The alignment of business strategy and IT/IS strategy, where agile software development is applied

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This thesis is presented for the degree of Doctor of Information Technology (DIT) of Murdoch University

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DECLARATION

I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary education institution.

Signed: ___ __________________

(Pattama Kanavittaya)
ABSTRACT

The alignment of business strategy and IT/IS strategy has consistently been one of the top concerns for IS and academic researchers. It has been claimed that, in order for an organisation to gain competitive advantage and take the greatest return for its IT/IS investment, its business strategy and IT/IS strategy should closely align. The strategic alignment literature indicates that this is still difficult to achieve, due to one or more of several key drivers, including strategic alignment being unsustainable (Hirschheim and Sabherwal 2001), characteristics of IT/IS investment (Tallon 2009) and lack of communication between business and IT/IS departments (Chan and Huff 1993). The aim to this study is to examine whether the alignment of business strategy with IT/IS strategy is facilitated in organisations which apply agile software development. Due to the exploratory nature of this research, a positivist case study approach was adopted, with a total of five case studies selected. The unit of analysis was organisational size (small, medium, and large) in Thailand and Australia. This study employed different sources of information for the purpose of triangulation. These included: interview, questionnaire, field notes, and organizational websites.

The findings of this study show that agile methods play an important role in an organisation that adopts them. They provide a basis for gaining competitive advantage and improving the functionality of the organisation. In practical terms, agile methods are considered a human-centric approach, which not only allow customers and software developers to engage in software development projects, but also keep top management and IT/IS managers working closely together. This not only reflects the technical aspect but facilitates the social dimension (Reich and Benbasat 2000) (i.e. communication, shared domain knowledge, and the involvement of business manager in IT/IS projects) between the business managers and IT/IS managers in relation to achieving strategic alignment. With the significant benefits of agile methods identified, the findings of this study, therefore, suggest that the flexibility of agile methods is a key to an organisation ability to achieve strategic alignment. The findings of this study are not only beneficial to practicing managers, who gain insight into how the flexibility and value of agile methods can facilitate the alignment process, but also will be of benefit to scholars who start studying strategic alignment. Scholars may use the findings of this study as a meaningful reference from which to conduct further studies.
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CHAPTER 1
INTRODUCTION

1.1 Introduction

In today’s dynamic market environment, many organisations have been driven, by rapid change in technology and the global market, to seek a new way of conducting business for survival and growth. The need for organisations to adapt their structures, strategies, and policies to suit the new environment has also become more and more critical (Nerur and Mahapatra 2005). To cope with this, successful organisations are required to monitor their environment and focus on how effectively and efficiently their Information Technology and Information Systems (IT/IS) support business unit strategy and processes.

Since the 1980s, IT/IS has played an increasingly strategic role by changing the way organisations manage their business processes, communicate with their customers and deliver services (Johnston and Carrico 1988, Silvius, Waal et al. 2009), as well as the way IT/IS affects the strategic activities of an organisation (Pollalis 2003). With the expansion of the Internet, ICT (Information and Communications Technologies) has been highlighted as a strategic weapon in gaining a competitive position in the marketplace for organisations (Rackoff, Wiseman et al. 1985, Henderson and Sifonis 1988, Broadbent, Weill et al. 1999). The growing significance of ICT has increased the awareness in organisations of how ICT and its consequences can be a business enabler (Luna, Costa et al. 2010).

Strong competition in the market is more likely to lead an organisation to invest in ICT, as a way to strengthen performance and growth (Pilat 2003). Moreover, the quality of ICT architecture and infrastructure (Hodama 2008), and also the implementation of appropriate application of IT/IS (Peppard and Ward 2004) are vital for organisations to gain competitive advantage. Research such as Ward, Griffiths et al. (1990) and Luftman, Lewis et al. (1993) argue that an organisation can gain competitive advantage only if business strategy and IT/IS strategy are
strategically coordinated and closely aligned. This study is focused on the role that can/or should be played by IT/IS in supporting business strategy.

1.2 Background to the research problem

1.2.1 Strategic alignment

Attention on alignment of business strategy and IT/IS strategy has increased. It has consistently been one of the top concerns for IS and academic researchers for over 30 years (Reich and Benbasat 2000, Rathnam, Johnsen et al. 2004/2005, Revenaugh and Papp 2007, Vessey and Ward 2013). This is because organisations, markets and technology are constantly changing, which makes strategic alignment a continuously practiced activity (Kappelman, McLean et al. 2014). Ideally, strategic alignment is widely believed to improve organisational performance from IT/IS investment, sustain competitive advantage, and provide direction and flexibility to react to new opportunities (Avison, Jones et al. 2004). The lack of such alignment is one reason why organisations fail to realise value from IT/IS investment (Henderson and Venkatraman 1993, Kearns and Lederer 2000).

There is a widespread research interest in business strategy and IT/IS strategy alignment. At the early stage, the body of strategic alignment literature abounds with a number of frameworks to examine the alignment of business strategy and IT/IS strategy (Henderson and Venkatraman 1993, Luftman, Papp et al. 1999, Luftman 2000, Reich and Benbasat 2000, Sabherwal, Hirschheim et al. 2001), while other researchers are concerned with the impact of alignment on organisational performance (Chan and Huff 1993, Luftman, Lewis et al. 1993, Ramaswamy, Thomas et al. 1994, Sabherwal and Kirs 1994, Sabherwal and Chan 2001).

Teo and Ang (1999) investigate the critical success factors that influence alignment. Similarly, Reich and Benbasat (2000) examine the influence of factors on the social dimension of alignment between business strategy and IT/IS strategy. Avison, Jones et al. (2004) investigate how organisations achieve alignment. The benefits of strategic alignment have been explored by Peak, Gyenes et al. (2005). A study by Leonard (2007) provides a comparison of perceptions between the business and IT/IS managers toward strategic alignment. More recently, there have been many attempts
to investigate the strategic alignment in small organisations; found in the studies by Levy, Powell et al. (2001), Hussin, king et al. (2002), Cragg, Tagliavini et al. (2007), and Levy, Powell et al. (2009).

As a result of the research in different areas of strategic alignment, most researchers agree that strategic alignment is essential to organisations (Henderson and Venkatraman 1993, Hirschheim and Sabherwal 2001, Sabherwal and Chan 2001). At the same time, it is accepted by several researchers that strategic alignment is still difficult to achieve and sustain over time, especially under unstable environment conditions (Hirschheim and Sabherwal 2001). As highlighted by Hirschheim and Sabherwal (2001) the problem of strategic alignment arises when an organisation changes business strategy to respond to an evolving environment, but IT/IS strategy remains unchanged. Tallon (2009) argues that organisations invest in inflexible IT/IS to support a specific form of business strategy, which may not lead to successful ongoing strategic alignment.

1.2.2 Agile software development methods

The pace of innovation and market pressures along with an increasing demand for ICT products force an organisation to put a new emphasis on IT/IS projects: to be flexible; respond quickly to uncertainty in the market; and meet customer needs (Morris and McManus 2002). The methods and practices for improving IT/IS projects are also expected to have a significant impact on the project outcomes in terms of cost and product quality (Bellini and Storto 2006). In a highly competitive market, using traditional software approaches may no longer be appropriate (Tomaszewski, Berander et al. 2008).

Prior to the last decade, the development of an IT/IS project was undertaken by traditional software development methodologies such as waterfall, spiral, and incremental processes (Nerur and Mahapatra 2005). These processes are complex, slow in nature, and require high investment (Huo, Verner et al. 2004, Murphy and Rooney 2006). It has been claimed that traditional software approaches have resulted in many unsuccessful projects, since they fail to provide a meaningful transition to meet the expectations of the business requirements, while the IT/IS design solutions
are not easy to modify (Lindstrom and Jeffries 2004). These failures result in resources and time spent ineffectively as well as missed business opportunities.

Given this, agile software development has emerged as a paradigm to overcome the limitations of the traditional software development methodologies (Pedrycz 2006). It has been claimed that agile methods work well in highly dynamic business and IT/IS environments (Shrivastava and Date 2010). The most important feature of agile methods is that they focus on adaptive and flexible processes, which are significant in response to changing market conditions. In particular, agile methods support the timely and economical development of Web and Internet-based software (Meso and Jain 2006). The benefits that agile software development methods bring to an organisation are well documented. These include: reduced cost; rapid adjustment to change in the environment; increased productivity; reduced risk; higher customer and developer satisfaction (Murthi 2002, Andrea 2003, Vinekar, Slinkman et al. 2006, Vijayasarathy and Turk 2008).

With the recognition of flexibility to quickly respond to the market, along with the mentioned benefits, agile methods have become popular and have gained the support of many software developers (Cohen, Lindvall et al. 2004). Moreover, it appears that software processes have become strategic elements of an organisation: in order for the organisation to create a unique competitive advantage, agile software development methods can be integrated as part of the IT/IS functions and be a key component of product and service (Truex, Baskerville et al. 1999, Martinelli and Graykowski 2010).

While there is growing interest in agile methods for successful IT/IS project development (Beznosov and Kruchten 2004, Holmstrom, Fitzgerald et al. 2006), there is no consensus or guidance on how agile methods can be embedded as part of IT/IS strategy. The existing literature on agile software development is mainly focused on adaptability and practice, and has attempted to promote the success of agile methods implementation (Aydin, Harmsen et al. 2004, Pikkarainen and Passoja 2005, Turk, France et al. 2005), with, however, little focus on how such methods are adopted in specific industries or countries. As an example, in Thailand, agile software methodologies have been adopted by many organisations. However, there is
a scarcity of published studies from both academic researchers and practitioners related to this subject in Thailand. At the same time, agile approaches have been used among Australia’s organisations (Bushell 2002). Although some research has been conducted on the use of agile methods in Australia, there has been no discussion on how to achieve strategic alignment between business strategy and IT/IS strategy where agile methods are applied.

1.2.3 Research issues

The following presents the issues and problems found in the strategic alignment and agile software development methods literature:

- limited research was found to investigate the alignment of business strategy and IT/IS, where agile software development is applied
- there has been little research focus on the process of strategic alignment
- there has been minimal comparative research on strategic alignment between countries.

Hence it is believed that the result of this study should bring about a better understanding of how organisations align business strategy and IT/IS strategy, where agile software development is applied, and provide some evidence for addressing these issues.

1.3 The objectives of the research

The overarching objective of this study is to understand the interplay between business strategy and IT/IS strategy alignment and the impact of agile methods on the business strategy of organisations. From this main objective, a number of sub-objectives have been derived:

- to investigate and explain how organisations can achieve alignment of business strategy and IT/IS strategy, where agile software development is applied
- to investigate the current process of alignment within the five case organisation
to make a comparison between Australia and Thailand organisations and understand how they achieve alignment, whether similarly or differently

- to investigate the types of agile methods being adopted by Australian and Thai organisations

- to determine the issues that motivate organisations to implement agile methods

- to add and extend knowledge of the existing literature and make recommendations regarding the alignment of business strategy and IT/IS strategy, where agile software development is applied.

Given the objectives for this research, the research question for accomplishing these objectives is presented below.

1.4 Research question

Yin (1989) notes that defining the research question is the most important step to be taken in a research study. The research question need to be interesting and significant to the potential participant organisations to gain their support (Darke, Shanks et al. 1998). The research interest for this project is in the area of the alignment between business strategy and IT/IS strategy through agile software development. Based on the research objectives, and the research problem, the question which this research seeks to answer is as follows:

**Do organisations that employ agile software development align their business strategy with their IT/IS strategy?**

The research question addressed above reflects the crux of this study. Based on this research question, two sub-questions are identified. Each of these represents a number of research objectives to be achieved in order to answer the main research question:
Sub-question 1

How do agile methods contribute in IT/IS projects and how do organisations view current practices of software development?

Sub-question 2

How do organisations achieve the alignment of business strategy and IT/IS strategy, where agile software development is applied?

1.5 Research framework

The research model is proposed to investigate the alignment of business strategy and IT/IS strategy, where agile software development is applied. Therefore, the central question of the research project is based on a proposed conceptual model as shown in Figure 1.1.

Figure 1.1: Research model
The model consists of the following components:

- organisations, selected from organisations in Australia and Thailand, which have applied agile methods
- alignment, examined through the strategic alignment model of Henderson and Venkatraman (1993)
- business strategy, examined through Miles and Snow (1978)’s typology
- IT/IS strategy, examined through Saberwal, Hirschheim et al. (2001)’s model of competitive advantage and organisational performance.

The models through which these components are examined are described and discussed in Chapter two.

1.6 Definition and terms used in this thesis

A review of research literature presents various definitions in terms of business strategy, IT/IS strategy, strategic alignment, and agile software development methods. It is fairly clear that these definitions and terms lack consistency in their meaning. In order to avoid confusion, working definitions have been developed for the purpose of this study:

- **Business strategy** – this study refers to the road-map for the organisation to perceive its processes, structure, and position in the market. This guides the organisation to take action to change its environment in order to achieve its business’s goals.

- **IT/IS strategy** – this study refers to the use of IT/IS to support structure and process.

- **Strategic alignment** – this study refers to the extent to which the contribution of IT/IS delivery supports business activities.

- **Agile software development** – this study refers to a set of software processes that combine elements of short iteration, incremental development, self-management, and emergent properties.

The background to these definitions is also provided in Chapter two.
1.7 Research methodology

The objectives of the study, congruent with the exploratory nature of this research, lead the researcher to seek an in-depth understanding of a complex phenomenon. The researcher has therefore utilised multiple-case studies for this project. For this study, five case organisations were investigated. The first organisation (Case X) is a small software house in Thailand. This case organisation was conducted as pilot case study. The second organisation (Case A) is a small consulting company in Australia. The third organisation (Case B) is a large media and entertainment organisation in Thailand. The fourth organisation (Case C) is a large banking organisation in Australia. The last organisation (Case D) is a small food company in Thailand.

For the purpose of triangulation, this study also employed multiple data sources. The objective of triangulation in this study is to find information from other sources to corroborate the findings of this study, and to increase validity of the findings. This study utilises the interview instrument as the main method for data collection. The interviews have been developed in the form of a semi-structured interview. Each participant was interviewed individually. The secondary data sources included a questionnaire, field notes, news and articles, and the company websites. The data analysis consists of within-case analysis, cross-case analysis, and simple descriptive statistical techniques.

1.8 The key findings and implications for research

1.8.1 Contributions to theory and knowledge

The findings of this study make several contributions to the current literature on strategic alignment, while some insights found in the five case organisations are worthy for practitioners to take into account. First, the prior literature reveals that there have been many attempts to identify success factors and influencing factors to implement agile methods (Vyver, Koronios et al. 2003, Turk, France et al. 2005, Chow and Cao 2008, Pikkarainen, Haikara et al. 2008, Vijayasarathy and Turk 2008). Moreover, most researchers pay more attention to technological and operational aspects of agile methods than managerial or strategic aspects. There was considerably less in the literature on whether agile methods help facilitate the alignment process. Thus, this study addresses the issue in the literature (Issue 1: The
nature of the alignment between business strategy and IT/IS strategy, where agile software development is applied has not been investigated thoroughly) and makes a contribution to software development knowledge and the growing research on strategic alignment by providing a fresh view synthesising and clarifying why an organisation should align business strategy and IT/IS strategy, where agile software development is applied.

Second, this study contributes to the current debate and addresses the issue in the strategic alignment literature, which focuses on the outcomes of strategic alignment. Despite the vast knowledge in relation to outcomes of strategic alignment which have been discussed in the literature, there is lack of agreement as to how organisations do and should align. (Issue 2: There has been insufficient research focus on the dynamic process of strategic alignment). The strategic alignment model (SAM) investigated in this study suggests that agile methods play two different roles in the organisation. At the strategic level, agile methods play a flexibility role by which an organisation has the ability to adapt to change and respond quickly to the market. At the operational level, agile methods support lower costs, a better quality of product, and shorter-time to market. The comprehensive view proposed in this study helps to explain the process and how organisations can achieve alignment of business strategy and IT/IS strategy, where agile software development is applied. The findings of this study imply that social dimension appeared to have important implications in determining the readiness of organisations for strategic alignment.

Third, given that most of previous studies in relation to strategic alignment were conducted in a single country, the findings of this research not only make a contribution to addressing research Issue 3: there has been minimal comparative research on strategic alignment between countries, but also contribute to the body of knowledge by extending the applicability of the results across countries (Thailand and Australia) and industries (e.g. software house, consultancy, media and entertainment, banking, and food industry). By comparing the Australian and Thai organisations, this study provided evidence that organisations from both countries are likely to put value on the alignment of business strategy and IT/IS strategy, where agile software development is applied. The findings of this study may also help to
advance understanding of how different organisations, in different industries, incorporate agile methods into their IT/IS investment and business operations.

*Finally*, the findings provide insights into the relative importance of the motivating factors for implementing agile methods. The factors identified in this study are organisations searching for improvement in the software development process, high time to market pressure, and experience and inspiration from previous projects.

**1.8.2 Implications for management and practice**

For the practitioner, this research provides some insights into the mechanisms management and practitioners apply in considering the alignment of business strategy and IT/IS strategy, where agile software development is applied.

In considering the alignment of business strategy and IT/IS strategy, where agile software development is applied, it is important for management and practitioners to understand the underlying benefits of the way that agile methods can keep pace with change and provide insight as to aspects that foster the alignment process. By acknowledging agile methods as an effective mechanism that supports strategic alignment, the findings of this study are able to guide and direct decision making as to whether an organisation, in implementing flexible software development, can still achieve strategic alignment.

The findings of this study provide an indication of the ways in which the organisation understands the overall context of strategic alignment. In addition, the four perspectives of strategic alignment analysed in this study assist management and practitioners with decision-making roles in choosing the appropriate perspective of strategic alignment that suits the organisation’s situation. Further, the comprehensive model would also help the organisation to clarify what they have already been doing and/or how ready they may be to develop the strategic alignment process.

What is clear from this study is that the implementation of agile methods does not only bring software project success, but it also responds to uncertainty in business and delivers business value in terms of cost benefits and customer satisfaction.
Hence, it is believed that business executives who are directly responsible for the management of the organisation might benefit from the insights this research provides into the extent to which agile methods can support future change in business strategy and enable organisations to remain competitive and at the forefront of their respective industries in the future.

Based on the findings of this study, the most important areas which the management and practitioners should be aware of and prioritise in order to achieve strategic alignment can be determined. Firstly, the business managers should understand the potential and value agile methods provide to an organisation. Secondly, top management and IT/IS managers should be able to understand how their roles assist in achieving strategic alignment. Thirdly, top management and IT/IS managers should share the responsibility and work as a partnership to discuss and choose the most appropriate software development processes to support organisational functions. Finally, the business executive and IT/IS manager may have to understand that strategic alignment is a dynamic practice, which needs frequent adjustment when the business environment changes.

In addition, the findings of this study provide a very useful means to encourage the business management and scholars to promote the alignment of business strategy and IT/IS strategy where agile software development is applied. Given the fact that an organisation faces change and uncertainty in market conditions, what matters is the underlying capability of the software development process to enable the organisation to adapt to changing business environments and support business goals and objectives. From this point, there is emphasis placed on using agile methods as an approach to building flexibility of organisational function in order to keep pace with change. Based on the findings of this study, since agile methods may be considered human-centric, the implementing of agile methods not only delivers efficiency and effectiveness of an organisation’s function, but also through agile methods’ characteristics, which include promoting communications, facilitates and eases the processes of strategic alignment.
1.9 Organisation of this research

This section describes how the chapters in this thesis are organised. The structure of this research is displayed in Figure 1.2.

![Figure 1.2: Thesis organisation](image)

This research is organised into six chapters. The content of each chapter is summarised as follows:

**Chapter 1: Introduction to the research.** This chapter presents a synopsis of the background of the research and motivation for this study. The research issues that need to be explored are justified. The objectives and research question of this study are addressed. The research methodology used in this study is described. The significance of the research is also briefly discussed.

**Chapter 2: Literature review.** This chapter presents a review of existing literature related to the alignment of business strategy and IT/IS strategy, and agile software development. This chapter is also dedicated to discussing the issues found in previous research. Working definitions and a research model for this study are also developed.
Chapter 3: Research method and design. This chapter contains a discussion of the choices of research methodology used in this study. The procedures relating to the data collection are explained. Ethical considerations are also discussed.

Chapter 4: Within-case analysis. This chapter presents an individual analysis of the five case organisations: Company X (pilot case), Company A, Company B, Company C, and Company D. The findings were drawn from interviews and the questionnaire instrument, field notes, and company websites.

Chapter 5: Cross-case analysis. This chapter present comparative findings of the five case organisations. The purpose of this chapter is to identify the similarities and differences of the results across the cases.

Chapter 6: Discussion, conclusion and recommendation. This final chapter discusses the research findings based on the five case organisations. It also set out to discuss the contributions and limitations, and make recommendations for future research.
CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of existing research and literature that are pertinent to the current research project. The literature review was carried out in order to acquire an understanding of the theoretical background to the research project, and help the researcher to identify the research problem, research questions, and revise the research design. The primary purpose of this research, as indicated previously, was to gain understanding of whether organisations can align business strategy and IT/IS strategy, where agile software development is applied. Therefore, this literature review details the four dominant themes. These are business strategy, IT/IS strategy, strategic alignment, and agile software development. Once the literature review has been conducted, the research model for this study is proposed based upon variables reported in the literature.

As shown in Figure 2.1, the structure of this chapter divided into nine sections.

Figure 2.1: Structure of the chapter
Section 2.1 presents an introduction of the chapter. Section 2.2 presents an overview of the research and discusses the term strategy. Section 2.3 describes the theoretical background with regard to business strategy. Section 2.4 reviews the literature on IT/IS, and the strategic perspective of IT/IS. Section 2.5 looks into the concept of strategic alignment. Previous research on business strategy and IT/IS alignment is also presented. Section 2.6 presents the theoretical background of agile software development methods. The prior research on agile methods is also presented. Section 2.7 contains various working definitions developed for this research. Section 2.8 presents the proposed research model of this study, and finally Section 2.9 presents a summary of the chapter.

2.2 Overview

2.2.1 Defining strategy

The term strategy has been discussed in business and strategic management literature since the 1960s. Obviously, there is no consistent or single agreed definition: various authors have defined the terms strategy differently. For Chandler (1962), for example, strategy is some sort of basic long-term goals and the objectives of an organisation, the adoption of a course of action and the allocation of resources necessary for achieving these goals. Quinn (1980) defines strategy as the pattern or plan that integrates an organisation’s major goals, policies and actions into a cohesive whole, where the goals state what is to be achieved. Policies are rules or guidelines that express the limits within which action should occur. Programs specify the step-by-step sequence of actions necessary to achieve the major objective.

Alternatively, Mintzberg (1987) distinguishes the meaning of strategy in five different ways. The first is strategy as plan. This definition implies some sort of consciously intended course with two important characteristics: it is purposeful and intended to develop, and it intends to design for action beforehand in order to deal with a situation. The second is strategy as ploy. This definition implies the specific aspect of conscious strategy to be the first mover in order to win over competitors. The third is strategy as pattern. This definition emphasises action and behaviour that has emerged. The fourth is strategy as position. This definition places emphasis on
how the organisation positions itself in its environment (internal and external). The final term is strategy as perspective. This definition emphasises the ingrained way in which an organisation perceives the world.

In Henderson (1989)’s view, strategy is defined as a deliberate search for a plan of action that will develop a business’s competitive advantage and compound it. The search is an iterative process that starts with knowing where the organisation is and what it has.

The review of the definition of strategy shows that many authors not only attempt to define what strategy is, but also contain information regarding how a strategy is created and what a strategy is expected to achieve. This thesis does not attempt to produce such a universal definition of strategy, but to understand the root of strategy and use the concept effectively.

Strategy is important for an organisation because it presents the way that an organisation positions itself relative to its competitors (Brown and Blackmon 2005). Without a proper strategy, the technological and organisational resources and capacities will be distracted and misdirected (Sun and Hong 2002). In many organisations, strategy identifies the goals and direction that managers and employees at every level need in order to define their work and make their organisation successful (HavardBusinessSchool 2005). Strategy can be operated at different levels of an organisation (Venkatraman 1989); the following section describes different levels of strategy.

