teams are assembled according to task)
- Other _____

How would you rate the level of Business-IS planning integration in your organisation?

- Independent (IS strategy formulation and business strategy formulation are separate, unrelated processes)
- Sequential (IS strategy formulation follows and supports business strategy formulation)
- Simultaneous (IS strategy formulation and business strategy formulation are developed together)

Business units that will be involved in the study:_____

What are your organization's three most important **business objectives** in order of importance?

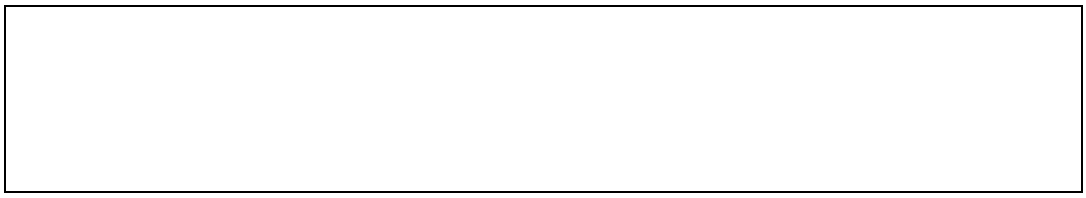
1.

2.

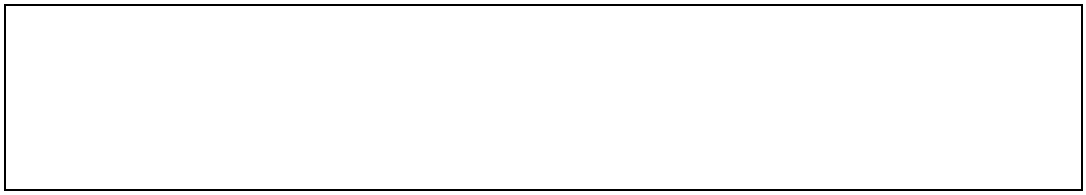
3.

What are your organization's three most important **IT objectives** in order of importance?

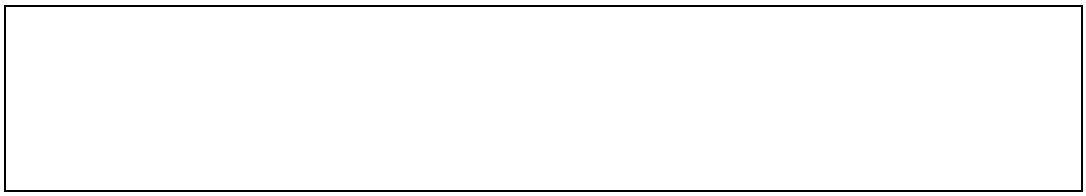
1.



2.



3.



B.2 Example of Questions for the Assessment Process

Example of Original Questions:

The following statements pertain to IT investment decisions. Our IT investment decisions are primarily based on IT's ability to:

- Reduce costs.
- Increase productivity and efficiency as the focus.
- Traditional financial reviews. IT is seen as a process enabler.
- Business effectiveness is the focus. IT is seen as a process driver or business strategy enabler.
- Create competitive advantage and increase profit. Our business partners see value.
- N/A or don't know

The following statements pertain to the use of integrated IT and business metrics to measure IT's contribution to the business.

- We do not measure the value of our IT business investments, or do so on an ad-hoc basis.
- The value measurements for IT and business are not linked. We have limited or no formal feedback processes in place to review and take action based on the results of our measures.
- The value measurements for IT and business are starting to be linked and formalized. We are also starting to have formal feedback processes in place to review and take action based on the results of our measures.
- We formally link the value measurements of IT and business. We have formal feedback processes in place to review and take action based on the results of our measures and to assess contributions across functional organisations.
- We use a multi-dimensional approach with appropriate weight given to IT and business measures. We have formal feedback processes in place to review and take action based on the results of our measures. These measures are extended to our external partners (e.g., vendors, outsourcers, customers).
- N/A or don't know

(Note: Contact jluftman@stevens-tech.edu regarding the full access to survey)

Example of Adapted Questions:

The following statements pertain to IT investment decisions. Our IT investment decisions **for the project (project's name)** are primarily based on IT's ability to:

- Reduce costs.
- Increase productivity and efficiency as the focus.
- Traditional financial reviews. IT is seen as a process enabler.
- Business effectiveness is the focus. IT is seen as a process driver or business strategy enabler.
- Create competitive advantage and increase profit. Our business partners see value.
- N/A or don't know

The following statements pertain to the use of integrated IT and business metrics to measure IT's contribution to the business **for the project (project's name)**.

- We do not measure the value of our IT business investments, or do so on an ad-hoc basis.
- The value measurements for IT and business are not linked. We have limited or no formal feedback processes in place to review and take action based on the results of our measures.
- The value measurements for IT and business are starting to be linked and formalized. We are also starting to have formal feedback processes in place to review and take action based on the results of our measures.
- We formally link the value measurements of IT and business. We have formal feedback processes in place to review and take action based on the results of our measures and to assess contributions across functional organisations.
- We use a multi-dimensional approach with appropriate weight given to IT and business measures. We have formal feedback processes in place to review and take action based on the results of our measures. These measures are extended to our external partners (e.g., vendors, outsourcers, customers).
- N/A or don't know