### 2.2.2 Levels of strategy

Venkatraman (1989) indicates that there is reasonable consensus on three levels of strategy: corporate strategy; business strategy; and functional strategy. The following provides a brief description of each:

- **Corporate strategy** – this specifies the business in which the organisation will and/or will not participate. It also concerns the appropriate acquisition and allocation of resources for the organisation (Hofer and Schendel 1978, Wheelwright 1984, Kotha 1989)
- **Business strategy** – at this level, two critical issues are specified: the scope or boundaries of each business that satisfies customer requirements; and with which business unit the organisation wants to achieve and maintain a competitive advantage in the market (Hofer and Schendel 1978, Wheelwright 1984, Kotha 1989).

- **Functional strategy** – at this level, functional strategies such as marketing/sales strategy, a manufacturing strategy, a research and development strategy, and an accounting/control strategy that will support competitive advantage are specified (Hofer and Schendel 1978, Wheelwright 1984, Kotha 1989). The hierarchy of strategy is presented in Figure 2.2.

Based on the classification of the level of strategy above, it can be questioned whether corporate strategy, business strategy or functional strategy is the level that the researcher should address. In most cases, every organisation may not use all strategies. For example, an organisation that competes in a single product market area in a single geographic location does not need a corporate level strategy to deal with product diversity. At the same time, an organisation may use one corporate level strategy as well as a separate business level strategy for each product market area in which it competes (Hitt, Ireland et al. 2008). This assumes that every organisation must form and use at least one business level strategy.

When business strategy level interacts with IT/IS functions, it can be an important element of a company’s competitive advantage and is a key determinant of success or failure (Gordon and Gordon 2006). Chan and Huff (1992) suggest that strategic alignment should occur at the business strategy level. Support for this view is found in the study of Tang and Walters (2006) who state that the alignment at business strategy level is essential to ensuring the success of the organisations and to achieving expected results. Therefore, this study considers the business strategy level as an important part of organisational decision-making for selecting software processes and technology that support IT/IS functions and business activities.
2.3 Business strategy – theoretical background

2.3.1 Definition

Given the situation related to the definition of strategy, a similar situation exists for the definition of business strategy. The term can be determined by broad general purpose definitions. The following provides the definitions of business strategy that have been discussed in the literature:

- *A company’s behaviour in the market, including policies, plans and procedures* (Ritter and Gemunden 2004, p.550)

- *Business strategy has been characterized as the manner in which a firm decides to compete, which encompasses the pursuit, achievement, and maintenance of competitive advantage in an industry* (Morgan and Strong 2003, p.164)
• *Business strategy is the outcome of decisions made to guide an organisation with respect to the environment, structure and processes that influence its organisational performance* (Croteau and Bergeron 2001, p.78)

• *Business strategy aims to establish a match or fit between the organization and its environment* (Chan and Huff 1992, p.192).

From the above, it can be seen that authors define the term *business strategy* differently. It also seems that these definitions are too broad to be useful in this study. The definitions provided by Morgan and Strong (2003) and Croteau and Bergeron (2001) appear to provide similar ideas, but have a different focus. What these authors have in common is that they view *business strategy* as some kind of set direction and decision. The definition by Ritter and Gemunden (2004) only recognises the organisation’s behaviour but does not discuss what business strategy should be achieved. Moreover, the definition by Chan and Huff (1992) seem to be unclear and lacking direction.

It can be argued that the term *business strategy* is a vague statement that means different things to different people at different times. It is complicated and yet suffers from a narrow focus. Consequentially, it is important for this study to develop a valid and precise working definition of business strategy. This is presented in Section 2.7.

2.3.2 The need for business strategy

In many cases, business strategy represents dynamic managerial decisions that are continuously made in order to deal with changes in the competitive environment (Segars, Grover et al. 1994). Different types of business strategy are also associated with different types of IT/IS, and account for differences in information management sophistication. Business strategy is vital for organisations of all sizes (Kyobe 2007), as it ensures efficient allocation of resources, provides direction for business operations, creates shared understanding of challenges and goals and provides a structured means of identifying and evaluating resources (Kyobe 2007).
Chan and Huff (1992) state that when IS researchers conduct research in the strategy discipline, they frequently need to characterise or measure company strategy. The body of literature on strategic management has examined business strategy through different types of typologies. The purpose of a typological approach is to identify business strategies, and to create a better understanding of the strategic reality of an organisation (Croteau and Bergeron 2001). Several typologies have been introduced by various researchers. Nevertheless, the most popular typologies used among IS researchers are Porter (1980)’s generic strategy, and Miles and Snow’s (1978) typology. The following presents a brief description of these in order to choose the most suitable typology for this study.

2.3.3 Miles and Snow typology

Miles and Snow’s typology is widely used in classifying business-level-strategy (Smith, Guthrie et al. 1989, Zahra and Pearce 1990, Croteau and Bergeron 2001). The important characteristics of this typology are that it includes dimensions such as product/market attitude, technology, organisational structure, management characteristics, and reflects on a complex set of environment and organisation processes (Smith, Guthrie et al. 1989, Croteau and Bergeron 2001). This typology consists of four types of business strategy:

- **Defender** – this organisation focuses on a narrow range of product/market domains. It tends to prevent competition by offering high quality products and services with lower cost. This type of organisation is technology based, does not tend to search outside its market for new opportunities and rarely makes major adjustments in structure or technology (Miles, Snow et al. 1978). Appendix A summarises the Defender’s characteristics.

- **Prospector** – an organisation with this strategy typically seeks for new product and market opportunities, with a tendency to invest heavily in research and development. This type of organisation always deals with change and uncertainty in the market. In recognition of this, it invests in leading-edge technology in order to gain advantage over competitors (Miles, Snow et al. 1978). The characteristics of Prospector are summarised in Appendix B.
• **Analyser** – this strategy shares characteristics of both Defender and Prospector. This type of organisation attempts to minimise risk while maximising the opportunity for growth. In delivering new products/or services, this type of organisation carefully observes the action of its competitors. At the same time, it produces a limited range of products, and does not invest in new technologies (Miles, Snow et al. 1978). Appendix C summarises the Analyser’s characteristics.

• **Reactor** – this type of organisation does not have a clear strategy or plan in dealing with its competitors in the market. Such organisations perceive market opportunities and change but are unable to adapt effectively (Miles, Snow et al. 1978).

Miles and Snow (1978) claim that an organisation may choose any one of these four modes of strategic orientations in response to the environment of an organisation. However, three types of strategy that are regarded as stable and expected to enhance organisational performance are Defender, Prospector, and Analyser. A Reactor strategy is considered as a form of strategic failure, since it represents organisations with no specific identifiable strategy.

### 2.3.4 Porter’s generic competitive strategies

Porter’s generic competitive strategies typology is one of the most popular typologies used both in strategy and information systems studies. This typology distinguishes three generic strategies: differentiation, cost leadership, and focus:

• **Differentiation** – this strategy aims to create a product or service that customers see as unique (Porter 1980, Miller 1988)

• **Cost leadership** – an organisation seeks to gain competitive advantage by being the lowest cost producer in the market (Porter 1980, Miller 1988)

• **Focus** – the strategy of focus is to concentrate on a particular buyer group, or product line, or geographic market (Porter 1980, Miller 1988).

The framework of Porter’s (1980) typology is presented in Figure 2.3.
Although both Miles and Snow (1978) and Porter’s (1980) typologies are significant approaches in measuring business strategy for the IS researcher, Smith Guthrie et al. (1989) argue that Porter’s (1980) typology seems to be described in more general terms and is limited to explaining the competitive market behaviour of organisations. In comparison, Miles and Snow’s (1978) typology appears to be more analytical in manner, with the ability to provide in-depth analysis of business strategy. Therefore, the more attractive typology for this study, recommended for the IS researcher, and closely aligned to the concept and the purpose of this study, is Miles and Snow’s (1978) typology.

This research therefore applied Miles and Snow’s (1978) typology as the foundation for investigating the different types of strategy that organisations may employ. This model is useful for the study because it clearly defines the types of business strategy for specific organisations, and helps determine which types of business strategy can be best aligned with IT/IS strategy, and how an organisation can achieve alignment when they operate with a specific choice of business strategy at a particular point in time. Therefore, there are three main reasons for choosing Miles and Snow’s (1978) typology for this study:

- it provides rich descriptive tools
- it considers the structure and process necessary for the realisation of a given type of business strategy
it accounts for different sizes of organisation.

2.4 IT/IS strategy

2.4.1 Definitions

Current IT/IS literature has often made the distinction between IT and IS. Earl (1988) argues that IT strategy and IS strategy correspond with each other. Hence, the two aspects of IT strategy and IS strategy should be treated as one. It appears that the terms IT/IS are used interchangeably by some researchers. Ward and Peppard (2002) note that IT/IS strategy is composed of an IT component and an IS component. The IT component refers to a wide range of equipment such as computers, network and communication device, and services used by organisations to deliver data, information, and knowledge (Luftman, Lewis et al. 1993). The IS component refers to how designed information flows attempt to meet the information needs of the organisation. IT strategy is concerned with technology policies and addresses questions related to computer, communication, data and application architecture (Earl 1988). In contrast, IS strategy deals with aligning IS development with business need and with searching for competitive advantage from IT (Earl 1988).

Given the above, there are a number of definitions of IT/IS strategy by different authors in the literature. The following presents some definitions of IT/IS strategy that have been identified:

- The choice pertaining to the business in the information technology marketplace. It reflects the set of goals (ends), means (actions) and underlying assumptions that relate to these choices (Henderson and Venkatraman 1989, p.10)

- (1) information technology scope – the types and range of IT systems and capabilities; (2) systemic competencies – those distinctive attributes of IT competencies; and (3) IT governance – choice of structural mechanisms to obtain the required IT capabilities (Chan, Huff et al. 1998, p.275)
• **Multi-dimensional which includes the IS role, the IS sourcing arrangement, and the IS structure** (Hirschheim and Sabherwal 2001, p.89).

From the above mentioned three definitions, it is noticeable that there are only minor differences between them. Henderson and Venkatraman (1989) see IT/IS strategy as a frame for the scope of decision-making regarding the choice of technology and to enable business strategy. The definition given by Chan, Huff et al. (1998), on the other hand, discusses IT/IS strategy in more detail. To them, IT/IS strategy involves IT scope, systematic competencies, and IT governance. The term IT/IS strategy defined by Hirschheim and Sabherwal (2001), indicates that Chan, Huff et al. (1998) have similar view of IT/IS strategy. They present the term IT/IS strategy as multi-element of different IT/IS activities.

Even though various researchers attempt to provide a definition of IT/IS strategy, there appears to be differing nuances among authors. Thus, for the specific purpose of this study, the researcher establishes a working definition of IT/IS strategy, instead of using one particular definition of IT/IS strategy described above. The working definition of IT/IS strategy for this study is presented in Section 2.7.

### 2.4.2 IT/IS strategy implications

IT/IS has changed the business world dramatically by changing the ways in which organisations perform their operations and design and market their products and services (Sohal and Ng 1998). The rapid technological change of IT/IS continues to have a deep impact on competition and competitive advantage, due to the pervasive role of IT/IS (Sohal and Ng 1998).

Traditionally, IT/IS has been used to reduce the costs of operations in organisations (Sohal and Ng 1998). Over time the role of IT/IS in business has changed in focus from being conceived as a means of improving the efficiency of operational functions to being used as a strategic weapon for an organisation (Henderson and Venkatraman 1993). The IT/IS literature states that IT/IS has the potential to be a strategic weapon in four different ways: to gain competitive advantage, which encourages organisations to become cost efficient (Earl 1989, Sheth 1994); to
improve productivity and performance, since IT/IS has become more affordable for organisations (Earl 1989, Sheth 1994); to enhance new way of managing and organising; and to develop new business (Earl 1989).

Since IT/IS has become so central to the development and delivery of business value, organisations of all size invest in new IT/IS with the hope of achieving strategic use (Levy, Powell et al. 2003, Zhu and Weyant 2003). An investment in IT/IS refers to any acquisition of hardware or software which is expected to increase or expand the possibilities of an organisation’s IT/IS and deliver long-term benefits to the organisation (Willcocks 1994). Ward and Peppard (2002) claim that the investment in IT/IS throughout an organisation is directed toward the achievement of an organisation’s objectives and goals. Andresen (2000) argues that the investment of IT/IS by organisations may not be economically justified and in fact may not provide the strategic benefits initially envisaged. Given that, Hayles (2007) claims that the IT/IS investment should not move further without an articulate, concise understanding of an organisation’s mission, objective, and goals.

With the increasingly strategic importance of IT/IS in organisations since the 1980s and 1990s, the IT/IS literature has shown a greater awareness of the need for development of strategic use of IT/IS (Peppard 1993). The development of IT/IS strategy is taken to mean thinking strategically and planning for the effective long-term management and identifying the best possible impact of IT/IS in an organisation (Ward and Peppard 2002). Thus, in order to make the most effective use of IT/IS investment and to ensure that the IT/IS investment is critical to the survival of an organisation, IT/IS strategy development should be based on a careful review of organisational strategies (Glaser 2006). In other words, IT/IS strategy and business strategy should be complementary for successful investment of IT/IS, thereby increasing organisational performance and competitiveness.

Earl (1988) identifies four possible reasons why many organisations have put IT/IS into strategy. Firstly, the potential benefits of new technology appear to improve and enhance the boundaries and activities of an organisation and that often increases competitive pressures for organisations. Secondly, an organisation has a desire to seek competitive opportunities from current IT/IS investment. Thirdly, the need for
alignment of IT/IS with business strategy to ensure that investment in IT/IS matches business need. Finally, the desire for an organisation to change IT/IS functions by raising their profile, putting them on a strategic plinth, and reasserting top management direction.

Ward and Peppard (2002) assert that a lack of IT/IS strategy may result in missing business opportunities; lack of integration of systems; ineffective information management producing duplication of effort; inaccurate and inadequate information for managing the business; priorities are not based on business needs; resource level are not optimal; project plans are consistently changed; poor quality of IT/IS solution and productivity; competitors gaining advantage over the organisation; and lack of understanding and agreed direction between users, senior management and the IT/IS management.

The literature discussed in this section has pointed out the important aspects of IT/IS from past to present. This study acknowledges the fact that IT/IS can change the nature of how the organisation competes, along with the fact that IT/IS can help an organisation to gain competitive advantage through its contribution to the overall business strategy. Hence, this study focuses on the IT/IS strategy being used in organisations including the way an organisation plans and manages IT/IS, and also the decision-making for investing in new technology. This study also focuses on the investment in software processes and techniques by organisations in improving IT/IS functioning, and the roles that software processes should play in an organisation.

2.4.3 IT/IS strategy profiles

In order to understand how IT/IS strategy is formed, Hirschheim & Sabherwal (2001) propose the punctuated equilibrium model to explain some aspects of IT/IS strategy through strategic alignment. This is shown in Figure 2.4.
As indicated in Figure 2.4, the IT/IS strategy alignment model identifies three different modes of how IT/IS strategy can be constructed and how an organisation can achieve alignment. In this model IT/IS strategy is defined in terms of **Role** – the manner in which the IT/IS function is viewed by senior management; **Sourcing** – the arrangements by which IT products and services are provided and **Structure** – which reflects the configuration of the IT function and the locus of responsibility for IT/IS management decisions. A brief description of the alternatives within each is provided below:

- **Role** – efficiency is achieved through process improvement and long-term decisions; *opportunistic* focuses on market flexibility and quick decisions, while *comprehensiveness* involves careful decisions based on knowledge of other organisations

- **Sourcing** – *outsourcing* requires 80% of the IT/IS budget to be allocated to third-party providers; *insourcing* assumes the same percentage provided by an internal department, while *selective sourcing*
enables organisations to retain a substantial internal IT facility as well as outsourcing a component

- **Structure** — *centralised* indicates IT/IS decision-making is concentrated within the corporate structure; *decentralised* develops responsibility to the business unit, and enables responsiveness to users, while a *shared* responsibility is divided between the two.

Where the business strategy is *Defender*, the *Utility* profile identifies the IT/IS strategy as focusing on low cost delivery, using outsourcing approaches, and/or with a centralised IT/IS structure. The *Infusion* profile identifies IT/IS strategy as focused on technologies that play an opportunistic role, selected insourcing approach, and/or with a decentralised IT/IS structure, where the business strategy is *Prospector*. Lastly, where the business strategy is *Analyser*, the *Alliance* profile identifies IT/IS strategy to be focused on the deployment of technologies that plays a comprehensive role, has selective sourcing approach, and/or with a shared IT/IS structure.

IT/IS strategy is a multidimensional construct and can be defined in different ways (Hirschheim and Sabherwal 2001). Therefore, in order to interpret the IT/IS strategy within the case organisations, this study applies the IT/IS strategy profiles defined by Hirschheim & Sabherwal (2001). This model is useful for this study because it clearly defines the types of business strategy for specific organisations, and identifies the characteristics of IT/IS expected to align with the three strategy profiles. Alignment is seen to be best achieved when the business and IT/IS strategies are considered harmonious.

### 2.5 Strategic alignment

#### 2.5.1 Definition

Several definitions of strategic alignment have been developed by different researchers. According to Henderson and Venkatraman (1993), strategic alignment is the internal fit and functional integration between business strategy and IT/IS strategy. Other researchers have defined strategic alignment differently. These included:
• “The degree to which the information technology mission, objectives, and plans support and are supported by the mission, objectives, and plans” (Reich and Benbasat 1996, p.56)

• “Applying IT in an appropriate and timely way, in harmony with business strategies, goals and needs” (Luftman 2000, p.3)

• “A process for anticipating the future IT requirements of the corporation in an effort to ensure that the corporation will be prepared to meet future challenges” (Peak and Guynes 2003, p.22)

From the above, it can be noted that Reich & Benbasat (1996) and Luftman (2000) appear to have a common understanding of the concept of strategic alignment in that IT/IS should be committed to the business mission, objectives, and plans. Henderson and Venkatraman (1993), on the other hand, discuss the term strategic alignment under the concept of ‘fit’ between the internal and external environment, while the definition provide by Peak & Guynes (2003) discuss the term of strategic alignment as a process.

Despite some researchers having similar views of strategic alignment, it still appears that the definition of strategic alignment has been subject to different interpretations, dependent upon the context of the particular research. Chan and Huff (1997) claim that the concept of strategic alignment is a nebulous one that is difficult to understand. In fact, it is difficult to use a single definition and apply it universally. Therefore, it is necessary to establish a definition of strategic alignment for use in this study, as proposed in Section 2.7.

2.5.2 The importance of strategic alignment between business strategy and IT/IS strategy

The need to develop a strategic fit between IT/IS strategy and business strategy has long been discussed. It has been claimed that, in order for an organisation to gain competitive advantage and take the greatest return for its IT/IS investment, an organisation’s business strategy, IT functionality, and IT/IS investment should closely align (Lederer and Sethi 1988). In addition, some researchers have seen the
alignment of business strategy and IT/IS strategy as a necessary management practice that can enable IT/IS to adapt to the changing business environment (Vessey and Ward 2013, Kappelman, McLean et al. 2014).

In fact, an organisation invests a large amount of resources in IT/IS primarily to increase revenue and cut costs (Peppard 1993), to solve functional and technical problems of business (Peppard 1993, Grant 2003), and to enhance its market performance and competitiveness (Ozer 2000). As aforementioned, the role of IT/IS has changed, with many organisations striving to make a significant investment in IT/IS. It has been reported that organisations are still failing to achieve the desired results from their IT/IS investment and fail to explore long-term opportunities (Ross and Beath 2002).

In recognition of this, it has been documented in the IT/IS literature that failure to link IT/IS investment with business objectives and strategy is the reason behind organisations’ inability to realise the value of their IT investment (Henderson and Venkatraman 1993). Bruce (1998) agreed with this comment and further identified the consequences of a lack of alignment, including inability to gain credibility with the business and provide proactive rather than reactive services, inability to attract, retain, and resource the appropriate skills, and inability to measure IT contribution to the business.

A number of researchers have highlighted the importance of strategic alignment in the business and IT/IS literature. Papp (1999) demonstrates that alignment enables an organisation to focus on the application of IT to improve business. By understanding and leveraging the business-IT partnership, organisations are able to focus on the application of IT to enable the business strategy. Moreover, it allows an organisation to maximise its IT investments and achieve harmony with its business strategy plans, leading to greater profitability.

Kearns and Lederer (2000) claim that strategic alignment is important because it ensures that the business plan reflects the experience and knowledge of the organisation in utilising IS-based resources. It also improves organisational understanding of how it will add value in using IT. Avison, Jones et al. (2004)
indicate that organisations can achieve the benefits of business and IT/IS strategic alignment in three ways. These are maximising return on IT/IS investment to organisations, helping organisations to gain competitive advantage through IT/IS, and providing direction and flexibility for organisations to react to new opportunities.

Similarly, Raymond (2001) states that by concentrating on the alignment of business strategy and IT/IS, there is not only synergy and facilitation of the development of business plans that an organisation can achieve, but also an increase in the profitability and efficiency of their organisation within its industry. These tangible benefits allow management to focus on the application of IT as a means to leverage their core competencies, skills, and technology scope, resulting in improved efficiency. Moreover, an organisation benefits from strategic alignment because information resources are more likely to support business objectives thus increasing opportunities for the strategic use of IT/IS.

Peak, Guynes et al. (2005) conducted a study investigating the IT alignment model created by a major utility company in midwestern United States. They found that the process helped align IT with business strategies and improved and facilitated communication on IT project management and development. The benefits of the IT alignment planning process for the organisation were also identified: it helps improve operational IT support of clients while addressing long-term client need; brings IT and client closer together; and creates a decision and capital budgeting tool for IT projects across the corporation.

In Byrd, Lewis, & Bryan (2006), the authors acknowledge the importance of strategic alignment as it brings the business manager and IT manager together in a closer working relationship, which may lead to the development of long-term strategic objectives. It also may facilitate more reasonable investment in IT/IS, at the same time reducing improvident spending resources on IT for an organisation. Moreover, it helps in developing more effective IT systems so that an organisation is able to take a long-term view of its IT investment.

As noted above, a substantial body of literature emphasises several aspects of business strategy and IT/IS alignment. The literature suggest the alignment of
business strategy and IT/IS strategy to be a very important issue especially when IT/IS has become a strategic weapon (Vessey and Ward 2013, Kappelman, McLean et al. 2014), a fundamental part of the business and is used to leverage business competencies, merge companies, restructure industries and facilitate global competition (Sabherwal and Chan 2001, Kappelman, McLean et al. 2014).

2.5.3 Review of the prior literature in the context of business strategy and IT/IS alignment

Strategic alignment has long been an important issue for both IT/IS research and IT/IS practitioners. For many years, researchers have spent enormous effort to investigate and verify various aspects of business strategy and IT/IS strategy alignment. The following presents prior literature on the characteristics of business strategy and IT/IS strategy alignment in general.

Sabherwal and Kirs (1994) examine the performance implications of alignment between critical success factors (CSFs) and one source of competence, the organisation’s information technology capability. The survey results from two hundred and forty-four large academic institutions show that alignment positively supports both perceived IT success and organisational performance. This means that an organisation which aligns its IT capability with its CSFs may not only be more successful in its IT, but may also have increased performance. Moreover, the results show that an organisation can receive greater benefit from IT when it is operating in uncertain environments. However, it can be argued that, compared to executives in organisations with greater IT success, an organisation with low IT success may be less aware of environmental trends, and may therefore perceive uncertainty to be lower.

Teo and Ang (1999) conduct an empirical study on critical success factors in the alignment of IS plans with business by proposing eighteen CSFs. However, the research indicates that out of eighteen, there are three that IS executives consider to be the top CSFs for business and IS planning alignment. These are: top management commitment to the strategic use of IT; IS management knowledge about business; and top management confidence in the IS department.
Luftman, Papp et al. (1999) investigate and identify the most important enablers and inhibitors that affect alignment. The six enablers of strategic alignment include senior executive support for IT; IT involvement in strategy development; IT understanding of the business; business/IT partnership; well prioritised projects; IT demonstrating leadership. On the other hand, the six inhibitors of strategic alignment include IT/business lacking close relationships; IT does not prioritise well; IT fails to meet its commitments; IT does not understand business; senior executives do no support IT; and IT management lacks leadership.

Burn and Szeto (2000) design a comparative study adapting Henderson and Venkatraman’s (1993) strategic alignment model to identify whether there are any significant differences in the perspectives of IT and business managers on what factors contribute to successful strategic alignment. The result from that case study shows that there are no significant differences in the perspectives between both groups with regard to strategic alignment. Two key success factors identified in their study are top management selection of an appropriate alignment approach to accomplish business objectives, and the matching of internal IS with the external market.

Reich and Benbasat (2000) investigate influencing factors on the social dimension of alignment between business and IT within ten business units in the Canadian life insurance industry. These authors produce a model based on the four factors that significantly influence alignment: shared domain knowledge between business and IT executives; IT implementation success; communication between business and IT executives; and connection between business and IT planning process. The result reveals that short-term alignment is influenced by three factors: IT implementation success; communication between business and IT executives; and connections between business and IT. Shared domain knowledge appears to influence long-term alignment, while strategic business plans appear to influence both short and long-term alignment.

King, Cragg et al. (2000) investigate the alignment of business strategy and IT/IS strategy and organisational performance within small to medium-sized enterprises (SMEs). The findings indicate that most SMEs have aligned business strategy with
IT/IS strategy, and they also had achieved a high degree of alignment. The authors point out that SMEs are gaining IT/IS support for their business strategy, particularly in the areas of service quality, production efficiency and product quality. The findings also confirm that the alignment of business strategy and IT/IS alignment is associated with organisational performance. The authors conclude that not only large organisations can achieve alignment, but also SMEs.

Sabherwal & Chan (2001) apply Miles and Snow’s (1978) typology to examine the impact of alignment of business strategy and IT/IS strategy on business performance. Four types of IT/IS strategies are developed in order examine this matter. This study suggested that the alignment between business strategy and IT/IS strategy is associated with the organisation’s success. However, the study identifies that not all organisations perceive the effect of alignment on business performance: Prospector and Analyser organisations can achieve the success of alignment but this is not the case in Defender organisations.

Hussin, King et al. (2002) examine IT alignment in small organisations by testing three factors. These include IT sophistication, chief executive officer (CEO) commitment to IT, and external IT expertise. They suggest that the major factors influencing IT alignment in small firms were IT maturity, technical IT sophistication and the CEO’s software knowledge. However, the authors argue that not all of the factors proposed by Reich and Benbasat (2000) and Luftman, Papp et al. (1999) seems to be relevant for SMEs. The only factor that they find to be in line with the study of Reich and Benbasat (2000) is the CEO’s software knowledge. Moreover, the authors find that factors such as the CEO’s personal involvement in IT planning and personal IT usage seemed to have little influence on IT alignment or the firm’s sources of external IT expertise.

Rathnam, Johnsen et al. (2004/2005) study the alignment gap between business strategy and IT/IS strategy. The authors claim that this gap exists due to a lack of business strategy and communication within an organisation, and lack of strategic alignment between the different business areas. In order to minimise the alignment gap, the results suggest that an organisation should develop a clear business vision and strategy, develop business architecture, and establish a separate, centralised IT/IS
department. Moreover, the authors suggest other areas to improve strategic alignment that organisations should investigate. These include: improving the business strategy development process; increasing the amount of collaborative strategy development between business and IT departments; and including the chief information officer (CIO) on the executive council.

Chan, Sabherwal et al. (2006) propose a model to examine the factors affecting alignment within business organisations and academic institutes. Those factors are: shared domain knowledge; planning sophistication; prior IS success, size of organisation; and environmental uncertainty. The findings indicate that successful alignment depends on two factors: shared domain knowledge and prior IS success. These findings also support the study by Reich and Benbasat (2000). The authors confirm that alignment enhances organisational performance, but they argue that the results can be varied depending on the business strategy being adopted in an organisation.

Byrd, Lewis, & Bryan (2006) look into the moderating effect of strategic alignment on the relationship between IT investment and firm performance, examining four different perspectives of strategic alignment. The first two perspectives are coordination, and integration. These perspectives concern the alignment in the planning process between business strategy and IT strategy. The last two perspectives are matching, and moderating. These perspectives concern the outcome of alignment between business strategy and IT strategy. The result shows that only two perspectives present a leveraging effect on the relationship between IT investment and organisational performance. These are coordination and matching. The authors conclude that strategic alignment has a direct impact on IT investment in organisations and firm performance. The real value of alignment is in leveraging an organisations’ investment, not simply just investing more in IT/IS.

Gartlan and Shanks (2007) examine the perspective of Australian organisations toward strategic alignment. The study draws the most important factors that facilitate alignment from the literature. The authors group factors into three categories: people; process; and organisational. The findings show that the people factor and process factor appear to be the most important factors to facilitate alignment, and that the
organisation factor appears to be less important. The authors suggest that, in order to achieve successful alignment, the people factor should be considered to be the capability and skill of the business decision maker. Moreover, the process factor should have a process that promotes clarity and consistency and a process that ensures IT goals are linked with business goals. The authors conclude that Australian organisations perceive that alignment is important and can bring significant benefit to the organisation.

Leornard (2007) conducts a comparative study on the perceptions of business and IT/IS managers regarding the five issues that affect alignment: organisational and governance position of the IS manager; IS business partnerships; business and IS managers understanding of IS and business; IS and business manager views on levels of alignment; and IS and business manager shared visions on the alignment profile. The overall findings indicate that the IS manager and business manager show their perception on how they perceive their own and each other’s contribution to the alignment maturity of their organisation in the same manner. Nevertheless, the findings show three interrelated perspectives between business managers and IS managers toward the alignment profile of their organisations. Firstly, business managers view the organisation’s alignment profile as a technical resource or business enabler, while IS managers did not see the potential of IS as competitive weapon. Secondly, business managers do not have the level of understanding of IS that IS managers believe they should have. Finally, there is disagreement between business managers and IS managers regarding the time required to obtain advantages from strategic plans.

Kashanchi and Toland (2008) examine the social dimension of alignment. Two factors are investigated as key enablers of alignment: communication and knowledge sharing between IT/IS and business management. The findings reveal that the consistency of communication and knowledge sharing lead organisation to achieve a high level of alignment. However, the extent to which they can lead to alignment is affected by factors such as frequency of communication, amount of knowledge sharing between business and IT/IS management, incentives, trust and organisational structure. These factors not only inhibit or enhance organisation ability to achieve alignment, but also impact on the desired alignment outcome. The authors suggest
that the strength of alignment depends on the nature of organisations and to what extent they are meeting these challenges.

In their study, Tarafdar and Qrunfleh (2009) investigate two levels of alignment. Between the strategic level and tactical level they identify at which level alignment takes place and identify the processes and aspects associated with these two levels of alignment. The authors confirm that business strategy and IT/IS strategy alignment can occur at different levels. At the strategic level, the authors suggest three processes for achieving alignment: linking business planning processes and IT planning processes; exploiting IT-based strategic opportunities; and CIO proactively contributing to the business strategic planning exercise. The authors also identify five processes associated with tactical alignment. These include: alignment at the level of projects; aligning the decision-making processes of the IT/IS function and other departments; organisation-wide technology standardisation with process-specific customisation; formal and informal IT/IS-business communication; and alignment at the level of skills.

Antikainen and Pekkola (2009) investigate different factors influencing Service-Oriented Architecture (SOA) development from the business and IT/IS alignment perspective. The authors set eleven factors that are related to the business and IT/IS alignment of SOA development: organisation culture; competencies; SOA teams; business driven SOA development; governance; business stakeholder participation; common language; strategy; enterprise architecture framework; rapid development tools; and process automation. The findings reveal that SOA adoption is affected by several factors and this may be varied from organisation culture to processes and methods, communication and technology. These factors can contribute to the success of SOA development.

Ricardo, Ram et al. (2010) examine the impact of strategic alignment on the operational effectiveness, technology innovation effectiveness, and the improvement of operational performance. Their findings show that the operational effectiveness and technological innovation effectiveness are significantly related to improved operational performance. Beside, technological innovation effectiveness is also positively correlated with improved operational performance. However, the results
show that there is no direct influence of strategies organisational and business and IT/IS on improvement of operational performance. Improved operational performance is the result of interactions between the implementation of strategies and related outcomes of both technological innovation and operational effectiveness.

Jorfi, Nor et al. (2011) conduct empirical research assessing the relationship between IT connectivity, IT capability, and strategic alignment by means of data gathered through survey questionnaire from IT managers in the United Arab Emirates. The findings indicate that IT connectivity and IT capability have a significant positive effect on strategic alignment, and IT connectivity has a positive impact on IT capability. The authors conclude that in order to help an organisation sustain strategic alignment, it is important to improve IT connectivity more than other factors.

Vessey and Ward (2013) employ co-evolutionary theory of IS alignment to explore how sustainable IS alignment occurs. The findings show that sustainable IS alignment occurs when the organisation’s IS co-evolve with the organisation so that the Information Systems support the organisation in its efforts to meet its goals. The findings also indicate that organisational performance will accrue consistently only when IS alignment is sustainable. The authors suggest that, for an organisation to succeed, it must engage in both informal, adaptive activities as well as formal, administrative activities.

Gerow, Grover et al. (2014) explore whether strategic alignment leads to an increase in organisational performance by measuring the interrelationship between strategic alignment dimensions (intellectual, operational, and cross-domain), performance (finance performance, productivity, and customer benefit), and context constructs (environment uncertainty, information intensity, and transformative industry behaviours). The findings demonstrate that each strategic alignment dimension indicates a unique relationship with the different performance type and other constructs in the alignment nomological network.

Orozco, Tarhini et al. (2015) propose a framework by including relevant practices in the process of business strategy and IT/IS strategy alignment in a large leading
international food and beverage organisation. They confirm that the activity such as improving the coordination of the IT/IS investment management process and enabling structures that strengthen the connection of budgetary controls appear to be a core management practice that can positively improve the process of IT/IS business alignment as well as impact significantly on the design of IT/IS governance architectures at operational and tactical levels.

In summary, regarding a review of prior literature, several areas of business strategy and IT/IS strategy alignment were found by different researchers. Table 2.1 provides the major findings.

Table 2.1: Summary of research area in relating to business strategy and IT/IS alignment

<table>
<thead>
<tr>
<th>Article (s)</th>
<th>Areas of the research</th>
<th>Methodologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sabherwal and Kirs (1994), Teo and Ang (1999)</td>
<td>CSFs</td>
<td>Survey</td>
</tr>
<tr>
<td>Luftman, Papp et al. (1999)</td>
<td>Enablers and Inhibitors of strategic alignment</td>
<td>Survey</td>
</tr>
<tr>
<td>Reich and Benbasat (2000), Chan, Sabherwal et al. (2006), Kashanchi and Toland</td>
<td>Influence factors of IT/IS alignment/Antecedents of strategic alignment</td>
<td>Survey/Case study</td>
</tr>
<tr>
<td>King, Cragg et al. (2000)</td>
<td>IT alignment in SMEs</td>
<td>Survey</td>
</tr>
<tr>
<td>King, Cragg et al. (2000), Hussing, King et al. (2002)</td>
<td>IT alignment in SMEs</td>
<td>Survey</td>
</tr>
<tr>
<td>Rathnam, Johnsen et al. (2004/2005)</td>
<td>The gap in strategic alignment</td>
<td>Case study</td>
</tr>
<tr>
<td>Tarafdar and Qrunfleh (2009)</td>
<td>Level of strategic alignment</td>
<td>Case study</td>
</tr>
<tr>
<td>Jorfi, Nor et al. (2011)</td>
<td>Improving the process of strategic alignment</td>
<td>Survey</td>
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</tbody>
</table>
A review of the aforementioned research shows that prior research on strategic alignment emerges with four streams of findings. The first group of early research focuses on area of antecedents and CSFs of the alignment between business strategy and IT/IS strategy. The second group looks into the outcomes of the strategic alignment in relation to organisational performance. The third group attempts to propose a framework of how organisations can align business strategy with IT/IS strategy. The last group investigates the level of strategic alignment.

Despite the research in different area of strategic alignment, researchers agree that strategic alignment is essential to organisations (Henderson and Venkatraman 1993, Hirschheim and Sabherwal 2001, Sabherwal and Chan 2001, Gerow 2014, Gerow, Grover et al. 2014). At the same time, it is accepted that strategic alignment is still difficult to achieve and sustain over time, especially under unstable environment (Hirschheim and Sabherwal 2001, Kappelman, McLean et al. 2014). As highlight by Hirschheim and Sabherwal (2001) the problem of strategic alignment arises when an organisation changes business strategy to respond to an evolving environment, but IT/IS strategy remain unchanged. Tallon (2009) argues that organisations invest in inflexible IT/IS to support specific form of business strategy, which may not lead to successful results of strategic alignment.

Based on this observation, this research raises the question of whether an organisation can keep up with strategic alignment and/or the barriers in strategic alignment can be eliminated. This research argues that the values and flexibility of software development methods can be an important mechanism to facilitate alignment and enhance the ability of organisations to achieve tighter alignment.

### 2.5.4 Strategic alignment models

A review of research literature on strategic alignment shows that a number of strategic alignment frameworks have been proposed. However, the one that has attracted most attention from many researchers is the strategic alignment model (SAM) by Henderson and Venkatraman (1993). It has been claimed that the SAM is the most practical framework (Avison, Jones et al. 2004), which provide researchers with additional practical ways to attain alignment (Chan and Reich 2007). The SAM
was proposed to replace a traditional functional linkage model of IT planning that requires a highly integrated strategic management process. The SAM model consists of four dimensions: Business strategy; Information Technology strategy; Organisational Infrastructure; and IS Infrastructure.

Figure 2.5: Business and IT/IS alignment model (Henderson and Venkatraman 1993)

As indicated in Figure 2.5, the top two components refer to the *Strategic* level, looking at the relationship between business strategy and IT strategy. This is defined as having an *external positioning focus*. *Strategic Integration* addresses the capability of the IT/IS strategy to shape and/or support the business strategy. The bottom two components refer to the *Functional* level, looking at the relationship between organisational infrastructure and processes and IT infrastructure and processes. This is defined as the *internal domain*. *Functional Integration* considers how choices made in the IS/IT domain impact on the business domain and vice versa, and examines the internal coherence between organisational requirements and IT/IS capability to deliver. Relationships across the external/internal domains are also examined: *Linkage* indicates the alignment between business strategy and IT/IS infrastructure; whilst *Automation* indicates the alignment between IT strategy and organisational infrastructure.
The relationships across the four domains are presented as four perspectives, categorised by whether business or IT serves as the driving force. The first perspective is *Strategic Execution*, whereby business strategy is the organisational driver for design choices in IT/IS infrastructure, representing a classic view of strategic management. The second perspective is *Technology Transformation*. This perspective involves identifying the appropriate IT to support business strategy, and migrating the IT/IS infrastructure in support. This perspective therefore has strong implications for the IT domains – impacting on IT/IS strategy with subsequent changes in IT/IS infrastructure. The third and fourth perspectives view IT as the enabler or enhancer of business strategies, with corresponding organisational implications. The *Competitive Potential* perspective involves taking advantage of emerging IT capability to enhance new business strategy. Adaptation of business strategy is an outcome of this perspective. Finally, the *Service Level* perspective focuses on how to build IT to meet the need of IS customers. Here, business strategy provides the direction to stimulate customer demand.

The SAM is valuable in this study in that it shows, through identified relationships between the domains, how alignment can be accomplished. Therefore, the model for analysing strategic alignment applied in this study is Henderson and Venkatraman’s (1993) strategic alignment model (SAM). There are three main reasons for choosing the Henderson IT/IS alignment model:

- the model is clearly focused on particular components of business strategy, IT strategy, organisational infrastructure, and IT infrastructure
- the model shows the dynamic, two-way relationships between four domains of strategic choice when business and IT/IS are in alignment, which can help the researcher to compare and analyse objectives and activities of software organisations
- the model embeds a perspective of alignment, which can help the researcher to identify the current level of alignment.

2.5.5 Summary for strategic alignment

Strategic alignment is not only a process; it is a fundamental principle of how IT/IS can work together with business and how an organisation is enabled to reap benefits
from IT/IS. Despite the long history of research on strategic alignment as well as the increasing emphasis in the practical world, alignment remains a continuing concern for many researchers. In a dynamic environment, the primary challenge with strategic alignment is whether IT/IS can keep pace with the changes sought by organisations, and beyond this, how organisations can better plan for, and design, IT/IS to respond to change (Tallon 2009). This study argues that the flexible IT/IS development methods could be effective in producing a tighter fit between IT/IS and business strategy in the unpredictable and turbulent market.

2.6 Agile software development methods

In software engineering literature, the terms methodology, method, and approach are frequently used interchangeably by different researchers. In order to avoid the confusion, this study uses the term methodology defined as a notational and procedural framework to be used by humans for developing software products (Hubmann 1997). The term methods is considered a collection of techniques and procedures that support a methodology.

2.6.1 Software development methods in a dynamic environment

In most organisations, functions or formance of the organisation how their project manager and systems development team cope with these changes. To successfully deliver value to the business, Petersen and Wohlin (2009) suggest that the underlying methodologies and process used within IT/IS departments must be highly efficient, disciplined, reliable, and flexible. Simply put, software development has to be more and more strategic (Kakihara 2006), in other words, the more dynamic and turbulent environmental changes facing IT/IS development are, the more strategic the development practices have to be to cope with those changes efficiently and effectively (Kakihara 2006). Given that, the methods for building and improving IT/IS applications are clearly important elements of products and services (Truex, Baskerville et al. 2000). It is a major issue determining whether an IT/IS project succeeds (Petersen and Wohlin 2009).

The advent of software development techniques in the late 1980s and 1990s, coupled with the need for rapid delivery of the software solution has forced organisations to shift away from the controlled quality process of traditional approaches toward
highly flexible approaches (Wieczorek and Meyerhoff 2001), which may be labelled agile methods (Rehman, Ullah et al. 2010). Often, agile methods and traditional software approaches are viewed as competing bipolar choices (Batra, Xia et al. 2010), which lead to dilemmas when it comes to deciding whether a methodology is appropriate in a certain situation (Dalcher, Benediktsson et al. 2005).

With the dynamic nature and uncertainty in the market, IT/IS projects based on traditional development methodologies are mismatched and give a static picture in a dynamic environment (Augustine, Payne et al. 2005). Agile methods have proved to have a far higher agility and flexibility than traditional software development, and provide higher quality software in a shorter period of time (Mishra and Mishra 2011). In order to understand the nature of traditional software development methodologies and agile methods, the following section gives a brief description of existing traditional software approaches and agile software development methodologies without the intent to analyse or criticise these different approaches.

2.6.2 Traditional software development methods

Traditional software development methods were developed to standardise the procedures used to develop and maintain software (Leishman 2001). These methods mainly apply three basic models: the waterfall model; the incremental model; the evolutionary or spiral model:

- **Waterfall model** – the waterfall model is a sequential approach to developing software. The waterfall model organises the software development life cycle into sequential phases: analysing requirements; designing the system; developing the system; testing the system; and implementing. The waterfall model is presented in Figure 2.6

- **Requirements analysis phase** - all requirements of the systems which has to be development are captured

- **Design phase** – design drafts are reviewed and finalised. Test cases for design integrity are also generated
• **Implementation and testing phase** – all test cases are finalised. The implementation is tested, first at the unit level, then following integration

• **Integration phase** – the system is acknowledged for release to customers. This phase involves minimal final acceptance level testing

• **Maintenance phase** – regression testing, software evaluations and specifications for evolving the software are generated during this phase

Figure 2.6: Waterfall Model (Leishman 2001)

• **Incremental model** - the incremental model is a development of the waterfall model that attempts to provide some developmental stability, and at the same time allow users some opportunity for specification change (Sommerville 1996). In the incremental approach, at the beginning of the development process, the user needs will be determined, and system requirements are defined. Then the rest of the
development is performed in a sequence of builds. The first build incorporates part of the planned capabilities. The next build includes additional capability. This incremental process continues until the system is complete (Leishman 2001). The Incremental model is illustrated in Figure 2.7

Figure 2.7: The Incremental Model (Leishman 2001)

- **Evolutionary or Spiral model** – the objective of the evolutionary model is to combine qualities of other models and solve some of their problems.

As shown in Figure 2.8, the stages in an evolutionary process are:

- Create an outline of the system requirements
- Develop a system as quickly as possible by using the outline specification
- Evaluate the system with users and keep modifying until the system functionality meets the user requirements. This involves modifying the preliminary functionality of the system and adding new functionality as required (Sommerville 1996).
2.6.3 Agile software development methodologies

**Definition of agile methods**

Even though *agile methods* has been around for more than a decade, there is no one formal and agreed definition of *agile methods* in the software engineering field (Conboy and Fitzgerald 2004). The current body of literature of agile methods suffers from a lack of clarity of what an agile method is, while understanding of the phrase agile methods may vary in practice (Abbas, Gravell et al. 2008). Several researchers have attempted to define agile methods. These are presented below:

- A departure from plan-driven traditional approaches, where the focus is on generating early releases of working software using collaborative techniques, code refactoring, and on-site customer involvement (Melnik and Maurer 2005, p.197)

- Contemporary approaches for creating new software based on customer collaboration, teamwork, iterative development, and response to change (Rico, Sayani et al. 2009, p.1)
The mix of iterative development, with set of best practices to cope with software changes and increase client satisfaction (Nisar and Hameed 2004, p.418).

The aforementioned definitions of agile methods show that most authors define agile methods in a similar way. The definition provided by Melnik and Maurer (2005) is practice-oriented. Nisar and Hameed (2004) provide a similar definition as they consider agile methods as a set of practices. Rico, Sayani et al. (2009) tend to define agile methods based on agile philosophies. It is important to have some solid definition on which to build a cohesive body of knowledge. This study develops a working definition of agile methods for the purpose of this study. The working definition of agile methods is presented in Section 2.7.

2.6.4 Background of agile software development methodologies

The emergence of agile methodologies began when a number of leaders of agile software development methods such as Extreme Programming (XP), Scrum, Dynamic System Development Method (DSDM), Adaptive Software Development (ASD), Feature-Driven Development (FDD), Crystal family, and others met to describe their approaches and to discuss future trends (Alliance 2001, Lindstrom and Jeffries 2004). The word ‘agile’ was selected to combine the methods and techniques that would share the values and principles of agile software development. According to the Agile Manifesto (2001) the four values of agile methods are:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan.

The Agile Manifesto consists of twelve core principles that guide agile methodologies (Alliance 2001):

1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software

2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale
4. Business people and developers must work together daily throughout the project
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation
7. Working software is the primary measure of progress
8. Agile processes promote sustainable development. The sponsors, developers and users should be able to maintain a constant pace indefinitely
9. Continuous attention to technical excellence and good design enhances agility
10. Simplicity—the art of maximizing the amount of work not done—is essential
11. The best architectures, requirements, and designs emerge from self-organizing teams
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behaviour accordingly.

2.6.5 Sample of agile software development approaches

In order to understand agile methodologies, a brief description of prominent agile approaches is provided:

- **Extreme Programming (XP)** – Extreme Programming (XP) is the most popular method in the agile family of methodologies (Lindstrom and Jeffries 2004). XP is based on a set of concepts and practices that include having the customer co-located with the development team, pair programming, collective code ownership, and the use of metaphors to describe a business situation. XP was claimed as a discipline of software development, which encompasses the following values: Simplicity, Communication and Feedback, and Courage (Lindstrom and Jeffries 2004). The life cycle of XP consists of five phases: Exploration, Planning, Iterations to Release, Productionising, Maintained, and Death (Highsmith 2002)
• **Scrum** – the Scrum approach aims to help project teams to focus on how they can be organised to produce software in a constantly changing environment (Highsmith 2002). It tries to minimise the amount of time people have to spend tackling less important concerns. The Scrum lifecycle consists of three phases: Pre-game, Development, and Post-game (Coram and Bohner 2005)

• **Crystal methodologies** – Crystal is the name of a family of methodologies developed by Alistair Cockburn. The Crystal family describes a framework of related methods that address the variability of the environment and the specific characteristics of projects. Crystal focuses on archaeology, people and communications, design principles, domain, and bare sufficiency (Highsmith 2002). The two rules in Crystal are: Incremental Development, and Self Adaptation (Highsmith 2002)

• **Feature Driven Development (FDD)** – Feature Driven Development (FDD) is an agile methodology developed by De Luca (Highsmith 2002). It is a highly iterative software development process. FDD consists of a five-step process: develop an overall model; build a features list; planning; design by feature; and build by feature (Highsmith 2002). The core concept of FDD is based on the idea of discovering and implementing system features. A feature is a client-valued distinct unit of functionality (Bauer 2004). FDD’s processes are brief, and two key roles are involved: chief architect and chief programmer (Highsmith 2002)

• **Lean Development (LD)** – a significant aspect of Lean Development (LD) is its ability to adapt quickly and effectively to a wide range of customer requirements (Highsmith 2002). It also combines with the ability to create stable, continuously improved internal processes that are general purpose and flexible across a wide range of products (Highsmith 2002). LD is the creation of change-tolerant software with human effort, time, investment in tools and methods, and the effort to adapt to a new market environment (Coram and Bohner 2005)

• **Dynamic Systems Development Method (DSDM)** – Dynamic Systems Development (DSDM) is a formalisation of Rapid Application
Development (RAD) practice (Highsmith 2002). It uses a variety of prototypes: Business, Usability, Performance, and Capacity. The nine DSDM principles reflect very closely the twelve principles of the Agile Manifesto. Moreover, values and principles of DSDM, which need to be applied in a project, fit well within the Agile framework (Highsmith 2002)

- **Adaptive Software Development (ASD)** – ASD was developed by Highsmith. It offers a philosophical background for agile methods, showing how software development organisations can respond to the turbulence of the current business climate by harnessing rather than avoiding change (Coram and Bohner 2005).

### 2.6.6 A comparison between traditional software development and agile software development

Both agile and traditional methods are introduced for the management and improvement of the software development process. These methods follow their own techniques and practice for development of software processes (Rehman, Ullah et al. 2010). Nerur and Mahapatra (2005) provide a brief comparison of general features between traditional software development methods and agile software development methods. This is presented in Table 2.2.

Table 2.2 shows that traditional software development and agile software development are different in many ways. For example, in terms of *Fundamental assumptions*, agile development embraces adaptive development and a short iterative development process, which are used to respond to changing market conditions and spread project risk over time. Traditional development is geared toward optimisation, predictability, and control. The customer requirements are carefully documented.

*Control* – agile development places emphasis on people, skills, and knowledge (Nerur and Mahapatra 2005, Meso and Jain 2006). It is suggested that, for effective agile development, team members must be responsive, competent, and collaborative (Cockburn and Highsmith 2001, Meso and Jain 2006), whereas the traditional software development approach relies on process, guided by the belief that sources of
variations are identifiable and may be eliminated by continually measuring and refining processes (Nerur and Mahapatra 2005).

Table 2.2: A comparison between traditional software development methods and agile software development methods (Nerur and Mahapatra 2005, p.75)

<table>
<thead>
<tr>
<th></th>
<th>Agile software development methodologies</th>
<th>Traditional software development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamental Assumptions</td>
<td>High-quality, adaptive software can be developed by small teams using the principles of continuous design improvement and testing based on rapid feedback and change</td>
<td>Systems are fully specifiable, predictable, and can be built through meticulous and extensive planning</td>
</tr>
<tr>
<td>Control</td>
<td>People centric</td>
<td>Process centric</td>
</tr>
<tr>
<td>Management Style</td>
<td>Leadership-and-collaboration</td>
<td>Command-and-control</td>
</tr>
<tr>
<td>Knowledge Management</td>
<td>Tacit</td>
<td>Explicit</td>
</tr>
<tr>
<td>Role Assignment</td>
<td>Self-organizing teams-encourages role interchangeability</td>
<td>Individual-favors-specialization</td>
</tr>
<tr>
<td>Communication</td>
<td>Informal</td>
<td>Formal</td>
</tr>
<tr>
<td>Customer’s role</td>
<td>Critical</td>
<td>Important</td>
</tr>
<tr>
<td>Project Cycle</td>
<td>Guided by product features</td>
<td>Guided by tasks or activities</td>
</tr>
<tr>
<td>Development Model</td>
<td>The evolutionary-delivery model</td>
<td>Life cycle model (Waterfall, Spiral, or some variation)</td>
</tr>
<tr>
<td>Desired Organisation Form/Structure</td>
<td>Organic (flexible and participative encouraging cooperative social action)</td>
<td>Mechanistic (bureaucratic with high formalization)</td>
</tr>
<tr>
<td>Technology</td>
<td>Favors object-oriented technology</td>
<td>No restriction</td>
</tr>
</tbody>
</table>

*Maintenance style* – agile development favours a leadership-and-collaboration style of management where the project manager’s role is that of facilitator or coordinator (Nerur and Mahapatra 2005). In traditional development, the primary focus is on realising highly optimised and repeatable processes. Therefore, planning and control accomplished by a command and control style of management provide the impetus for developing a software product (Nerur and Mahapatra 2005).

*Knowledge Management* – agile development relies on the tacit knowledge and skills of individual team members (Boehm and Turner 2004, Nerur and Mahapatra 2005). Knowledge is specifically gathered through team planning and project review (Boehm and Turner 2004). Traditional development relies on explicit knowledge, gained through documentation.
Role assignment – in agile development, the team is characterised by self-organisation and intense collaboration. It requires team members to have a common focus, mutual trust and respect, and have the ability to manage their own tasks and activities. In traditional development, the team member has one defined role in the development process.

Communication – with limited amount of formal documentation and minimal design upfront, agile methods rely on active informal communication (Coram and Bohner 2005). With traditional software development, on the other hand, communication among team members is formalised through the large amount of documentation (Nerur and Mahapatra 2005).

Customer’s role – while customers in agile development are involved and participate more frequently in all stage of the development process (Huo, Verner et al. 2004, Coram and Bohner 2005), customers in traditional development may be involved at the beginning of the development process, and do not contribute as much as they are expected to in an agile development environment (Huo, Verner et al. 2004, Coram and Bohner 2005).

Project cycle – agile development is characterised by short iterative cycles of development driven by product features, and dynamic prioritisation (Highsmith and Cockburn 2001). The features to be implemented in each development cycle are decided by the customer and development team, unlike traditional development, where the development process is guided by task and activities as represented in the plan.

Development model – agile development relies on evolutionary delivery cycles to promote early delivery. The traditional approach is guided by a life cycle model such as the waterfall model, the spiral model, or some variations of these. The life cycle model specifies the tasks to be performed and the desired outcomes of each phase, and assigns roles to individuals who will perform these tasks (Nerur and Mahapatra 2005).
Desired organisational form/structure – in agile development, the organisation or team is structured in an organic and flexible manner, as opposed to traditional development which is highly bureaucratic and highly formal.

Technology – agile development is best at supporting Object-Oriented technology to produce the artefacts that both support the development process and result in the final product. However, traditional development does not restrict the choice of technology.

As noted above, the literature demonstrates the core concepts for traditional methods and agile methods, which includes the sets of focus under which they are most likely to succeed. Even though traditional methods and agile methods have different foci and details, they each have the ability to handle and enhance the software development process and to ensure the delivery of the product within a specific time frame and cost (Rehman, Ullah et al. 2010).

2.6.7 The need for agile methods

The software development environment is becoming more and more complex while still expected to deliver as quickly as possible. This drives many organisations to search for methods that will help them develop software much more quickly and more efficiently than traditional software methods (Gollery 1999). Consequentially, there are several reasons why organisations move from a tradition software development methods to agile methods:

- Firstly, there is growing recognition that traditional software development methods are complex, inflexible, slow in nature, and require high investment (Huo, Verner et al. 2004, Murphy and Rooney 2006). It has been claimed that traditional software approaches have resulted in many unsuccessful projects since they fail to provide a meaningful transition to meet the expectations of both the business requirements and the IT/IS design solutions, and are not easy to modify (Lindstrom and Jeffries 2004)

- Secondly, there is a need for dynamic capabilities in software development to respond to today’s turbulent environment, which requires simpler processes rather than heavyweight processes (Cao and
Moreover, in order to sustain business competitive advantage, an organisation needs to invest in the approach that supports current business objectives and goals in an efficient manner, which means that an organisation needs to make their IT/IS systems flexible enough to respond to yet unknown business needs (Kim, Jang et al. 2000).

- Thirdly, the issues of high time-to-market (Baskerville, Levine et al. 2001, Highsmith and Cockburn 2001) requires organisations to more quickly deliver a product to capture market opportunities (Cao and Ramesh 2007). Systems can no longer be a constraint on business development. It is not acceptable to wait for two or more years for an application to be developed when market are changing much faster (Rockart, Earl et al. 1996). In such cases, organisations must speed up the time-to-market for their products and services in order to survive (Harter, Krishnan et al. 2000). Many organisations believe that the product that reaches the market first has the greatest promise for capturing interest from the customer (Baskerville, Levine et al. 2001, Lindvall, Muthig et al. 2004). Traditional processes tend to have a long life cycle and do not deliver actual customer value anticipated (Tomaszewski, Berander et al. 2008).

Highsmith and Cockburn (2001) assert that the strategic value of agile methods is to reduce the cost of change throughout a project. Hence, this leads many organisations to seek to gain competitive advantage through agile methods (Meso and Jain 2006). Lindvall, Muthig et al. (2004) argue that many organisations seek to implement agile methods due to the shortcomings of traditional software development methodologies, which appear to be more cumbersome, complicated, inflexible, costly, and do not cope well with the rapid changes in the requirements from customers and internal users. Tomaszewski, Berander et al. (2008) claim that traditional software approaches are not very good at dealing with changing requirements due to their long duration. This leads organisations to seek a flexible process with capacity to adapt to volatile requirements (Lindvall, Muthig et al. 2004, Tomaszewski, Berander et al. 2008).
Aguanno (2004) claims that a number of unusual characteristics occur during the progress of a project: communications are difficult to manage; the project progress is often hard to assess; and the tools and building block are constantly changing. These uncertainties are not easy to manage. These can be some of the reasons why an organisation may decide to implement agile methods.

2.6.8 Benefits of agile methods

Agile methods have attracted attention from many organisations (Mahanti 2006). The tangible benefits of agile methods have been reported in the research literature:

- **Improve communication** – this has been the major benefit of agile methods (Paasivaara and Lassenius 2006, Begel and Nagappan 2007). Agile methods explicitly emphasise communication and provide many useful communication practices. There is strong emphasis on frequent communication, which brings testers, developers, and customers together

- **Quick release** – agile methods embrace a short iteration process, which makes it easier for developers, project managers, and customers to track the progress of the project (Paasivaara and Lassenius 2006, Begel and Nagappan 2007). It is also easy to evaluate the value of features of the product, provide feedback to improve the product, and improve turnaround time for fixing bad bugs (Paasivaara and Lassenius 2006)

- **Flexibility of design** – the flexibility in design of agile methods enables developers to deal with uncertainty and changing user and customer requirements more efficiency. Frequent integration and testing also ensure that all parties have understood the requirements correctly (Paasivaara and Lassenius 2006, Begel and Nagappan 2007)

- **Improve software quality** – the quality of the software is a strong concern of many developers (Begel and Nagappan 2007). Agile methods embed high quality code which is much more adaptive to change (Huo, Verner et al. 2004, Begel and Nagappan 2007). Embracing short iteration, scoping, and frequent customer feedback improves the overall quality of the software (Mahanti 2006)
• **Reduce cost and improve return on investment** – agile methods help organisations to reduce the cost of operation by minimising the number of documents produced (Boehm 2002, Reifer 2002, Rico, Sayani et al. 2009). Moreover, customers provide frequent feedback on each iteration, which allows the development team to build better software, work faster, and spend more time building working operational software (Mahanti 2006, Rico, Sayani et al. 2009).

• **Meet customer requirements** – agile methods allow project managers and customers to be working closely together to ensure that the software products meet customer’s changing needs and expectations (Highsmith 2004).

• **Increase productivity** – agile methods make IT software development processes more productive, with faster development cycles to deliver finished software.

• **Reducing risks** – agile methods reduce risks by developing software products in small iterations, and conducting stakeholder requirement negotiations among the developer and customers to minimise the risk of future customer misunderstanding (Boehm 2002).

• **Control** – agile methods allow project managers to improve their control over the project (Aguanno 2004).

The above highlights the significant benefits of agile methods that have been recognised in the literature. It is also noted that the benefits of agile methods could bring strategic value to organisations (Favaro 2003).

### 2.6.9 Review of literature on agile software development methodologies

This section presents the review of prior research on agile software development methods.

Vyver, Koronios et al. (2003) explore whether agile methods are used in practice, and identify the factors that facilitate or inhibit their adoption. The findings show that agile methods such as XP are highly adopted in developing Web applications by practitioners. The authors found the four factors that facilitate the adoption of agile methods include: ability to adapt quickly to change; short time frames for release;
instant feedback from customer and highly quality; and bug free software. In terms of inhibitors, the authors found that agile methods may not be suitable for every organisation since agile methods involve many highly disciplined activities.

Turk, France et al. (2005) examine the principles of agile processes. They identify nine assumptions underlying agile processes: customer interaction; team communication; face-to-face; changing requirements; documentation assumption; quality assurance; iteration; application specific development; and continuous redesign. They suggest that these assumptions may not be suitable for all organisations or development projects. These authors also recommend that when these assumptions present conflicts with organisations, project managers need to take steps to adapt the agile development processes and need to know what better fits their environment. If this is not done, agile development methods may not provide desirable results because of the limitations that result from these assumptions.

Pikkarainen and Passoja (2005) introduce how an agile assessment can be conducted to determine which of the agile methods are suitable for a software project development. These authors clarify that agile assessment is an efficient and objective way to find which agile practices could be improved, by identifying working methods and what agile practices would fit the organisational culture and current working methods and environment. The results of this case study support the assumption that the use of agile practices improves project monitoring, risk management and requirements in project development. The empirical data from this case study show that assessment of the process can be done effectively by using close communication, rapid feedback, and simple documentation.

Vijayasarathy and Turk (2008) attempt to investigate the driving forces behind the adoption of agile methods, and identify the benefits of agile methods for an early adopter. The data was collected from different industries and sectors, and different types of projects. The findings indicate that personal interest was found to be the primary factor behind agile methods adoption. The authors recognise three benefits of implementing agile methods, including the ability to be flexible in developing software, to deliver quality software, and to meets customer needs.
Chow and Cao (2008) study the CSFs of agile software development. The data was collected from different agile projects in different countries. The results indicate that a correct delivery strategy, a proper practice of agile software engineering techniques, and a high-calibre team are the most critical success factors in implementing agile methods. Moreover, the three other factors that could be critical to certain success dimensions are found to be a good project management process, an agile-friendly team environment, and strong customer involvement.

Livemore (2008) examines the factors related to the successful implementation of agile methods. Four factors found to have the most impact on agile methods implementation are training, management involvement, access to external resources, and corporation size. However, the author claims that other factors such as using models, having an implementation plan, development team collocating, and developing software for Internet or Intranet use did not significantly impact the implementation of agile methods. The author suggests that, for a successful agile methods implementation, an organization should consider allocating the necessary resources to make agile methods work in an organization.

Misra, Kumar et al. (2009) investigate the factors that lead to the success of software development projects that adopt agile methods. Fourteen factors are investigated. However, they claim that only nine factors are significantly related with the success of the project. These are customer satisfaction, customer collaboration, customer commitment, decision time, corporate culture, control, personal characteristics, societal culture, and training and learning. However, factors such as team distribution, team size, planning, technical competency and communication and negotiation are not found to have a significant relationship with success.

Papadopoulos (2014) conducts a case study which focuses on the implementation of agile methods in a large software development project within an organisation. The author confirms that agile methods can be successfully implemented in a large software development project. However, the organisation, which has a long history of using traditional software development processes, requires a plan before implementing agile methods. With regards to the benefits of agile methods, the results reveal that agile methods improved the quality of the software development
Khalid, Zahra et al. (2014) examine the implement of agile methods in the mobile phone industry. They claim that the implementation of agile methods not only helps the software development team to speed up the development of a mobile application project, but also provides benefits that enhance the market position of the organisation: responsiveness toward changing market needs; rapid delivery of product; risks identified at early stages of a project. The authors conclude that whether an organisation gains maximum benefits of agile methods depends on project complexity, the type of agile methods being selected, and the size of a software development team.

As above, a major part of the existing empirical evidence on agile methods attempts to identify CSFs and driving forces behind agile methods adoption. On the other hand, some previous research tries to promote the successful implementation of agile methods. Another stem of prior research on agile methods focuses on analysing the impact of agile methods on the software project. There is a critical issue that the prior research on agile methods did not move far beyond the adoption stage (Abrahamsson, Conboy et al. 2009). In fact, many organisations have completed the adoption stage and agile methods start to become well established processes in these organisations. Recent literature of agile methods has called for more research on the use of agile methods in further real-world settings and identification of other challenges.

The focus of this study is in the area of the alignment of business strategy and IT/IS strategy. The need for the study derives from real-world situations where most organisations implement IT/IS development techniques and practices to achieve successful projects. The researcher recognises that the alignment of business strategy and IT/IS strategy is an important issue, since it helps organisations to focus on the right technology and techniques, and at the same time help IT/IS managers to focus on the use of technology to enhance the business (Hayles 2007). Previous research has not addressed how agile methods can be embedded as part of IT/IS strategy in
In order to help an organisation to achieve alignment. Therefore, more research to examine this area is needed. In order to respond to this need, this research aims at a better understanding of whether an organisation can align business strategy and IT/IS strategy, where agile software development is applied.

2.6.10 Agile software development methodologies practices in Thailand and Australia

**Thailand**

Since the Internet was first used in Thailand, many organisations have moved into the era of electronic commerce and e-business (ICT 2003). This movement has become an integral driver for the development of software in Thailand for organisations to be successful in the new economy. Thailand’s ICT products and market have strong support from government to promote the development of software. The demand for software and IT/IS products and services in Thailand has primarily risen as a consequence of economic recovery (SIPA and NECTEC 2009, Teamcouncil 2011). According to the Software Industry Promotion Agency (SIPA) and National Electronics and Computer Technology Center (NECTEC) (SIPA and NECTEC 2009), from 2006-2009, the value of Thailand’s ICT and software market has shown continuous rapid growth, with an average growth rate of 10.6% per year (SIPA and NECTEC 2009), and is expected to increase 5.5% in 2011 (SIPA and NECTEC 2009).

The growth of Thailand’s economy in computer and software has attracted both local and foreign investors. Many investors find Thailand to be an excellent investment location for many reasons. The country’s enhanced ICT infrastructure offers resources vital to software products development. These include reliable and swift broadband Internet, network security, low incidence of power outages, and outstanding R&D and production facilities. In addition, foreign investors benefit from local wages that are half of those in the United States and the European Union (Teamcouncil 2011).

Thailand has a growing market that offers great opportunities for Thai organisations to use ICT to create competitive advantage. Given the high demand for software and
ICT products, many Thai organisations seek to find sophisticated software approaches that can enhance productivity and growth. This has led Thai organisations to consider agile methodologies as an important tool to enable organisations to meet their competitive needs. Although agile methodologies have been given much attention by various researchers in many countries, it is a very new topic for Thai organisations.

Since agile methods have been introduced in Thailand, to date, there have been only a few investigations of agile methods, found only within academic institutions. For example, Morien and Tetiwat (2007) investigate agile methods adoption in Thai universities. The results show that there is little knowledge of agile software development amongst Thai academic staff. At this time agile methodologies already exist in the market, and have been adopted by organisations in Thailand (Morien and Tetiwat 2007). Some organisations find it challenging to break away from traditional software methods. As a result, it is important for those organisations in Thailand, who are participating in agile software development methodologies, to know and understand the role of alignment in successful agile software development project.

Australia

In Australia, there is a high rate of consumption and use of ICT products and services (ACS 2009). Australia is a nation of sophisticated ICT users who eagerly embrace new technology. The Australian market is used extensively by leading international companies to develop and trial new applications (Commission 2008). To become a leading supplier is a key ambition of the software industry (James 2001). Since the start of 2011, growth in the IT/IS and software domain has polarised around two key drivers: the resources boom; and the consumer technology revolution (Taylor 2011). Given that, many Australian organisations are looking for new generation IT/IS solutions to maximise productivity and generate revenue (Commission 2008).

There are many software providers in Australia who have moved quickly to adapt and deploy tools available in order for the software industry to have the best opportunities for future global competition (James 2001). By the commencement of the 21st century, agile methods have been used by some Australian organisations and
increasing to significant numbers (Vyver, Lane et al. 2010), while others are starting to look at it (Bushell 2002). Therefore, it is important to provide some understanding of how agile methods can be fitted into organisations and impact business strategy.

Despite agile methods having been used within some Australia and Thailand organisations, there is a scarcity of published studies from both academics and practitioners related to this subject, with none of the existing research attempting to promote the alignment of business strategy and IT/IS strategy through agile methods. Therefore, this study intends to compare the results between Thailand and Australia due to the fact that both countries are diverse in terms of culture and economy, which may be reflected in the challenge in decision making to implement agile methods. In order to address this issue, this research aims to build a better understanding of how organisations in Thailand and Australia can achieve alignment.

2.6.11 Summary for agile methods

In short, agile methods have emerged as a new paradigm of software development that claims to overcome the limitations of traditional software development. Agile methods also differ from traditional software development methods in several ways. As such, the need for agile methods is more evident in generating opportunity for organisations. In highly volatile environments, the ability to make rapid, low-cost changeovers in response to rapid changes in business and product requirements is crucial. In order to respond to such change, it is believed that software processes have to be flexible enough to adjust capacity and modify product specification quickly. In turn IT/IS needs to be designed so that it has the flexibility to develop in new directions alongside business strategy. Strategic alignment is fundamental for the investment in improving software processes to produce effective results from an organisation’s objectives and goals.

2.7 Working definitions

The literature review indicates different definitions of the terms strategy, business strategy, IT/IS strategy, strategic alignment, and agile software development methods with little common acceptance. Hence, in order to avoid confusion, working definitions have been developed for the purpose of this study. The following
discusses the working definitions that are developed based on prior literature and intended for use as working definitions for this study.

2.7.1 Define strategy

Definitions of strategy, taking into account a business/management context, have been developed by different authors, and are summarised in Table 2.3, which shows that strategy definitions are usually described in terms of goals and objectives, pattern or plan, and organisation’s action.

Table 2.3: Definitions of strategy

<table>
<thead>
<tr>
<th>Author</th>
<th>Definition</th>
<th>Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chandler (1962)</td>
<td>“The determination of the basic goals and the objective of an enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out these goals”</td>
<td>Management</td>
</tr>
<tr>
<td>Quinn (1980)</td>
<td>“Strategy is pattern or plan that integrates an organization’s major goals, policies, and action sequences into a cohesive whole”</td>
<td>Management</td>
</tr>
<tr>
<td>Mintzberg (1987)</td>
<td>“strategy is a pattern-specifically, a pattern in a stream of actions”</td>
<td>Business/Management</td>
</tr>
<tr>
<td>Henderson (1989)</td>
<td>“strategy is a deliberate search for a plan of action that will develop a business’s competitive advantage and compound it”</td>
<td>Business/Management</td>
</tr>
</tbody>
</table>

Based on a consideration of the definitions above, a working definition for the term strategy in this study is as follows:

“A guideline or direction for the organisation, which contains a description or statement of the organisation’s missions and objectives, and other vital principles, in a manner that the organisation can use to perform its business in an effective way”.

2.7.2 Define business strategy

Table 2.4 presents definitions of business strategy that have been selected from the business and management literature.
As Table 2.4 shows, business strategy definitions relate to the achievement of goals, actions, and guidelines. Croteau and Bergeron (2001)’s definition relates to the outcome of decisions and guidelines. Morgan and Strong (2003)’s definition relates to decision making. Chan and Huff (1992)’s definition relates to match and fit.

Table 2.4: Definitions of business strategy

<table>
<thead>
<tr>
<th>Author</th>
<th>Definition</th>
<th>Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Croteau and Bergeron</td>
<td>“The outcome of decisions made to guide an organisation with respect to the environment, structure and process that influence its organisational performance”</td>
<td>Business/Management</td>
</tr>
<tr>
<td>(2001)</td>
<td></td>
<td>p. 78</td>
</tr>
<tr>
<td>Morgan and Strong</td>
<td>“Business strategy has been characterized as the manner in which a firm decides to compete, which encompasses the pursuit, achievement, and maintenance of competitive advantage in an industry”</td>
<td>Business/Management</td>
</tr>
<tr>
<td>(2003)</td>
<td></td>
<td>p.164</td>
</tr>
<tr>
<td>Chan and Huff (1992)</td>
<td>Business strategy aims to establish a match or fit between the organization and its environment</td>
<td>IT/IS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p.192</td>
</tr>
</tbody>
</table>

Based on the synthesis of the definition and key features of business strategy described above, therefore, business strategy in this study is defined to be:

“The road-map for the organisation to perceive its processes, structure, and position in the market that guides the organisation to take action to change its environment in order to achieve its business’s goals”.

2.7.3 Define IT/IS strategy

Table 2.5 introduce the definition of IT/IS strategy from the research literature.

Table 2.5 shows that both Chan, Huff et al. (1998) and Hirschheim and Sabherwal (2001) agree that the definition of IT/IS strategy related to different dimensions within an IT/IS organisation, while Henderson and Venkatraman (1989)’s definition implies that IT/IS strategy is related to the goal of an organisation.
Table 2.5: Definition of IT/IS strategy

<table>
<thead>
<tr>
<th>Author</th>
<th>Definition</th>
<th>Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Henderson and Venkatraman (1989)</td>
<td>“the choice of pertaining to the business in the information technology marketplace. It reflects the set of goals (ends), means (actions) and underlying assumptions that relate to these choice”</td>
<td>IT/IS</td>
</tr>
<tr>
<td>Chan, Huff et al. (1998)</td>
<td>“(1) information technology scope – the types and range of IT systems and capabilities; (2) systemic competencies – those distinctive attributes of IT competencies; and (3) IT governance – choice of structural mechanisms to obtain the required IT capabilities.”</td>
<td>IT/IS</td>
</tr>
<tr>
<td>Hirschheim and Sabherwal (2001)</td>
<td>“multi-dimensional, including the IS role, the IS sourcing arrangement, and the IS structure”</td>
<td>IT/IS</td>
</tr>
</tbody>
</table>

Based on the synthesis of the definitions and the key elements of IT/IS strategy described above, the definition of IT/IS strategy for this study is:

“The use of IT/IS to support structure and process”.

2.7.4 Define strategic alignment

Table 2.6 includes definitions of strategic alignment from the discipline of business and IT.

Table 2.6: Definitions of strategic alignment

<table>
<thead>
<tr>
<th>Author</th>
<th>Definition</th>
<th>Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reich and Benbasat (1996)</td>
<td>“the degree to which the information technology mission, objectives, and plans support and are supported by the business mission, objectives, and plans”</td>
<td>Business/IT</td>
</tr>
<tr>
<td>Luftman (2000)</td>
<td>“applying IT in an appropriate and timely way, in harmony with business strategies, goals and needs”</td>
<td>Business/IT</td>
</tr>
<tr>
<td>Peak and Guynes (2003)</td>
<td>“a process for anticipating the future IT requirements of the corporation in an effort to ensure that the corporation will be prepared to meet future challenges”</td>
<td>Business/IT</td>
</tr>
</tbody>
</table>
As shown in Table 2.6, the terms *strategic alignment* as defined by Reich and Benbasat (1996), Luftman (2000), and Peak and Guynes (2003) is related to the *process of employing IT* and the business’s *goals*. The definition by Luftman (2000) focus on the *harmony* between business and IT/IS.

From the combination of the definition and key features of strategic alignment provided above, therefore, strategic alignment in this study is defined to be:

“The extent to which the contribution of IT/IS delivery support business activities”.

### 2.7.5 Define agile software development

Table 2.7 presents various terms of agile methods that have been defined by different researchers in the literature.

<table>
<thead>
<tr>
<th>Author</th>
<th>Definition</th>
<th>Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melnik and Maurer (2005)</td>
<td>“human centric bodies of practices and guidelines for building usable software in unpredictable, highly-volatile environments” p.481</td>
<td>Software engineering</td>
</tr>
<tr>
<td>Rico, Sayani et al. (2009)</td>
<td>“contemporary approaches for creating new software based on customer collaboration, teamwork, iterative development, and response to change” p.1</td>
<td>Software engineering</td>
</tr>
<tr>
<td>Nisar and Hameed (2004)</td>
<td>“the mix of iterative development, with set of bet practices to cope software changes and increase client satisfaction” p.418</td>
<td>Software engineering</td>
</tr>
</tbody>
</table>

Table 2.7 shows that the definition presented by Melnik and Maurer (2005) refers to guidelines for building software within a turbulent environment, whereas Rico, Sayani et al. (2009) describe agile methods as an approach to creating software by using collaborative technique. Nisar and Hameed (2004) define agile methods as the set of practices to deal with change.
By blending the key features of the definitions of agile methods described above, hence, agile software development in this study is defined to be:

“A set of practices responsive to change that combines short iterations in a collaborative environment with adaptable processes”.

2.8 The issues and problems in the research literature and proposed study

Based on the critical review of existing literature on strategic alignment and agile methods, it can be observed that the research in these areas has shortcomings and that some issues remain unanswered.

According to Section 2.4.3, the literature clearly demonstrates that three ways for organisations to yield better alignment are: focusing on different components of alignment; focusing on the flexibility of the IT/IS development approach; and focusing on the alignment process rather than the end point. The review of literature shows that the majority of strategic alignment covers the whole aspect of IT/IS strategy rather than focusing on technology. Chan (2002) states that due to the complex and daunting nature of overall business strategy and IT/IS alignment, in order to yield better results and make strategic alignment more feasible, perhaps successful alignment is more likely by emphasising the management of specific components of alignment, rather than aiming for the seemingly unreachable target of multifaceted and overall alignment.

Given the rapid changes in business environment and technologies, Tallon (2009) points out that a lack of flexibility in IT/IS development makes alignment even more difficult. The literature on agile methods illustrates that agile methods stand for a more flexible way of developing software and can respond and react quickly to uncertain market conditions. Unfortunately, past research lacks full consideration of the capability of agile methods in supporting existing business strategy. There is almost no research that investigates how organisations can achieve alignment when one specific IT/IS development method, such as agile methods, is implemented. This study posits that the flexibility and capability of agile methods can support change in business strategy and can help organisations to achieve better alignment. The issue with prior research is that agile methods and software engineering research has not
accommodated itself to a wide range of research, particularly in business and strategic management. As such, the first issue in the literature can be identified as:

- **Issue 1:** The nature of the alignment between business strategy and IT/IS strategy through agile methods has not been investigated.

Moreover, in dynamic environments, strategic alignment is no longer considered as a static point. Hence, in order to achieve better alignment, several researchers and scholars suggest that strategic alignment should focus on the process rather than end point. For example, Ciborra (1991) cited in Chan (2002) identifies strategic alignment not as a state but a journey. It cannot be predictable, rationalised or tightly planned but it is comprised of organisational learning on a continuous basis along with some experimentation. This supports the view found in the study of Henderson and Venkatraman (1993) who state that strategic alignment is not an event but is a process of continuous change. Vessay and Ward (2013) argue that when an organisation evolves through changes, strategic alignment should be constituted of dynamic processes and be sustainable. They suggest that this area requires increasing research.

The literature on strategic alignment shows that researchers have paid more attention on the outcomes of alignment and the process of alignment. This research considers that a process view of alignment is important, since it is one step that could point to the key to whether an alignment process is appropriate, and where alignment needs more remedial managerial attention. Tallon (2008) states that strategic alignment should be tightened in process because it is truly critical to organisational strategic focus. This suggests that the process view of alignment could help to understand the underpinning mechanisms of the impact of agile methods on strategic alignment, help explain when and how alignment could happen, and the implications behind it (Tallon 2008). Thus, the second issue can be identified as:

- **Issue 2:** There has been insufficient research focus on the dynamic of strategic alignment.
In addition, the existing literature on strategic alignment lacks comparative studies between countries. The majority of the studies in this research stream have been conducted in the U.S.A and focus on a single country. However, it can be argued that the validity and applicability of the findings may not be duplicated in countries such as Australia and Thailand. Despite a few studies conducted in Australia, evidence related to these issues is still lacking. Furthermore, it should be noted that organisations in each country may have different capabilities to exploit IT/IS, particularly agile methods. Moreover, each country may have different pathways in achieving alignment. This review points to an issue in the knowledge related to strategic alignment.

- **Issue 3:** there has been minimal comparative research on strategic alignment between countries

Figure 2.9: The research issues

Figure 2.9 displays the issues relevant to the research. These research issues suggest a strong need for further exploration in this research domain. According to Figure 2.9, three major research issues are identified. To address and respond to these issues, the following section presents the research questions.
2.9 Research questions

As discussed in Section 2.13, the current bodies of knowledge in strategic alignment and agile software development methods contain several shortcomings. Consequently, this has led the researcher to develop the research question for this study:

- Do organisations which apply agile software development align their business strategy with their IT/IS strategy?

Two-sub research questions have been identified. The first sub-research question aims to gain in-depth understand of the alignment:

- Sub-research questions 1: How do agile methods contribute in IT/IS projects and how do organisations view current practices of software development?

The second sub-research question examines the way in which agile methods contribute to IT/IS projects:

- Sub-research questions 2: How can agile methods be demonstrably aligned to business strategy and IT/IS strategy?

2.10 Research model

The research model developed for this study derives from the research problems and the research issues identified in the research literature, and serves as a basis for data collection in the next stage of this research.

Figure 2.10 depicts the five main constructs of the research model for this study. These include: Organisations, Business strategy, IT/IS strategy and Agile software development methods, Alignment, Implications of alignment.
The following presents the description of each:

- **Organisation**

  The strategic alignment literature suggest that organisation of all sizes can be affected by strategic alignment (Gutierrez, Orozco et al. 2009). In order to increase generalisability and provide new perspectives to strategic alignment research, this study includes organisation of various sizes.

- **Business strategy**

  The current study focuses on business strategy because it involves the decision-making to invest in new technology to favourably position a firm in its markets.
and ensure superior performance. This study aims to investigate the business strategic choices of an organisation in relation to strategic alignment. The three business strategy profiles identified in this study were based on Miles and Snow (1978)’s typology: Defender, Prospector, and Analyser.

- **IT/IS strategy and Agile software development methods**

IT/IS strategy serves as the tool that reflects the belief of IT/IS adoption to achieve system and product improvement. IT/IS strategy helps an organisation to gain competitive advantage through its contribution to the strategic goals of an organisation (Hemmatfar and Salehi 2010). Without an IT/IS strategy, organisations would not be able to compete (Al-Hatmi and Hales 2010). For this reason, organisations needs an IT/IS strategy to ensure that the IT/IS function sustains the organisation’s objectives and goals.

Traditionally, business strategy has been viewed as the key to drive IT/IS strategy. However, with the changing role of IT/IS today, this is no longer the case (Smith, Mckeen et al. 2007). Ideally, the capabilities of emerging IT/IS are the keys to shape the strategic direction of the organisation (Smith, Mckeen et al. 2007). Hence, whichever way business strategy is developed, if IT/IS is to deliver business value, business strategy and IT/IS strategy should be compatible (Gartlan and Shanks 2007).

Given IT/IS has become so much more central to the development and delivery of business strategy, this study argues that agile methods should be seen as important approaches to support business and IT/IS activities and functions. The capabilities of agile methods are associated with the ability to allow an organisation to successfully adapt to changes in the external environment. The focus of IT/IS strategy in this study is related to the decision to implement agile methods, and how they contribute to the chosen business strategy. This study examines IT/IS strategy using the Hirschheim and Sabherwal (2001) model, where the IT/IS strategy for Efficiency would support Defender, IT/IS strategy for Flexibility would support Prospector, and IT/IS strategy for Comprehensiveness would support Analyser.
• **Strategic alignment**

It has been clearly identified that strategic alignment not only helps an organisation to reap the maximise from value IT/IS investment (Raymond 2001, Chan 2002, Avison, Jones et al. 2004), but also helps an organisation to increase performance (Sabherwal and Chan 2001, Byrd, Lewis et al. 2006). In order to understand how successful IT/IS implementations are achieved by an organisation, and what the role of strategic alignment is, it is important to look at the process of alignment. It has been agreed by several researcher that strategic alignment should be centred on the process rather than end point in order to achieve long-term alignment and yield better results (Henderson and Venkatraman 1993, Kashanchi and Toland 2008). In order to understand the current situation regarding strategic alignment, this study applies the SAM as proposed by Henderson and Venkatraman (1993). The model reflects the fundamental aspects of how an organisation attains alignment, and helps an organisation to continuously adapt their environment.

• **Implications of alignment**

In order to understand the strategic alignment process, several researchers and scholars have attempted to identify antecedents and influencing factors that impact strategic alignment and how organisations can best achieve alignment. These reflect the way in which an organisation achieves alignment (Baker 2008). The antecedents and factors related to alignment that have been identified in the strategic alignment literature are IT implementation success; communication between business and IT executives; connections between business and IT; shared domain knowledge (Reich and Benbasat 2000). Some of these factors are recognised as applicable to both short-term and long-term alignment (Reich and Benbasat 2000), and are addressed as important factors for organisations to achieve high level of alignment.

Despite some researcher agreeing upon these antecedents and factors, Chan and Reich argue that these antecedents and factors seem to be overlapped and
interdependent (Chan and Reich 2007). Hence, this study focuses on the most highlighted factors and antecedents that occur in the process of the alignment of business strategy and IT/IS strategy through agile methods.

2.11 Chapter summary

This chapter presents a review of existing literature with regard to the concepts of business strategy and IT/IS strategy alignment. The beginning of the chapter provides a discussion on the fundamental elements of strategy, the level of strategy, and the choice of typology in measuring business strategy for this study. This chapter also discusses the significant aspects of IT/IS strategy with regards to business strategy and strategic alignment. Then this chapter moves on to discuss the various aspects of strategic alignment including the importance of strategic alignment, the SAM and the IT/IS strategic alignment profile that is being used in this study. This chapter also provides a discussion of agile methods and presents some literature in agile methods. The research issues identified from the existing literature are discussed. In order to address the research issue, the research problem and research questions for this study were developed. At the end of this chapter, working definitions for this study are provided, together with a research model. The next chapter discusses the research design and methods for this study.
CHAPTER 3
RESEARCH METHODS AND DESIGN

3.1 Introduction

This chapter describes the selection procedure and utilisation of research methods within this study to provide an understanding of how the researcher has conducted the research and to demonstrate why the chosen methods are appropriate for the problem.

Figure 3.1: Structure of the chapter
As shown in Figure 3.1, this chapter is divided into fifteen sections. Section 3.1 presents an introduction to the chapter. Section 3.2 and 3.3 present the classification of the research, discuss the positivist and interpretivist paradigms, examining the philosophical underpinnings of each perspective and their influence on the selection of research methods. Section 3.4 presents an overview of research methods available for the selected paradigm. The justification of the appropriate research methodology for this study is discussed in Section 3.5. Section 3.6 discusses the case study research design and issues relating to the selection of the cases, unit of analysis, number of cases, and the process of case selection. Section 3.7 describes data collection methods and techniques, while the data collection for the case used in this study is presented in Section 3.8. The discussion in relation to the design of research instruments for this study is presented in Section 3.9. Section 3.10 presents a brief discussion of the pilot case study and Section 3.11 discusses the case study analysis procedures. Section 3.12 discusses triangulation of research. The issues around reliability and validity of case study and research instruments are discussed in Section 3.13, while Section 3.14 deals with the ethical issues of research. Section 3.15 presents the chapter summary.

### 3.2 Classification of research

The classification of research is primarily based on the purpose or function of the study, and is important because it helps the researcher to understand how the nature of the issue influences the choice of research method (Zikmund 2003). In recognition of this, Neuman (2003) classifies the characteristics of research into three types: exploration; description; and explanation. The following provides a brief introduction to each:

- **Exploration** – exploratory research focuses on the basic problem situation confronting the researcher. Researchers may use exploratory research as the initial stage of the research. It addresses the *what* question. It also helps researchers develop and design research techniques and guidance for future research

- **Descriptive** – this type of research presents a big picture of the specific details of a situation, social setting, or relationship. Descriptive research
focuses on how and why questions. The result of a descriptive study is rich in detail about the subject such as people and social activities

- **Explanation** – explanatory research focuses on the cause and reason of an issue that researchers have recognised. It builds upon exploratory and descriptive research, and then continues to identify the reason and explain why something occurs.

The purpose of this study is to investigate *why organisations should align business strategy with IT/IS strategy, where agile software development is applied.* Accordingly, the researcher intends to probe deeply the details of the subject being studied. This indicates that the research is characterised as descriptive research because it aims to address “how” and “why” questions.

### 3.3 Research paradigms

A research paradigm is the fundamental set of assumptions about human nature or reality (Neuman 2003). Shanks and Parr (2003) state that a paradigm has three dimensions: ontological; epistemological and methodological. Each of dimensions is based on the following questions:

- the ontological question – What is the form and nature of reality?
- the epistemological question – What is the relationship between the researcher and what can be known?
- the methodological question – How does the researcher find out whatever they believe can be known?

Although three paradigms of research – namely the *positivistic* approach, *interpretive* approach, and *critical* approach (Orlikowski and Baroudi 1991, Klein and Myers 1999, Goede and de Villiers 2003, Neuman 2003) - have been identified, the Information Systems (IS) literature reveals that the two paradigms that are valid and more utilised in doing IS research are the *positivistic* and *interpretive* paradigm (Galliers 1990, Travis 1999). Each paradigm is described below.
3.3.1 Positivistic

Positivist research is sometimes known as the scientific method (Pather and Remenyi 2004). Positivist research is based on the existence of prior fixed relationships within phenomena which are typically investigated with structured instrumentation (Orlikowski and Baroudi 1991). It derives from the natural sciences, which try to explain various phenomena in terms of cause and effect relationships (Srivastava and Teo 2006). From the philosophical basis of positivist research, Hirschheim (1985, p.16) states that positivism is based on five pillars of philosophy: unity of the scientific method; search for human causal relationships; belief in empiricism; science is value free and the foundation of science is based on logic and mathematics.

Klein and Myers (1999) categorise the criteria for classifying research as positivist. These include: evidence of formal propositions; quantifiable measures of variables; hypothesis testing; and drawing of inferences about a phenomenon from a representative sample to a stated population. Similarly, Chen and Hirschheim (2004) state that positivist research can be described through: the formulation of hypotheses, models, or causal relationships among constructs; the use of quantitative methods to test theories or hypotheses; and researchers’ objectives. In IS research, according to Lincoln and Guba (1985) cited in Orlikowski and Baroudi (1991, p.9), the positivist researcher takes the position that the phenomenon of interest is single, and there is a unique and best description of any chosen aspect of the phenomenon. In addition, the researcher or investigator is independent; and the investigation is value-free.

3.3.2 Interpretive

The interpretive researcher believes that knowledge can be gained through social constructions such as language, consciousness, shared meanings, documents, and tools (Myers 1997, Klein and Myers 1999). The core of interpretive studies is attempting to understand phenomena through the meanings that people assign to them (Orlikowski and Baroudi 1991). In the field of IS research, the interpretive researcher aims to produce an understanding of the context of the information
systems, and the process whereby the information system influences and is influenced by the context (Myers 1997).

Table 3.1: Principles of interpretive field study (Klein and Myers 1999)

<table>
<thead>
<tr>
<th>Principles for interpretive field research</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The fundamental principle of the hermeneutic circle</td>
</tr>
<tr>
<td>This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles</td>
</tr>
<tr>
<td>2. The principle of contextualization</td>
</tr>
<tr>
<td>Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged</td>
</tr>
<tr>
<td>3. The principle of interaction between the researchers and the subjects</td>
</tr>
<tr>
<td>Requires critical reflection on how the research materials were socially constructed through the interaction between the researchers and participants</td>
</tr>
<tr>
<td>4. The principle of abstraction and generalization</td>
</tr>
<tr>
<td>Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action</td>
</tr>
<tr>
<td>5. The principle of dialogical reasoning</td>
</tr>
<tr>
<td>Requires sensitively to possible contradictions between the theoretical preconceptions guiding the research design and actual findings (“the story which the data tell”) with subsequent cycles of revision</td>
</tr>
<tr>
<td>6. The principle of multiple interpretations</td>
</tr>
<tr>
<td>Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it</td>
</tr>
<tr>
<td>7. The principle of suspicion</td>
</tr>
<tr>
<td>Requires sensitivity to possible “biases” and systematic “distortions” in the narratives collected from the participants</td>
</tr>
</tbody>
</table>

The characteristics of interpretive research have been identified by various researchers. For example, Dickson, Senn et al (1977) state that interpretive studies can be viewed through: evidence from a non-deterministic perspective; researchers
are involved in the specific social and cultural setting investigated and analysis is based on participants’ perspective. An example based on Dickson, Senn et al (1977)’s statement can be found in Orlikowski and Baroudi (1991, p.5), who identify interpretive research through evidence of a non-deterministic perspective where the intent of the research was to increase understanding of the phenomenon within cultural and contextual situations; where the phenomenon of interest was examined in its natural setting and from the perspective of the participants; and where researchers did not impose their outsiders’ a priori understanding of the situation.

In addition, Myers (1997) identifies the characteristics of research studies as interpretive by placing them into four categories: phenomenology; ethnomethodology; philosophy of language; and hermeneutics. Klein and Myers (1999) identify seven principles of interpretive field research. These principles are summarised in Table 3.1.

Table 3.2: Assumptions of Positivist and Interpretivist paradigms (Travis 1999)

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Research Paradigms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Positivism</strong></td>
</tr>
<tr>
<td>Ontology</td>
<td>Realist – reality exists ‘out there’ and is driven by immutable natural laws and mechanisms. Knowledge of these entities, laws, theorems, axioms and mechanisms is conventionally summarised in the form of time and context free generalisations. Holds up the one logic of science, to which any intellectual activity aspiring to the title of science must conform. Causes and effects are derived through deductive logic.</td>
</tr>
<tr>
<td></td>
<td>Dualist/Objectivist – both possible and essential for the enquiries to adopt a distant, non-interactive posture. Not value-laden nor subjective, nor biased, thereby automatically excluded from influencing any of the outcomes.</td>
</tr>
<tr>
<td>Epistemology</td>
<td>Hermeneutic, dialectic – individual constructions are elicited and refined hermeneutically; compared and contrasted dialectically, with the aim of generating one or a few social constructions. Shared understanding is generally a result rather than the result of 100% conflict or consensus.</td>
</tr>
<tr>
<td>Methodology</td>
<td>Experimental/Manipulative – questions and/or hypotheses are stated in advance in propositional form and subjected to empirical tests (verification/falsification; proof/refutation) under carefully controlled and repeatable conditions.</td>
</tr>
</tbody>
</table>
In order to help the researcher to better understand both positivist and interpretivist paradigms, Travis (1999, p.1042) provides a contrast based on assumptions made behind each approach. This is presented in Table 3.2.

Throughout the discussion of positivist and interpretive research, it can be clearly seen that the positivist approach focuses on the relationship between variables within the examined phenomena, whereas the interpretive approach is concerned with the big picture of the social reality of the investigated phenomena.

In making a decision as to whether positivist or interpretivist approaches are most appropriate, Patton (1990, p.39) states that the paradigm of choices recognises that different methods are appropriate for different situations. Situational responsiveness means designing a study that is appropriate for specific inquiry situation. Moreover, Weber (2004) suggests that researchers should consider the research question and the topic being studied. Referring back to the research problems and research questions discussed in the Chapter one, this research is more concerned with the relationship between the two variables: business strategy and agile software development rather than providing the explanation of social phenomena. Therefore, positivist approaches are seen to be the most appropriate for this study.

3.4 Choosing a research approach

It has been questioned by many researchers which research methods are the most appropriate for IS research, since different methods can generate information about different aspects of the subject being studied (Mingers 2001). In order to assist positivist researchers to select research methods for the study of IS, Galliers (1990) proposed a revised taxonomy, which classifies approaches into various types. These include: laboratory experiments; field experiments; surveys; case studies; theorem proof and forecasting and simulation. Based on this taxonomy, Galliers (1990) suggests that the decision regarding which one to select should be in line with the research objectives.

Alternatively, Yin (1989) proposes three criteria for choosing a certain type of research strategy in general: the form of research question; the extent of control an
investigator has over actual behavioural events; and the degree of focus on contemporary as opposed to historical events.

Table 3.3: Research strategies (Yin 1989)

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Form of research question</th>
<th>Requires control over behavioural events?</th>
<th>Focuses on contemporary events?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>How, why</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Survey</td>
<td>Who, what, How many, How much</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Archival analysis</td>
<td>Who, what, How many, How much</td>
<td>No</td>
<td>Yes/no</td>
</tr>
<tr>
<td>History</td>
<td>How, why</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Case study</td>
<td>How, why</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Subsequent to the three selection criteria illustrated in Table 3.3, this study identifies each criterion as briefly discussed in the following:

- **The type of research questions** The primary objective of this research as addressed in Chapter one is to gain an in-depth understanding of the problems and issues of the alignment between business strategy and IT/IS strategy where agile software development is applied. In order to achieve this, the research question and sub research questions have been designed in the form of *why* and *how* questions

- **The extent of control an investigator has over actual behavioural events** The researcher does not control or manipulate the behaviour of the participants. As the researcher seeks to investigate the situation/events of the subject, the degree to control over behaviour of participants and events is negligible

- **The degree of focus on contemporary as opposed to historical events** In this study, the focus on contemporary events is high. The researcher intends to describe contemporary events of the subject being studied rather than focus on historical events.
The positivist approaches proposed by Galliers (1990) have been evaluated using the three selection criteria for selecting research method proposed by Yin (1989). Based on these considerations, case study research is the most appropriate research method for this project and is consistent with the selected research paradigm.

3.5 Case study research as the chosen approach

According to Yin (1989, p.23) a case study is an empirical inquiry that: investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. Case study research can be used to achieve various research aims such as to provide in-depth understanding of issues of a phenomenon, and contribute to knowledge by relating findings to test theory (Cavaye 1996).

Benbasat, Goldstein et al. (1987) provide eleven characteristics of case studies. These characteristics are summarised in Table 3.4, and are consistent with the convention of positivism (Pare 2004). Positivist case research tries to understand a social setting by identifying individual components of a phenomenon and explaining the phenomenon in terms of constructs and relationships between constructs (Cavaye 1996).

In the field of IS research, the case study has been used extensively (Shanks and Parr 2003). Benbasat, Goldstein et al. (1987), in recommending the case study approach, give three main reasons why case study research is practicable for the IS researcher: first, the researcher can study and learn about information systems in a natural setting, and build theories from practice; second, the case method enables the researcher to answer “how” and “why” questions, in order to understand the nature and complexity of the current situation; third, a case approach is the most appropriate way to research an area in which few prior studies have been carried out.

There are several of types of case study that have been revealed in the IS research literature. For example, a case study can be exploratory, descriptive, explanatory (Yin 1994), intrinsic, instrumental, and collective (Stake 2000). An exploratory case study aims to identify the feasibility of research processes. A descriptive case study presents a full description of a phenomenon within its context. An exploratory case
Study presents data in cause-effect relationship manner (Yin 1994). An *intrinsic* case study is a case that is based on the particular interest of the researcher. The purpose of conducting this type of case study is to help researchers to better understand particular cases. An *instrumental* case study is focused on developing insight into an issue of particular cases or developing an existing theory. The purpose of the instrumental case study is to help researchers in understanding the intrinsic interest.

The *collective* case study is an instrumental study which encompasses more than one case. It aims to investigate a phenomenon, population, or general condition. Using a collective case study will help the researcher better understand the phenomenon and the theories underlying it (Stake 2000). Based on the distinctive types of case studies, the case study in this research is justified to be *collective case study* as the most appropriate type case study for this study, as it aligns with the aim to develop insight on the situations and the problems across organisations in business strategy and IT/IS strategy alignment.

<table>
<thead>
<tr>
<th>Key characteristics of case studies</th>
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<tbody>
<tr>
<td>1. Phenomenon is examined in a natural setting</td>
</tr>
<tr>
<td>2. Data are collected by multiple means</td>
</tr>
<tr>
<td>3. One or few entities (person, group, or organization) are examined</td>
</tr>
<tr>
<td>4. The complexity of the unit is studied intensively</td>
</tr>
<tr>
<td>5. Case studies are more suitable for the exploration, classification and hypothesis development stages of the knowledge building process; the investigator should have a receptive attitude towards exploration</td>
</tr>
<tr>
<td>6. No experimental controls or manipulation are involved</td>
</tr>
<tr>
<td>7. The investigator may not specify the set of independent and dependent variables in advance</td>
</tr>
<tr>
<td>8. The results derived depend heavily on the integrative powers of the investigator</td>
</tr>
<tr>
<td>9. Changes in site selection and data collection methods could take place as the investigator develops new hypotheses</td>
</tr>
<tr>
<td>10. Case research is useful in the study of “why” and “how” questions because these deal with operational links to be traced over time rather than with frequency or incidence</td>
</tr>
<tr>
<td>11. The focus is on contemporary events</td>
</tr>
</tbody>
</table>
In addition, various researchers in the research methods literature have discussed the core strengths of the case study. These include: it enables researchers to capture the richness of a phenomenon, and has richer detail than other methods (Galliers 1990); it allows researchers to study a large number of variables within different aspects of a phenomenon (Cavaye 1996); it provides the ability to deal with multiple examples of evidence such as documents, artifacts, interviews, and observation (Yin 1989); it allows researchers to present interactions between people and their understanding of situation, and is valuable in developing and refining concepts for further study (Cavaye 1996).

In summary, this project employs the case study method for three main reasons: firstly, the case research method is the most appropriate when the research questions are in the form of how and why question; secondly, the case study contains both single and multiple-cases, and various techniques that could help the researcher in gaining in-depth understanding of issues of a phenomenon; finally, the case study method is highly accepted and widely used among IS researchers.

3.6 Research design

A research design refers to the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose and research problem (Gable 1994).

3.6.1 Unit of analysis

The unit of analysis refers to the level of social life that the research is intended to focus and draw on for the outcomes of study (Ruane 2004). In case study design, the unit of analysis can be elected from different units such as individual, organisations, places, and periods of time (Vaus 2001, Ruane 2004). Each unit also has a different level of analysis. This ranges from a small (individual) to a large (organisation). The individual is easily seen and talked to, and the researcher can learn about them quite directly. Within the organisation, however, the data takes longer to gather. Yin (1994) notes that selection of the appropriate unit of analysis enhances the results in answering research questions and drawing conclusions.
To consider whether the unit of analysis is individual, group, organisations, or social artefact, Ruane (2004) cites that it depends on the topic that the researcher wishes to focus on. For example, if the research topic is focused on the level of social life, the individual would be utilised as a unit of analysis. If the research topic is focused on family issues, the group would be employed as a unit of analysis. If the research is focused on the products of major corporations, the researcher would utilise the formal organisation as the unit of analysis. Bendasat, Goldstein et al. (1987) argue that, before determining the unit of analysis, the researcher should closely examine the research questions to be pursued.

The research questions driving this study are of an exploratory nature, the focus on issues why organisations should align business strategy and IT/IS strategy through agile software development methods. The researcher considered that business strategy and the application of agile software development methods are organisational matters. Therefore, in order to gain the best understanding of this issue, using the organisation as the unit of analysis is the most appropriate. Since this study crosses national boundaries, following the European Commission\(^1\) classification for SMEs, this study classifies an organisation with less than 50 employees as a small organisation. An organisation with more than 50 employees but less than 250 employees is classified as a medium sized organisation and one with more than 250 employees is considered a large organisation.

### 3.6.2 Number of cases

There is no universal rule for the correct number of cases to include in a case study design (Vaus 2001). As stated by Yin (1989), case studies can be single or multiple. In selecting the number of cases, it has been questioned by many researchers whether one or more cases is sufficient in a research project (Dube and Pare 2003). Eisenhardt (1991) states that the number of cases is dependent upon how much the researcher knows about the phenomenon after studying a case, and how much new information is likely to be studied from further cases. Pare (2004) argues that in selecting the appropriate number of cases it should be valid to the period of time

available for the study. Therefore, the following section describes the characteristics of each in order to help decide whether a single case study or multiple case studies can be embedded in the research study:

- **Single case study** A single case study is typically focused on a single unit of analysis (Maylor and Blackmon 2005). Yin (1989, p.47) suggests that a single case study is appropriate when *it is a revelatory case, i.e., it is a situation previously inaccessible to scientific investigation. It represents a critical case for testing a well-formulated theory*, and when *it is an extreme or unique case.*

  The vital aspect of the study of a single case enables the researcher to investigate a phenomenon in-depth, getting close to the phenomenon, enabling a rich description and revealing its deep structure (Darke, Shanks et al. 1998)

- **Multiple case studies** Multiple case designs are suitable when the aim of the research is description, theory building, or theory testing (Benbasat, Goldstein et al. 1987). Pare (2004) claims that when the researcher adopts a multiple case design, a question many researchers encounter is related to how many cases would be sufficient. Eisenhardt (1989) states that multiple case design requires the study of at least four, but not more than ten cases. The important aspect of multiple case studies is that it enables the researcher to relate differences in context to constants in process and outcome (Cavaye 1996). Moreover, in a multiple case design, the case selection should follow a literal replication logic, where the conditions of the case lead to predicting the same results, or theoretical replication logic, where conditions of the case lead to predicting contrasting results (Pare 2004).

Through the discussion on the number of case studies above, the researcher employed *multiple case studies* for this study. The main reason for considering multiple case studies in the context of this study was regarding the purpose of this research, which is to investigate multiple organisations from both Thailand and Australia. Therefore, multiple case studies were considered more relevant to the purpose of this study. Moreover, in considering the number of cases, the researcher follows theoretical replications logic. The objective of this study as stated in Chapter
one, is that the researcher intends to compare the results between the cases, therefore five cases organisations were chosen in this study, with one organisation acting as pilot.

3.6.3 Participant selection

The process of selecting and finding sample cases is one of the most important elements of the research design (Yin 1994), as it leads the researcher to gain access to relevant information and data sources (Mason 2002). Patton (1990) lists a number of strategies for *purposive sampling* in order to assist the case study researcher in selecting participants. These include: extreme or deviant case sampling; intensity sampling; maximum variation sampling; homogeneous sampling, typical case sampling; stratified purposeful sampling, critical case sampling; snowball or chain sampling; criterion sampling; theory-based or operational construct sampling; opportunistic sampling; random purposeful sampling; sampling politically important; and convenience sampling; and as well as others. The reason of each strategy serves a particular evaluation purpose. The full details of each strategy can be found in Appendix D.

Of the listed strategies, only two sampling strategies were utilised in the current research. The *first* is criterion sampling. This form of sampling strategy involves the identification of important criteria in selecting case sampling. The *second* is convenience sampling. This form of sampling strategy involves the selection of samples that can be done conveniently, are accessible, and cost less. However, the researcher applied criterion sampling as the major strategy, and only applied convenience strategy as necessary. The researcher has chosen these two forms of sampling strategy because these offer more opportunities to select participants that meet the objectives of this study.

3.6.4 The process of case selection

The review of literature discussed in Chapter two shows that there is a lack of research in business strategy and IT strategy alignment where agile software development is applied. The procedure of case selection in this study incorporates a number of phases, which are outlined as follows:
• *Phase one* – the researcher seeks organisations which have a defined business strategy and are engaged in agile software development, both in Thailand and Australia

• *Phase two* – the researcher chooses case organisations from among the identified target organisations lists, initially ten organisations. Of these, five organisations are from Thailand, and five are from Australia. In this phase, the researcher sets up selection criteria and strategies to select eligible target organisations

• *Phase three* – prior to collecting data in each organisation, contacts are established by the researcher via telephone and email with a group of business managers and project managers within each organisation, to explain why the research study is being undertaken and the potential benefits to be achieved from conducting the research

• *Phase four* – once a potential participant is identified, a consent form and information sheet is sent out in order to obtain permission and approval. Once agreement to participate has been secured, the time of interview is scheduled.

Table 3.5: Characteristics of the four cases selected

<table>
<thead>
<tr>
<th>Number of cases</th>
<th>Organisations name</th>
<th>Type of organisations</th>
<th>Country of operations</th>
<th>Size of organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>Mining Consultancy</td>
<td>Australia</td>
<td>Small to Medium</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>Media and Entertainment</td>
<td>Thailand</td>
<td>Large</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>Banking and Financial</td>
<td>Australia</td>
<td>Large</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>Food industry</td>
<td>Thailand</td>
<td>Small to Medium</td>
</tr>
<tr>
<td>5</td>
<td>*X</td>
<td>Software house</td>
<td>Thailand</td>
<td>Small</td>
</tr>
</tbody>
</table>

*Pilot case study

In relation to phase two, a combination or mixed purposive sampling strategies are undertaken to select suitable organisations from Thailand and Australia. Therefore, the researcher has set a number of general and specific criteria for potential research
participants, based on a review of literature in business/IT strategy alignment and agile software development. The general criteria for inclusion focus on some general requirements for target organisations to participate in this study as follows:

- the organisations have to engage in business strategy and IT strategy alignment where agile software development is applied
- they operate in Thailand or Australia.

As can be seen from Table 3.5, two small to medium size organisations (Company A and D), and two large organisations (Company B and C) from Thailand and Australia were purposefully chosen as the specific case studies. Company X was selected as a pilot case study. The five cases were selected as an appropriate number in order to provide consistent and reliable data for the research outcomes, as suggested by the research methods literature (Eisenhardt 1989).

The following provides a number of reasons for selecting the organisations to participate in this study:

- **Case 1 – Organisation A** – is a mining consultancy company in Western Australia. This organisation is selected because the company presents strongly in the area of agile software development and management which, the researcher believes, could provide rich detail of information that the researcher wants to gain
- **Case 2 – Organisation B** – is a domestic media and entertainment company in Thailand. This organisation is selected as the appropriate company to investigate because it has extensive knowledge of agile software development and rich experience in developing strategic information systems in the media and entertainment industry
- **Case 3 – Organisation C** – is a banking and financial company in Western Australia. This organisation is chosen because it has a strong business management and has a strong focus on the state of the art of IT. The information gained from this organisation could be useful for this study
- **Case 4 – Organisation D** – is a food producing company in Thailand. The organisation is well known as the forefront company in Thailand for
applying agile methods and has an extensive knowledge base in software development. Therefore, the researcher selected this organisation for its rich experience in dealing with agile software development methods as well as its strong business strategy background.

- **Case 5 – Organisation X** – is a small software house in Thailand. The researcher has chosen this organisation for conducting a pilot case study because the company has a reputation and has been successful in using agile software development methods for producing software products.

Furthermore, specific inclusion criteria have been developed in order to ensure that potential participants meet the requirements of the study. These criteria are based on the recommendations made by Rubin and Rubin (1995) which include, for example, knowledge and experience of participants about the subject being asked, willingness of participants to talk about the subject, and participants who have a wider points of view. The following presents a set of specific inclusion criteria used in this study:

- they are willing to participate in the interview
- they can effectively articulate their knowledge accurately
- they have knowledge and experience in business strategy and/or agile software development
- they are willing to be open and share their experience and expertise.

Applying specific inclusion criteria, in each case, two participants were nominated to participate in interviews. These are the business manager and the IT/IS manager. These types of interviewees are purposefully selected. It is believed that the researcher has more opportunity to access valuable information and meet the research purpose; they are in a position to know and have good understanding in business strategy and IT/IS strategy where agile software development is applied. Gaining valuable knowledge and experience from them assists the researcher to answer the research questions. The participants take on different roles and positions, and have different perspectives which could be useful in gaining credibility for the research outcomes.
3.7 Data collection methods and techniques

There are three broad categories of data collection methods: qualitative, quantitative, and mixed methods. Each technique has its own advantages and disadvantages. The following presents a description of each:

3.7.1 Quantitative methods

Quantitative methods rely on techniques in which the researcher intends to focus on cause and effect thinking, reduction to specific variables and hypotheses and question, use of measurement and observation, and test of theory. Quantitative data contains information on attitude, behaviour or performance. The collection of these kinds of data might also involve using a checklist (Creswell 2007).

The advantages of quantitative methods are that the researcher can generalise the research findings which can be replicated on many different populations; the researcher can test hypotheses that are constructed before the data are actually collected; and it is useful for obtaining data that allow quantitative predictions to be made (Johnson and Onwuegbuzie 2004). However, the disadvantage of quantitative methods are that the knowledge produced may be too abstract and general for direct application to a specific local situation, and due to the focus on theory or hypothesis testing rather than on theory or hypothesis generation, the researcher may miss examining phenomena occurring (Johnson and Onwuegbuzie 2004).

3.7.2 Qualitative methods

In contrast, qualitative methods rely on techniques in which the researcher intends to focus on testing multiple meanings of individual experience, meaning socially and historically constructed, with an intent of developing a theory or pattern (Creswell 2003). Qualitative data consists of open-ended information that the researcher gathers through an interview instrument, participant observation, gathering documents from a private or public source, and audio-visual material (Creswell 2007).
The advantages of qualitative methods are that they are useful for studying a limited number of cases in-depth, describing complex situation, and can conduct cross-case analysis (Johnson and Onwuegbuzie 2004). On the other hand, the disadvantages of qualitative techniques are that it is difficult to make quantitative predictions, it is more difficult for the researcher to test hypotheses and theories, and the results are more easily influenced by the researcher’s personal biases (Johnson and Onwuegbuzie 2004).

### 3.7.3 Mixed methods

Mixed methods research is the class of research where the researcher combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study (Johnson and Onwuegbuzie 2004). Mixed methods emphasise how the two sets of quantitative data and qualitative data are combined and interpreted. Creswell (2007) states that the use of mixed methods approaches helps the researcher to provide more comprehensive evidence for studying the research problem, and helps the researcher answer the questions that cannot be answered by quantitative or qualitative methods alone.

The advantages of mixed methods are that they allow the researcher to generate and test a grounded theory, the researcher can use the strengths of an additional methods to overcome the weaknesses in another method by using both in a research study, and stronger evidence is available for a conclusion through convergence and corroboration of findings (Johnson and Onwuegbuzie 2004). Yet, the disadvantages of mixed methods are that they may not be suitable for a single researcher, are more expensive, and more time consuming.

Even though the three types of methods for data collection present some advantages and disadvantages, whether to choose qualitative methods, quantitative methods, or mixed methods as data collection technique, Creswell (2003) suggests that the researcher should considers the research problem, the experiences of the researcher, and the audiences for whom the report will be written.
The research problems discussed in Chapter two indicate that prior research on strategic alignment has not been documented in the area of alignment of business strategy and IT/IS strategy through agile software development methods. There is a need for more research to investigate in this area. As such, this subject is a new phenomenon to investigate, and therefore choosing either qualitative methods or quantitative methods may not produce enough findings to explain the complex phenomena uncovered.

Therefore, choosing mixed methods as data collection techniques is the most appropriate approach that can fulfil the purpose of this study. There were three main reasons why the researcher applied mixed methods of data collection: firstly, both qualitative and quantitative and richness and flexibility to the overall research process; secondly, mixed methods seem to be suitable for the study of a complex phenomenon in IT/IS (Dube and Pare 2003); thirdly, research findings are likely to be more convincing and accurate (Yin 1989).

3.8 Data collection methods for case study

Case study research typically combines various types of data collection methods (Pare 2004). Yin (1989) classifies six sources of evidence that work well when conducting case study research: documentation; archival records; interviews; direct observations; participant-observation; and physical artifacts. Out of six sources, the major data collection technique for this study was chosen to be interviews. As mentioned by Jonassen (2004) interviews can be used either as a major method for data collection or in combination with other data sources, particularly when the researcher conducts a case study. Therefore, this study considers the interviews as a primary data source.

3.8.1 In-depth interviews

Interviews are one of the most important methods of collecting information for conducting a case study (Yin 1989) because they allow the researcher to obtain a great deal of useful information (Leedy and Ormrod 2005). The most common interview technique presented in the research methods literature is an in-depth
interview. This is a face-to-face conversation between the researcher and the informant (Johnson 2002). The researcher who uses in-depth interview techniques commonly seeks to gain deep information and knowledge of the subject under investigation which is held by interviewees, such as everyday activities, events, or places (Johnson 2002).

There are various types of interview methods presented in the research methods literature. For example, Yin (1989) categorises three main types: opened-ended interviews; focused interviews; and structured interviews. Patton (1990) classifies interviews in three ways, namely: the informal conversational interview; the general interview; and the standardised open-ended interview. Minichiello, (1995) proposes a useful continuum model for distinguishing types of interview using different terms: structured interviews; focused or semi-structured interviews; and unstructured interviews. These are presented in Table 3.6.

Table 3.6: Interviewing methods (adapted from Minichiello (1995))

<table>
<thead>
<tr>
<th>Structured interviews</th>
<th>Semi-Structured interviews</th>
<th>Unstructured interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardised interviews</td>
<td>In-depth interviews</td>
<td>In-depth interviews</td>
</tr>
<tr>
<td>Survey interviews</td>
<td>Survey interviews</td>
<td>Survey interviews</td>
</tr>
<tr>
<td>Clinical history taking</td>
<td>Group interviews</td>
<td>Group interviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral or life-history interviews</td>
</tr>
</tbody>
</table>

In this study, the researcher followed the terms that are most common and have been highlighted in the research methods literature. These are structured interviews, semi-structured interviews, and unstructured interviews:

- **Structured interviews** – these types of interviews are normally used for collecting quantitative data. The researcher asks all respondents preset questions. The order of questions and wording are fixed (Robson 2002)

- **Semi-structured interviews** – the researcher asks respondents preset questions but the order of questions and wording can be changed based
on the researcher’s perception, as needed. This type of interview is widely used in flexible design (Robson 2002)

- **Unstructured interviews** – this type of interview allows the researcher to converse freely with respondents using their own terms about a set of concerns and general area of interest. This type of interview is useful when the researcher seeks to understand complex behaviour of people (Punch 1998).

In brief, in-depth interviews were employed in this study using both the structured and semi-structured interview mode. Aside from its advantages, there were two main reasons that influenced the researcher to choose in-depth interviews rather than focused group interviews: *firstly*, in-depth interviews provide more access to potential participants compared to focus group interviews (Ritchie and Lewis 2003); *secondly*, as this research aims to explore how organisations align business strategy with IT/IS strategy through agile software development, the researcher believes discussing this matter with an individual maximises the chance for both participants and the researcher to probe this matter more deeply in detail. Therefore, in-depth interviews would be the most appropriate method.

The other sources of data collection method to be used in conjunction with an in-depth interview that the researcher has considered are documentation, participant observation and field notes, and Internet sources such the company website. The following briefly presents the characteristics of each approach:

- **Documentation** – documentation is written material that people reveal based on their point of view (Bogdan and Taylor 1975). The most important aspect for using documents in a case study is to support and enhance evidence from other sources (Yin 1989). Documents include such wide range of materials as letters, memoranda, agendas, announcements and meeting report, administrative documents, and newsclippings (Yin 1989)

- **Participant observation** – participant observation is mainly used in research studies of different cultural or sub-cultural groups (Yin 1989), to be used when the research requires an examination of social relationships (Bryman 1984)
• **Internet sources** – Internet sources, which contain some company information such as company’s history, mission and products, may also be used.

### 3.8.2 Number of interviewees

In qualitative research, there is no standard requirement and guideline to determine the number of interviewees, but rather it depends on the purpose of the study, what will be useful, what will have credibility, and what can be done with available time and resources (Patton 1990). Patton (1990) also suggests that if the researcher seeks to gain rich and in-depth information from the cases, a small number of people can be very valuable. In order to be the most suitable for the time and amount of resources available to the researcher, a small number of interviewees for this study would be preferred. The number of interviewees in this study was two people from each organisation. Business managers, IT/IS managers and/or project managers were nominated for participation in this study because they are directly involved and have more experience in developing the business strategy and implementing agile software development. The interviews had a length of approximately fifty-five minutes, with transcription up to seven pages.

### 3.8.3 Recording interview

Due to their nature, interview methods are used to obtain oral information from participants about their ideas and beliefs on the subject being asked. In order to obtain an accurate record of what participants say, it is important for the researcher to consider how the interview can be recorded (Minichiello 1995). Schensul et al. (1999) note that interviews can be recorded in three ways: note-taking; audiotape; and videotaped. In order to gain accurate results during the interview, the researcher utilised audiotape and note-taking as the most appropriate tools for recording the interview.

### 3.8.4 Questionnaire instrument

Apart from an in-depth interview, a questionnaire instrument was also used as data collection for the case study (see Appendix F). The questionnaire instrument refers to a document used for collecting information or to assess beliefs, attitudes and
opinions of participants (Colton and Covert 2007). In the questionnaire, the researcher articulates a list of questions to which he/she wants to know the answer (Brace 2004). Patrick (1990) states that the questionnaire can be administrated in different ways. It can be completed either by the respondent or by the researcher. Kumar (1996) argues that the researcher should clearly consider which mode could affect the validity of the findings. In this study, the researcher employed an interview schedule with the researcher responsible for completing the questionnaire. With regard to how the researcher has designed the questionnaire instrument, this is discussed in detail in the next section.

3.9 Design of the instrument

3.9.1 Form of question

The form and wording of questions is important in developing research instruments as they have a direct result on the type and quality of information obtained (Kumar 1996). Therefore, the questions should be appropriate and relevant to the research questions (Kumar 1996, Sarantakos 2005). Whether the researcher develops an interview schedule or a questionnaire, questions can be formulated in two forms, namely open-ended questions and closed-ended questions:

- **Open-ended versus Closed** In an open-ended question, respondents are asked to provide their own answers (Babbie 1998). In a closed question, respondents are asked to select an answer from a list provided by the researcher (Babbie 1998). Both open-ended and closed questions have certain advantages and disadvantages, as is presented in Table 3.7.

How the decision to choose open-ended or closed-ended questions to be used in the research instruments was arrived is discussed in more detail in Section 3.9.3.

3.9.2 Types of questions

The types of questions in the research instrument represent how the researcher obtains information and data from individuals regarding their view on particular topics (Kumar 1996). Patton (1990) proposes six types of questions, suggesting that the researcher should include them when developing questions for research
instruments: experience/behaviour questions; opinion/values questions; feeling questions; knowledge questions; sensory questions; background/demographic questions; the time frame of questions. The following presents the characteristics of each:

- **Experience or behaviour questions** – these are questions that the researcher asks the respondents in order to find out what they are currently doing or have done in the past. The purpose of these questions is to describe the experience, behaviour, and action of respondents.

- **Feelings questions** – these types of question concern how respondents feel about the things or issues around them. The aim of these questions is to gain direct understanding of the respondents’ feeling and emotions relating to their experiences.

- **Opinion questions** – these questions are asked to find out how respondents think or what they believe about the subject or issues.

- **Sensory questions** – these questions are intended to find out what respondents have seen, heard, tasted or smelled, and touched. These types of questions allow the researcher to access the sensory apparatus of the respondent.

- **Knowledge questions** – the purpose of these questions is to find out what information the respondents have.

- **Background or demographic questions** – these sorts of questions seek to identify the background and characteristics of the respondents such as education, occupation, age, and income.

Sections 3.9.3 describe how the six types of questions given above were selected for the research instruments.

In this study, the draft of the research instruments has been developed by the researcher after a review of the literature, designed to answer the research questions outlined in Chapter one. As mentioned earlier, this study adopted the concept of data triangulation techniques by using a combination of data sources. Therefore, in order to meet the objectives of the study, two types of research instruments are implemented in this study: the semi-structured interview and structured interview questionnaire. The semi-structured interview instrument consists of eight open-ended
questions, designed by the researcher. The structured interview questionnaire consists of fifteen standardised, closed questions. Both the interview guide and survey questionnaire are written in English.

Table 3.7: The advantages and disadvantages of closed and open-end questions (Gray 2004)

<table>
<thead>
<tr>
<th>Types of questions</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed question</td>
<td>• Require little time</td>
<td>• Loss of spontaneous responses</td>
</tr>
<tr>
<td></td>
<td>• No extended writing</td>
<td>• Bias in answer categories</td>
</tr>
<tr>
<td></td>
<td>• Low costs</td>
<td>• May irritate respondents</td>
</tr>
<tr>
<td></td>
<td>• Easy to process</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Useful for testing specific hypotheses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Less interviewer training</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Time consuming</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• In interview: costly of interviewer time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Demand more effort from respondents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The respondents have freedom in the answers to the question</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Opportunity to probe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Useful for testing hypotheses about ideas or awareness</td>
<td></td>
</tr>
<tr>
<td>Open-ended question</td>
<td>• The respondents have freedom in the answers to the question</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Opportunity to probe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Useful for testing hypotheses about ideas or awareness</td>
<td></td>
</tr>
</tbody>
</table>

However, for the participants in Thailand, the in-depth interviews are conducted in the Thai language. The researcher has translated all questions for the participants. The researcher is a fluent speaker of Thai: it is her first language. Subsequently, the responses have been translated back into English and a transcript prepared by the researcher. The following description outlines details of the original interview questions and survey questions.

3.9.3 Developing interview questions

An interview question is a technique that is aimed to generate an answer from the person being interviewed (Patton 1990), and should relate to the type of information that the researcher wants to gain (Minichiello 1995).

Referring the research question stated in Chapter one, the researcher intends to explore why organisations should align business strategy and IT/IS strategy through
agile methods. Thus, the information and knowledge that need be obtained in order to enable to answer the research question are briefly discussed as follows:

- the experienced and knowledge of participants toward business strategy and agile software development
- the opinion of participants on business strategy and agile software development.

Taking into account the various types of interview questions described in Section 3.9.2, the researcher considered that, out of six types, four types of questions were useful in developing the interview questions: experience/behaviour question; opinion/values questions; knowledge questions; and background/demographic questions.

The rationale behind selecting these types of questions falls into three main areas. The first reason was that each type of question has a strong characteristic that covers all areas that need to be asked, and for the researcher to gain in-depth knowledge and yield the most revealing information from participants. The second reason was that gaining knowledge and information through these types of questions results in increasing the reliability of the research outcomes. The last reason was such that questions meet the purpose of the interview in a way that they obtain information such as facts, beliefs, present or past behaviour, and conscious reasons of the subject being studied.

Furthermore, as this research is descriptive in nature, a semi-structured interview utilises open-ended and closed questions in order to achieve an effective interview (Miller and Rollnick 2002). There were two main reasons in combining open-ended and closed questions in a semi-structured interview: open-ended questions encourage participants to talk freely about their knowledge and experience of business strategy and agile software development alignment. Another reason was that, asking closed questions in conjunction with open-ended responses helps the researcher to obtain specific information. The structure and content of interview instruments is presented in Table 3.8.
Table 3.8: Structure and content of interview instrument

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Type of questions</th>
<th>Scope of questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction and Instructions</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>Business strategy</td>
<td>Open-ended</td>
<td>Knowledge questions, Experience/behaviour questions, Opinion questions</td>
</tr>
<tr>
<td>3</td>
<td>Agile software development</td>
<td>Open-ended</td>
<td>Knowledge questions, Experience/behaviour questions, Opinion questions</td>
</tr>
<tr>
<td>4</td>
<td>Alignment</td>
<td>Open-ended</td>
<td>Knowledge questions, Experience/behaviour questions, Opinion questions</td>
</tr>
</tbody>
</table>

The interview instrument is divided into four sections. The first section is an introduction page. The second section contains questions with regard to business strategy. The third section contains questions about agile methods, and the last section includes questions in relation to strategic alignment.

3.9.4 Developing structured interviews questionnaires

The structured interview questionnaire instrument is the second data collection method for this study. The purpose of the questionnaire used in this study is to collect quantitative data from the participant regarding their perception and experience of business strategy and agile software development alignment. A copy of the questionnaire can be found in Appendix F.

In developing an effective structured interview questionnaire, Sekaran (1992) determines three important principles the researcher should consider and apply when developing questionnaire instruments. Each principle is presented as follows:

- **Principles of wording** – this principle including appropriateness of questions, level of sophistication of language used in the questions, sequence of questions, type and form of questions, and personal data needed to be gained from respondents
• *Principles of measurement* – this comprises scales or a scaling technique that is used for measuring qualitative responses, and assessment of the quality of data collection

• *General appearance or presentation of questionnaire* – this concerns the appearance of the questionnaire, such as including a good introduction, well organised questions and instructions.

3.9.5 Developing questions format

The application of the above guidelines has resulted in developing the structured interview questionnaire for this study. In relation to the principles of wording described above, the question format embedded in the questionnaire can be either structured or unstructured question format (Trochim 2001). In brief, the researcher utilised both a structured and unstructured question format in developing the question format for this study. In order for respondents to be able to indicate the types of business strategy that best describe their organisation, multiple-choice questions were selected as the most relevant.

Furthermore, rating-scale questions were also chosen based upon the purpose of the research. One of the main reasons for electing these types of questions was that they are common and widely used in developing questionnaires. The other reason was due to the researcher intent to measure attitude and perception of respondents on business strategy and agile software development. These types of questions can be used in measuring a diverse range of situations.

3.9.6 Developing response sets

With respect of items to be used as the response set in the question format, it should be clear and unambiguous. Sarantakos (2005) points out that in developing response categories in a questionnaire, the response set should be *accurate* in the way that is relevant and related to the essence of the questions that are being formed. The response set should be *exhaustive*. This means that a response set should enclose all possible options of the answer. The response set should be *mutually exclusive sets*, so that the respondents are able to select the correct answers without any confusion. The
response should be unidimensional sets. This refers to the requirement that a set of categories belong to and measure only a single construct, in one dimension only.

In terms of scales formats, a set of answers can be constructed through three types of scales that are widely used in questionnaires: Likert scales; Thurstone scales; and Semantic differential scales (Babbie 1998). Thurstone scales are used for measuring a given concept. Semantic differential scale is a numerical scale response based on choosing one end of the scale rather than the other. However, only Likert scales were used in developing the response set for the research instrument in this study. This type of scale is presented as follows:

- **Likert scales** – these scales contain statements about a particular topic. Using these scales, the researcher asks respondents to indicate their agreement or disagreement among a five-point scale ranging from ‘strongly agree’ (SA) , ‘agree’ (A), ‘undecided’ (U), disagree (D), and ‘strongly disagree’ (SD) (Burns 1994).

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Type of questions</th>
<th>Scope of questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction and Instructions</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>Demographic data</td>
<td>Closed</td>
<td>Background/demographic questions</td>
</tr>
<tr>
<td>3</td>
<td>Organisations data</td>
<td>Closed</td>
<td>Background/demographic questions</td>
</tr>
<tr>
<td>4</td>
<td>Business strategy</td>
<td>Closed/multiple choices</td>
<td>Opinion and experience questions</td>
</tr>
<tr>
<td>5</td>
<td>Agile software development</td>
<td>Closed</td>
<td>Opinion and experience questions</td>
</tr>
<tr>
<td>6</td>
<td>Alignment</td>
<td>Closed</td>
<td>Opinion and experience questions</td>
</tr>
<tr>
<td>7</td>
<td>Comments</td>
<td>Open-ended</td>
<td>Opinion questions</td>
</tr>
</tbody>
</table>

The researcher considered Likert rating scale as the choice approach in measuring attitudes and belief of participants in the alignment of business strategy and IT/IS strategy where agile software development is applied. There were two main reasons behind choosing these scale items. The first reason was that the characteristics of Likert scales are matched with data that is required for this study. Another reason was this type of rating scale is also highly recommended by the research methods.
literature and are usually familiar to respondents (Neuman 2003, Gray 2004). A summary of the structure and content of the questionnaire is presented in Table 3.9.

Referring to Table 3.9, the contents of the questionnaires for this research is divided into seven sections. The first section contains an introduction. The second and the third sections cover demographic and organisation data, which use closed questions. The fourth section contains questions about business strategy, and use closed questions and multiple choices. The fourth and the fifth sections involve questions with regard to agile methods and strategic alignment, and use closed questions. The last section encloses comments, which use open-ended questions.

3.10 Pilot case study

A pilot study serves as a method for preparing and testing the research instrument (Teijlingen and Hundley 2001), and is a vital element of a good research design. Although a pilot case study does not guarantee success in the main study, it does increase the probability. Yin (1994) states that the pilot case study helps researchers to plan for their data collection procedures, and to develop appropriate questions before beginning the research. Teijlingen & Hundley (2001) discuss the importance and reasons for undertaking a pilot study. These include: it helps the researcher in collecting preliminary data; it helps the researcher in designing a research protocol; it enhances assessing whether the research instrument addresses reliability and validity issues; and assesses the feasibility of the study.

In this study, a single pilot case study was conducted in a small organisation in Thailand prior to the research project in order to make preliminary assessment of how a small organisation perceived the alignment of business strategy and IT/IS strategy where agile software development is applied.

3.11 Methods of analysing case study data

Analysis of the case study is one of the most important aspects of case study research (Yin 1994). Therefore, the researcher needs to apply appropriate analytic strategies (Yin 1994). According to Vaus (2001, p.249) methods for analysing case studies are less systematically developed than are the techniques for analysing data collected with other types of research designs. Analysis with these other designs typically use
statistical techniques that rely on having many cases and revolve around comparing groups of cases.

Ideally, multiple case studies engages in two forms of analysis: within case analysis and cross-case analysis (Eisenhardt 1989, Yin 1994). The need is to apply both forms of analysis in multiple case studies, to get a deeper understanding and explanation of the findings (Miles and Huberman 1994, Bazeley 2007). According to Eisenhardt (1989, p.540) within-case analysis typically involves detailed case study write-ups for each site. These write-ups are often simply pure descriptions, but they are central to the generation of insight. In multiple case studies, the researcher analyses each case for specific themes, and then compares the themes across the cases (Creswell 2007). This form of analysis sometimes is used in conjunction with cross-case analysis because within-case analysis provides the data for cross-case analysis (Patton 1990, Miles and Huberman 1994).

In the form of cross-case analysis, the researcher selects two or more cases to examine, and then searches for similarities and differences among the cases (Creswell 2007). Eisenhardt (1989) suggests three strategies that can be applied when employing cross-case analysis: firstly, the researcher selects a category of the case, and then searches for similarities and differences within the group; secondly, the researcher selects two cases, and then matches the similarities and differences between each case; finally, the researcher splits the qualitative and quantitative data by data source for separation of analysis.

In brief, the researcher combined the analysis techniques discussed above. Applying within-case analysis, each case was separately analysed in order to identify specific themes. In cross-case analysis, all cases were compared in order to determine the similarities and differences among the cases. Further, the quantitative data gathered by the structured interview questionnaire were used primarily to support the analysis in each case. The quantitative data is recorded and analysed using simple statistical techniques in order to meet the requirements of this research study.
3.11.1 Case study analysis procedures

In this study, the data contained in each case is gathered from multiple sources of evidence such as interviews and documentation. The main procedures of case study analysis are broken into six main phases, and are presented in Figure 3.2.

According to Figure 3.2, details of each stage in the case study analysis process are described as follows:

- **Phase one** – the researcher commences the first phase by developing lists of coding categories that are used in the next phase of case study analysis through data reduction and data complication techniques (Coffey and Atkinson 1997) in order to identify the patterns within the data

- **Phase two** – in this phase, the researcher conducts the interviews and collects documentation. All interviews are recorded during the interview sessions using a high quality recording device in order to ensure that the quality of sound is audible and clear (McLellan, MacQueen et al. 2003)

- **Phase three** – once the interview sessions are completed, the researcher formulates and transcribes each interview. The following techniques were used to analyse transcripts (McCormack 2000):
  - the researcher listens to the tape several times in order to identify themes and the key ideas that are related to the research questions
  - identification is made of narrative process used by storyteller such as stories and augmentation
  - focus on the key words

- **Phase four** – afterwards, the transcripts are reviewed for accuracy, and then a transcript summary and a case report are written by the researcher. The transcript summary contains information and data that relate to each participant’s response during the interviews

- **Phase five** – the coding process is carried out in this phase. Through data reduction, the researcher formulates individual coding by reading each
interview transcript, and then assigns appropriate codes. The data of with-in case analysis are analysed through transcript summary. By comparison, the data of cross-case analysis are analysed through case report comparisons

- **Phase six** – the final phase is interpretation of the data through the drawing and verification of conclusions.

3.12 Triangulation

The notion of triangulation was first developed by Denzin (1978). He defines triangulation as *the combination of methodologies in the study of the same*
phenomenon (p.291). Triangulation is perceived as a research strategy for improving the validity of research and/or evaluation research findings (Mathison 1988). The notion of triangulation has been applied as a data collection technique (Kaulio and Karlsson 1998) in qualitative research and to case study research (Yin 1989).

Denzin (1978) outlines four basic types of data triangulation, based on the use of a variety data sources within a case study: data triangulations; investigator triangulation, theory triangulation; and methodological triangulation. The following provides a brief description of each:

- **Data triangulation** – data sources can vary depending on the times that data will be collected, the place, or setting and from whom the data will be obtained (Mathison 1988, Thurmond 2001). The use of data triangulation is to ensure that a theory is tested in more than one way, increasing the likelihood that negative cases will be uncovered (Denzin 1978)

- **Investigator triangulation** – by using multiple investigators/or researchers is to reduce bias in gathering, coding, or analysing of data (Thurmond 2001). The significant aspect of investigator triangulation is that researchers can test for reliability quickly, and reduce bias of research findings (Denzin 1978)

- **Theory triangulation** – this type of triangulation involves the use of multiple perspectives to analysis and interpret a single set of study (Denzin 1978). In theoretical triangulation, the perspectives used in the study may have opposing viewpoints, depending on what the researcher hopes to accomplish (Denzin 1978)

- **Methodological triangulation** – methodological triangulation refers to the use of multiple methods in the examination of a social phenomenon. It involves two forms of triangulation. The first is within method (Denzin 1978), which involves the process of cross-checking for internal validity (Kaulio and Karlsson 1998). The second is between-method (Denzin 1978), which involves the use of different methods
such as quantitative and qualitative methods to test external validity (Kaulio and Karlsson 1998).

Triangulation provides researchers with various important opportunities. As discussed by Jick (1979), triangulation allows researchers to be more confident of their results; it helps researchers develop a new way of capturing a problem to balance with conventional data collection; it can lead to richer data. It can lead to the fusion of theories; and it also can serve as the critical test, by virtue of its comprehensiveness, for competing theories.

On the other hand, Thurmond (2001) identifies some limitations of triangulation that should be considered, including: it increases the amount of time needed in comparison to single strategies; it is difficult when dealing with a vast amount of data; there is potential disharmony based on investigator biases; it conflicts because of theoretical frameworks; and there is a lack of understanding about why triangulation strategies were used.

In short, this study utilised data triangulation and methodological triangulation as the most appropriate mechanisms for increasing reliability and validity of the research. The researcher did not apply investigator triangulation and theory triangulation because this study is being conducted by one researcher. The researcher also does not intend to use multiple theories in the single subject.

3.13 The quality of the research

According to Freeman, deMarrais et al. (2007), the quality of the research is constructed and maintained continuously through the life of a research project and includes decisions that researchers make as they interact with those they study and as they consider their analyses, interpretation, and representation of data (p.27).

The quality of case study can be considered as trustworthy. It should be valid and reliable (Travis 1999). Validity refers to how accurately the researcher has conducted their research (Maylor and Blackmon 2005). It also refers to what is to be accepted
and not accepted in the research study (Scheurich 1996). *Reliability* is used to measure the accuracy of an instrument (Boudreau, Gefen et al. 2001).

Data collection in a positivist case study aims to provide the researcher with a high level of confidence that the methods being selected are useful for achieving a level of certainty (Straub, Boudreau et al. 2004). Yin (1989) and Lee (1989) recommend four criteria for evaluating the adequacy of the measurement quality of case study: *construct validity; internal validity; external validity; and reliability*. The following provides a brief description of each:

- **Construct validity** – is concerned with how well the subject and the concept of the study are being measured in the case study (Scandura and Williams 2000). It deals with knowing whether the results from multiple situations and conclusion are related, and is improved by using multiple sources of evidence, and establishing a chain of evidence (Yin 1989)

- **Reliability** – *reliability is a statement about the stability of individual measures across replications from the same source of information* (Straub 1989 p.160). To reduce the errors and biases of the research findings is the purpose of reliability (Yin 1989)

- **Internal validity** – this is the degree of correspondence between research findings and the real world (Travis 1999). In the case study, internal validity can be measured by using pattern matching. For example, if the case study is a descriptive study, the predicted pattern needs to be defined prior to data collection. If case study is explanatory, the patterns can be defined through the dependent or the independent variables of the study (Yin 1989)

- **External validity** – in case study research, external validity concerns the generalisability of the research findings to the subject of interest by using different measurements (Sue 1999). It also concerns the generalisability of the research findings through types of person, settings and time (Cherryholmes 1988). The important aspect of
external validity is that it ensures that research results are applicable in natural settings (King and He 2005).

By taking four types of validity into account, the researcher considers each of four criteria as appropriate, but is mainly focused on construct validity. As mentioned earlier, this research applies multiple sources of evidence as data collection methods. It is reasonable to apply construct validity to provide multiple measures of the same phenomenon (Pare 2004).

3.14 Ethical considerations

IS research is often involved with ethical issues. It is important for the researcher to consider the ethical basis and content of their specific method when doing research (Stake 2000). Ethics is defined in order to inform the researcher what is legitimate or is not legitimate to do, or what moral research procedure involves (Neuman 2003). There are two main reasons why researchers should take ethical issues into account. Firstly, the target population may be harmfully affected by some of the questions, whether direct or indirect. Secondly, respondents are expected to share their private information (Kumar 1996).

The most important issues that the researcher needs to address in professional codes of ethics include: value of the research project to society; informed consent; avoiding harm and risk to participants; ensuring privacy and confidentiality; and avoidance of sensitive information (Kumar 1996, Stake 2000). The researcher has clearly addressed these issues in the ethic protocol application submitted to Murdoch University, Human Ethics Committee. In the ethical application, including the consent form and participant’s information sheet, the researcher states the purpose of the research, and explains the process of how data is collected. In order to assure that there is no harm and risk to participants during the data collection, the researcher informs participants that participation is voluntary and they can withdraw from the study at any time without notice.

In terms of privacy and confidentiality, the researcher informs and confirms to participants that all information they provide remains anonymous during data
collecting and writing of the thesis. All data is stored in a locked cabinet at Murdoch University and only the researcher of this study can access the data at any time.

3.15 Chapter summary

This chapter presents a detailed description of the research methods and design for this research. The chapter begins with the justification of research and the selection of research paradigm. Table 3.10 presents the highlights based upon the major decisions made on research methods and design in order to conduct this research. The selection of research methods and research strategy is then explained in detail. Moreover, the data collection techniques and analysis processes and analysis are explained. The chapter concludes by identifying the issues of the quality of research and measurement, and ethical issues. The next chapter commences the discussion of the results of this study by presenting within-case analysis.

Table 3.10: Summary of the research design and data collection

<table>
<thead>
<tr>
<th>Discussion</th>
<th>Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research approach</td>
<td>Positivist</td>
</tr>
<tr>
<td>Research strategy</td>
<td>Case study</td>
</tr>
<tr>
<td>Number of cases</td>
<td>Multiple case studies (in a total four organisations)</td>
</tr>
<tr>
<td>Unit of analysis</td>
<td>Organisations from Thailand and Australia</td>
</tr>
<tr>
<td>Research techniques</td>
<td>Documentations</td>
</tr>
<tr>
<td></td>
<td>Interviews</td>
</tr>
<tr>
<td></td>
<td>- Open-ended interview</td>
</tr>
<tr>
<td></td>
<td>- Semi-structured interview</td>
</tr>
<tr>
<td>Data collection techniques</td>
<td>Mixed methods</td>
</tr>
</tbody>
</table>
CHAPTER 4
WITHIN-CASE ANALYSIS AND RESULTS

This chapter presents the company analysis of the pilot and four case studies, based on data gathered from the interview process and responses to the questionnaire described in Chapter three. Analyses of these five cases are individually presented in the form of the within-case analysis according to the research design, also described in Chapter three. Each report starts with a description of the company background and a review of the participants and data sources. The findings from the interviews together with response to the questionnaire are then described. Case analysis is also based on observations and field notes from the interviews, as well as other sources as noted individually for each company.

Figure 4.1: Structure of the chapter

Based on Figure 4.1, Section 4.1 explains how each case organisation was analysed throughout the chapter. Section 4.2 presents the individual case report for the pilot case study (Company X). This company is a small software house in Thailand. It emphasises a low cost Defender strategy. Section 4.3 presents the individual case report for the case of Company A. This company is a medium size mining
consultancy company in Australia. This company emphasises the innovative profile of an Analyser.

Section 4.4 describes the individual case report for the case of Company B. This company is a large media and entertainment company in Thailand. This company emphasises the innovative profile of a Prospector. Section 4.5 presents the individual case report for the case of Company C. This company is a large financial service company in Australia, and emphasises the highly innovative profile of an Analyser. Section 4.6 presents the individual case report for the case of Company D. This company is a small food company in Thailand. This company emphasises a high quality of service with an acceptable price of a Prospector. Section 4.7 summarises the chapter.

4.1 Approaches for case analysis

This section describes how the five case organisations are analysed, and how the data is presented.

4.1.1 Data sources

As described in Chapter three, this study combined data from different sources for the purpose of triangulation. The primary data sources were an interview and questionnaire. Secondary data were obtained from the company websites, and observation field notes.

Table 4.1: Data sources and instruments

<table>
<thead>
<tr>
<th>Primary data source /Instrument</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Interview schedule</td>
<td>• Views on opinion towards business strategy and IT/IS strategy, where agile software development is applied.</td>
</tr>
<tr>
<td>• Questionnaire</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary data source</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Company website</td>
<td>• Workforce profiles, news and information, and products and services</td>
</tr>
<tr>
<td>• Field notes</td>
<td>• Note taking during interview</td>
</tr>
</tbody>
</table>
Table 4.1 shows that the interview and questionnaire were designed, as described in Chapter 3, aiming to collect data for each participant’s perspectives on business strategy and IT/IS strategy, where agile software development is applied. The company website was used for collecting data such as workforce profiles, news and information, and products and services of the company.

4.1.2 Approach for analysing case study evidence

The data from case studies can either be analysed manually or by using qualitative data analysis software (Welsh 2002). For a case study that produces large amounts of data, the research methodology literature suggests approaches for analysing the data such as computer-aid and software packages (Yin 1994, Basit 2003). However, as this study does not contain large volumes of data, computer-aid and software packages are not necessary. The data and information from the interviews are manually analysed.

4.1.3 Data presentation

Each case organisation was analysed based on responses to a number of questions. The findings from the interviews are presented under the parent topics of the alignment of business strategy and IT/IS strategy, where agile software development method is applied. The key findings and analyses of results are identified and discussed at the end of each case. Note that the analysis of data is presented in the past tense since the data have already been collected and analysed.

4.1.4 Use of quotes

Description and quotation are essential elements of qualitative data analysis since they allow the reader to understand the situation and thoughts of people represented in the thesis (Patton 1990). Hence, this study uses quotes from the participants in order to provide evidence and enhance understanding of specific issues.
4.2 Pilot case – Company X

4.2.1 Company background

Company X is a small software house operating in Bangkok, Thailand. Although this organisation was used as a pilot case study, participants provided significant insight into the value of alignment. Company X has, as one of its goals, the creation of a long-term partnership between the company and its customers. Company X is highly focused on a small niche market.

In order to keep its position in the market, Company X emphasises cost effectiveness rather than high margins. At the same time, it maintains and improves the standard of quality of products and services. The emphasis on quality is high as a means to prevent new competitors from entering into the market. Company X maintains its organisational structure as a flat hierarchy due to the fact that it adopts small working teams, and all employees have the flexibility to adapt to change when the circumstance or working environment has changed. Employees are organised into functional groups. These include a project team and a marketing group. The managing director oversees these functional groups.

4.2.2 Observation and field notes

The data collection process was carried out primarily through an individual interview with the director of Company X. The following section presents the observations and field notes taken during the interview with the participant.

- Participant (X) – Managing and technical director

Participant (X) is the managing director of Company X. Having ten years of experience in agile methods has proven that Participant (X) is extraordinarily knowledgeable and optimistic in this area. During the interview, Participant (X) provided useful information and comments on important issues relating to the use of agile methods for current practice and for the future. It was
observed that Participant (X) provided an open discussion. He also appeared to have extensive knowledge of strategic alignment.

4.2.3 Analysis of the findings Company X

In this section, the findings in the case of Company X from qualitative and quantitative data are reviewed.

Business strategy

The data collected from the interview and secondary data sources are used to identify the type of business strategy used, based on Miles and Snow (1978) strategic types as discussed in Chapter two. At the beginning of the interview, the participant was asked a question relating to an understanding of the term business strategy. According to Participant (X):

“We define business strategy as a company direction, company vision. So in our business, when we keep company direction’s strategy, we have to envisage where the market for that business section is going to be”.

As above, Participant (X) understood the term business strategy as direction and vision of the organisation. This appeared to be consistent with definitions that have been given in the literature. When queried about Company X’s business strategy, Participant (X) noted that Company X centred on a nice market and focused on its effort to develop the product in order to achieve operational excellent and build strong financial performance. According to Participant (X):

“We focus on a strategy where we pick a niche market, our business strategy works with partners long term, our business strategy is to focus on a large scale enterprise, our strategy is to develop our own product mind in order to create cash flow”.
Additional comments from Participant (X):

“In our case, we position ourself as a niche high end consulting firm so we focus on that as a solution, and we sell this to our customers, so we sell high margin, and low project volume because we are a very specialist group of people. So my team here are very high end people, very capable people, so I can deliver a solution that normal companies cannot deliver”.

The business strategy of Company X published on the company’s website can be summarised as follows:

- to deliver IT/IS solutions to customers
- to build strong relationships with the partners.

Overall, Company X appeared to have a clear view of how the company should serve its customers. There is a very high focus on the price and the quality of products and services. This implied that the ability of Company X to maintain and research customers is dependent upon operational efficiency. As such, Company X’s core competencies are in the area of customer satisfaction and operational excellence. The results from the questionnaire specifically classified Company X as having Defender characteristics. This is also consistent with the information given by Participant (X) during the interview.

In terms of the commitment of the participant towards the business strategy of the organisation, the results from the questionnaire showed that Participant (X) has a role to a great extent (rating of 5) in this regard. Given this response, it is reasonable to say that this is due to his position as managing director of Company X. It is his responsibility to decide on business strategy for the organisation. However, it was interesting to note that Participant (X) was neutral (rating of 3) in agreeing that Company X has a well formulated business strategy. This may, perhaps, be based on a small company’s perception. Participant (X) may not feel confident that Company X has formulated the business strategy well enough when compared to larger size organisations in the same industry. Moreover, it is possible that Participant (X) may
feel that Company X is still a period of change and may not yet see the results of how well their business strategy is formulated.

**IT/IS in Company X**

Company X’s IT vision centres on delivering technology solutions to customers. Company X’s core competencies are in the area of the capabilities to produce large volumes of products and services. The role of IT is to search for technological innovations that could support operational efficiencies for the organisation. Being a small software house, the company has a flat hierarchy. The IT/IS function is managed by centralised control, where the business manager makes decision and has authority for IT/IS investment (Peterson, O'Callaghan et al. 2000).

Company X’s core business is IT/IS services organisation. The managing director of Company X therefore has strong support for IT/IS investment. This could be explained by the fact that IT/IS is the backbone of its strengths and is the cornerstone behind Company X’s success. Even though there is no information to indicate whether Company X has developed IT/IS planning, in terms of IT/IS investment, Company X appears to be aware of capital returns and growth as well as the capabilities of IT/IS implementation in helping organisation to achieve its goals and objectives.

**Agile software development methods**

In the interview, the participant was asked to describe agile software development methods. According to Participant (X):

“Agile, if you look up in dictionary, agile means ability to change and adapt to change more easily. So, agile methodologies means you adapt to, you able to adapt to whatever happens around you. So in this case we adapt to change”.

From the above comments, it can be said that Participant (X) provided an understanding of the term ‘agile methods’ which is fairly consistent with the
literature. In the questionnaire, the knowledge of Participant (X) on agile software development methods is claimed to be very extensive (rating of 5).

**The situation and driving forces to implement agile methods**

Company X deals with various large scale and highly complex projects. Selling in-house software products is the main focus of Company X. Company X implemented agile methods about five years previous to the interview. Attention is given to higher efficiency and effectiveness in their business operation. Initially, software projects were undertaken by means of the waterfall model. The key changes were driven by technology and market issues. Given the concern with rapid change in the technologies the managing director of Company X noted that, in the past, the software development life cycle was three to five years, but today in a dynamic market, the software life cycle has shortened to a six month period. Additionally, Company X recognises that its position in the marketplace is dependent upon the technology development cycle. Hence, to be responsive to the needs of business, and maintain itself as the leader in the industry, waterfall processes are no longer an option for Company X. Company X believes that one way to accomplish this is to replace the older processes with flexible processes such as agile methods. Discussing the issues and the need to apply agile methods, Participant (X) indicated:

“I think why people are so interested now, they really think that software has to be quick and has to have a very quick turn around. So, the key driving force to change is because of the software life cycle. Software life cycle is no longer 5 years, 3 years, 2 years, not even 1 year. Generally, people want some software out in 6 months or less. So, think about what you can do in 6 months. So, I think the driving force now is changed by the fact that IT has changed a lot and people have to adapt to that”.

**IT/IS projects where agile methods are applied at Company X**

In Company X, the use of agile methods evolved as part of all core software projects. The company’s core software technologies include E-finger print, Live scan, Golf
online, and Network planning management. The types of agile methods being implemented in Company X’s software projects were not consistent, rather the company adapted techniques that could offer the best outcomes and suited the characteristics of each project. Company X’s methodology is presented in Figure 4.2.

![Figure 4.2: Methodology of Company X](image)

At Company X, the development cycles last from one to two weeks. Product development at Company X was up to four phases as depicted in Figure 4.2. Each iteration included analysis and planning phases. The first iteration was used for coding stories and provided background related to possible problems. The second, third and fourth iterations were used to develop and test. At the end of each iteration, the software development team evaluated the project and delivered working software to customers. Meetings were set up on a daily basis for software development teams to share information, to ensure that everyone focused on a specific set of tasks, to discuss which tasks are going to be done, and identify issues that may obstruct the progress of the projects.

It can be noted that implementing agile methods is based on the decision of the managing director of Company X. All software projects are headed by the managing director. He basically acts as project sponsor and project champion. Communication between the IT/IS manager and the software development team was set on a daily
basis. The managing director of Company X worked closely with the software development teams and customers to ensure that the project delivered as they expected. By implementing complementary approaches as such CMMI (Capability Maturity Model Integration)\(^2\) together with agile methods, the company recently was the first company in Thailand to achieve CMMI level 3. Moreover, Company X has won several awards and has been recognised for their successful implementation of agile methods.

One of the most significant challenges facing Company X, when trying to implement agile methods, is its technical staff. Most of software developers at Company X have more experience in traditional software development, and find it difficult to implement and cope with agile methods. In an effort to overcome this obstacle, new staff had been recruited in order to fulfil this need. At the same time, in order to build high performance teams and retain competent individuals, training was conducted to primarily provide a shared understanding of the whole aspects of agile methods.

**Benefits acquired**

From Participant (X)’s point of view, he has seen three major positive outcomes and benefits of agile methods. *Firstly*, it satisfied customer needs. Agile methods captured all the customer needs and requirements. *Secondly*, agile methods improved communication. In fact, communication plays a big part in building software projects. This means that project success is dependent upon the communication within the team. *Finally*, agile methods improved the testing process. With frequent testing, the team has more opportunities to detect the defects immediately. This, in turn, will allow the software development team to see the progress of the software projects. Participant (X) commented in the following statement:

“*Customer - agile gives a solution to what the customer wants - we deliver the solution based on the customer needs. An important aspect of agile is it improves communication. The number one failure to all software projects is communication.*

\(^2\) CMMI is a process improvement approach developed through the SEI (Software Engineering Institute) at Carnegie Mellon University. CMMI helps integrate traditionally separate organizational functions, set process improvement goals and priorities, provide guidance for quality processes, and provide a point of reference for appraising current processes.
Agile is always testing, instead of waiting till the end to test, agile tests at a unit level, testing as it goes, seeing the outcome now, not later, refining rapidly”.

It was also evident from the questionnaire that Participant (X) mostly agreed with the given six statements identified in Table 4.2 regarding the outcomes and benefits of agile methods. Therefore, these might be additional benefits that Participant (X) agreed agile methods in general could yield for many organisations.

Table 4.2: Results from questionnaire – Company X

<table>
<thead>
<tr>
<th>Potential benefits</th>
<th>Participant (X)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Agile software development enhance the ability of my software teams to manage change priorities</td>
<td>5 (Strongly Agree)</td>
</tr>
<tr>
<td>(b) Agile software development helps my software teams meet customer requirements</td>
<td>4 (Agree)</td>
</tr>
<tr>
<td>(c) Agile software development helps my software development teams increase productivity of software development</td>
<td>3 (Neutral)</td>
</tr>
<tr>
<td>(d) Agile software development enhances the quality of software products</td>
<td>4 (Agree)</td>
</tr>
<tr>
<td>(e) Agile software development reduces project risk</td>
<td>3 (Neutral)</td>
</tr>
<tr>
<td>(f) Agile software development reduces software development process complexity</td>
<td>4 (Agree)</td>
</tr>
</tbody>
</table>

In addition to the questionnaire response, Participant (X) indicated that the company has been successful (rating of 4) in applying agile methods in software development projects. This success was defined in terms of customer satisfaction, which in turn drives Company X to create strong relationships with its customers. Participant (X) highlighted this as follows:

“Everybody defines success differently, some people define success depending on finances. Some people define success based on best design, but from my perspective, I define success
based on every customer I deliver to, or get their solutions as they wanted at the time they agreed on”.

Participant (X) went on to further comment that not every organisation will implement agile methods successfully. The successful implementation of agile methods depends on the culture of organisations and whether organisations have the right people to do it or not. According to Participant (X):

“So, will agile make your business more successful? Well it depends on the people. Do I believe it or not? absolutely. But does everybody, can every organisation implement it? I don’t think so. Because it depends on the culture a lot”.

Figure 4.3: Summary of agile methods implementation at Company X

Apart from the successful implementation of agile methods, Participant (X) indicated that he was strongly satisfied (rating of 5) with the current agile methods being used. There is no doubt that agile methods make it possible and help to get things done
quickly. Given that no consistent agile method was applied, it may be concluded that Participant (X) perceived (any) agile methods as providing both a quick software solution and high quality software products. Overall, agile methods play an important role in improving the efficiency of Company X’s products operation. This means that the implementation of agile methods not only shapes the way Company X engages in the market, but it provided means to realise the sustainable value from being the first mover in exploiting agile methods. Figure 4.3 presents the overall situation and findings of how agile methods were implemented at Company X.

**Strategic alignment**

In this section, the participant was asked to discuss the questions relating to the concept of business strategy and agile software development alignment. The purpose of this section is to identify the potential aspect of the alignment of business strategy and agile software development.

With respect to the concept of the alignment of business strategy and IT/IS strategy, where agile software development is applied, Participant (X) stated that agile methods served as a mechanism that bound execution outcomes to business goals. Participant (X) stated:

“Agile is one point in business strategy, in business strategy defined by your objective, your goals. So for us, our business strategy is to be in the marketplace with a product focus and customer development, with agile as a core concept”.

It was observed that Participant (X) appeared to hold a broad view of strategic alignment. Although the above definition given by Participant (X) was not consistent with what has become the overall definition of strategic alignment stated in the literature, he interpreted the meaning of strategic alignment and established what he does know based on his background knowledge.

As far as the alignment of business strategy and IT/IS strategy where agile software development is applied was concerned, Participant (X) emphasised that whether to align agile software development with business strategy was based on the ability of
management to recognise the nature of the problem and their decision-making ability. Participant (X) also pointed out that if the management did not perceive the potential benefits of agile methods, and at the time they did not recognise the issues and the need for change within organisations, then the alignment will remain aimless. Participant (X) highlighted these aspects as follows:

“When you are talking about company strategy, does the CEO believe that agile solves their problem? So you find a lot of business owners have no clue about software, have no clue about solution. So, whether your company aligns to agile is, whether your operation management believes there is need to fix the problem. If your operation management does not even recognise there is a problem, there is no need for them to align to agile”.

Arising from the above quote, it may be claimed that strategic alignment can be difficult for some organisations to achieve. This difficulty has been highlighted in the literature when the business managers do not understand IT. From Participant (X)’s point of view, he agreed there is a need to align business strategy with IT/IS strategy. He believed that the value and capability of agile methods can delivery business results, while remaining flexible when the market and customer changes.

In the questionnaire, Participant (X) strongly agreed (rating of 5) that the alignment of business and IT/IS where agile software development is applied, is important and helps the organisation improve performance. Participant (X) has seen the benefit of this alignment in the area of helping the company increase their bottom line. These findings were consistent with the literature (Raymond 2001, Avison, Jones et al. 2004). Participant (X) stated that:

“The reason is we believe that agile will eventually provide short-term benefit to our company bottom line. So, if the CEO believes that, then the alignment will automatically happen without the bottom line value. So, I think its benefits are, to help your bottom line and deliver solutions quick enough”
4.2.4 Summary and discussion of findings of company X

The findings indicated that the choice of business strategy evolved from how the business sees problems and how it can position itself in the market. Company X’s core competency lies in the area of operational excellent and customer intimacy. It can be noted that Company X has the features of *Defender* with respect to Miles and Snow’s (1978) strategic type. It was observed that having these characteristics offers Company X benefits in a number of ways, including improving customer satisfaction with their products and services, as they are focused on a niche market, together with low investment on research and development for new products (Miles and Snow 1978).

Company X’s IT/IS strategic vision is focused on delivering technology solutions to customers. Based on Hirschheim and Sabherwal (2001)’s IT/IS strategy profile, it can be seen that the business strategy and IT/IS strategy of Company X are compatible. This result is presented in Figure 4.4.

Figure 4.4: IT/IS strategy profile of Company X

The IT/IS strategy of Company X included seeking improvement in their software development processes in order to strengthen their ability to deliver quality software products and to be able to compete in the market. In fact, agile methods seemed to play an efficiency role: agile methods were selected as a major technology to improve the operational processes and were recognised as a mechanism to gain efficiency. Being a small organisation, Company Xs’ IT/IS function is retained under
centralised management, where the business manager has decision-making authority for IT/IS investment (Peterson, O'Callaghan et al. 2000).

The SAM (Henderson and Venkatraman 1993) verified that Company X fits in the *Competitive Potential* perspective. Figure 4.5 presents the relationship of this perspective.

As shown in Figure 4.5, the IT/IS strategy is the driver in making the decision to choose agile methods to enhance the software development processes. Since Company X seeks to strengthen their ability to deliver software products and be able to compete in the market, a high degree of improvement in software development processes is considered an enabler. At the same time the managing director of Company X has strong knowledge in agile methods, and expressed the belief that the capability of agile methods offered an opportunity for the company to become a leader in the local software industry.

![Figure 4.5: Competitive Potential perspective – Company X](image-url)

In this case, Participant (X) takes the key roles as business manager and also technical director. It was evident that he played a key role in choosing and implementing agile methods. His role was consistent with that described in the
strategic alignment literature (Henderson and Venkatraman 1993). The results suggest that the implementation of agile methods in Company X were closely coupled with business needs. It also shows that this company has a high level of competitive advantage, and performs very well in the Thai market. This could be due to the IT/IS maturity (Hussin, King et al. 2002) of Company X.

Analysis of the interview showed that the strategic alignment factors that have been discussed in the strategic alignment literature existed in Company X. A history of successful IT/IS implement is one common factor for achieving alignment that has been recognised in the strategic alignment literature. The findings revealed that there was history of IT/IS implementation success in Company X. Luftman, Papp et al. (1999) and Teo and Ang (1999) identified the successful alignment required the business knowledge of IT/IS management. The findings showed that the managing director of Company X has a strong understanding of Company X’s business environment. He also has a vision of the ways in which agile methods will contribute to the success of the organisation (Teo and Ang 1999, Reich and Benbasat 2000, Hussin, King et al. 2002).

The findings demonstrated that the managing director of Company X provides strong support for IT/IS implementation, which is in line with the strategic alignment literature dealing with factors involved in achieving alignment (Luftman, Papp et al. 1999). Overall, most factors and antecedents that affected alignment found in Company X appeared to be social dimension factors of alignment. The findings suggested that Company X may have the possibility to achieve both short-term and long-term alignment as discussed by Reich and Benbasat (2000).

4.3 Case 2 – Company A

4.3.1 Company background

Company A is a medium sized mining consultancy that provides IT/IS services and solutions to its customers. Company A operates in Perth, Western Australia and at the time of this study had about 200 employees. Company A has a vision of improving information technology in the mining and exploration industry. To
achieve this, the company has invested in high technology, allowing Company A not only to save on time but, most importantly, to better understand the needs and expectations of its customers.

Company A provides a wide range of products and service to its customers including a statistic software package, software toolkit, and decision support software. Company A has a significant share in the Australian market as it also has offices in other states. Further, in order to keep its profitability up, Company A has decided to branch out and innovate in a new market in foreign countries. Company A sees both local and international competitors as the major threat. The organisation is divided into functional areas.

4.3.2 Observation and field notes

As planned in Chapter three, the relevant participants were identified as the Business Manager and the IT/IS manager. Unfortunately, only the IT/IS manager and senior systems analyst expressed their willingness to participate in this study. The following section presents the observations and field notes taken during the interview with each participant:

- **Participant 1 (A) – IT manager**

  Participant 1(A) is the IT manager of Company A. He has a high level of knowledge in business and IT. During the interview, the researcher observed that participant 1(A) possessed a broad understanding of the alignment of business strategy and IT/IS strategy

- **Participant 2 (A) – Senior system analyst**

  Participant 2(A) is the senior system analyst of company A. Participant 2 (A) had a technical background in the development of software application and the use of IT. He was also very experienced and knowledgeable in agile methods, and has a strong knowledge of the business side of the company.
4.3.3 The findings of Case 2 – Company A

Business strategy

At the beginning of interview, the participants were questioned regarding their understanding of the term business strategy. Participant 1(A) perceived business strategy as a plan or idealistic view for the current and future practice of the organisation. Participant 1(A) responded:

“It means the future of business...the strategy is a means of getting from how we are now, to how we are going to be in the future. So it could be an actual plan or it could be idealistic view”.

Similarly, Participant 2(A) described the business strategy as a plan and process of how the organisation positions itself in the market. According to Participant 2(A):

“It is a plan or company approach of business for long-term and/or short-term strategy for its position in the market. It is path to where we want to get to, and its process, in how it will get there”.

The above quotes showed personal understanding of the term business strategy. It appeared that both participants defined business strategy in pretty much the same way. In short, both participants agreed that business strategy is plan and process. This is similar to the definition given in the literature review in Chapter two.

In relation to the business strategy of Company A, only Participant 2(A) answered this question, but he noted that he did not have information about the business strategy of Company A. He believed that Company A has a very broad business strategy. Participant 2(A) stated:

“[Company A] is currently going through the same transitions currently, but the objectives which is a very sort of high in the sky kind of strategy. It’s basically to be a leading provider in professional services within the mining industry. So, it is very
much a fluffy duff kind of description, but in terms of actually a key business strategy I don’t actually have that information”.

From the above quote, despite Participant 2(A) not being confident about the business strategy of the organisation, it was observed that he put an effort into answering this question based on what he knew. One possible explanation could be that Company A has developed a business strategy, but did not communicate it throughout the organisation. Based on the information on the company’s website, the business strategic objectives of Company A can be summarised as follows:

- to provide the most effective and relevant and timely solutions to customers
- focused on clearly understanding customer’s requirements
- to build long-term relationship with the clients.

From the above, it is shown that Company A has a clear strategic focus, which concentrates on customer service; providing credible advice and delivery of systems to meet customer needs. Given these emphasises has resulted in significant implementation of state-of-the-art technologies, which has opened opportunities for Company A to maximise their productive capacity. The core competencies of Company A can be considered as delivery of high quality products and services, and rapid response to the needs and unique requirements of clients. The results from the questionnaire confirmed that Company A has Analyser characteristic. This is also consistent with the information given by participants.

With regards to the commitment of participants towards the business strategy formulation of the organisation, it was evident that both participants did not perceive themselves as being very much involved in business strategy formation within their organisation (average rating of 2). Their roles were considered to be very much technical support roles rather than on the business side. This implied that Company A may not involve the IT/IS people in defining and developing business strategy, which may involve only the top management level. Furthermore, both participants agreed that Company A has a well formulated business strategy (average rating of 4). In this respect, the organisation’s reputation and the success of an organisation may lead the participants to believe this.
**IT/IS at Company A**

Company A has an IT/IS vision to be the world’s best information system services provider to the international mining sector. The IT/IS department plays an important role in helping Company A to stay competitive in the current market and also to work towards helping the organisation to achieve its goals and objectives. The IT/IS competencies are presented in terms of the capability of underlying software processes that the organisation implemented to enhance the quality of products and services.

The IT/IS operations and development is preferably undertaken in-house, but outsourcing is considered at times. IT/IS functions are managed by shared structure, where the decision-making for IT/IS implement/investment are shared between business management and IT/IS management (Peterson, O'Callaghan et al. 2000).

**Agile software development methods**

In the questions relating to agile software development methods, Participant 1(A) did not feel able to answer and hold discussions with the researcher. Only Participant 2(A) provided information in this section. In this part of the interview, the participant was asked to explain his understanding of the term agile software development methods. In response to this question, Participant 2(A) described agile methods as:

“It [Agile] is using tools or mechanisms to be able to be flexible and understanding of scope of requirements, understanding deliverable requirements, deployment requirement, functional requirements, being able to adjust”.

The aforementioned indicates a solid understanding of the concept of agile methods by Participant 2(A). He described agile methods based on a practical view and knowledge. Yet it appears to be consistent with the definition of agile methods that has been discussed in the literature. The results from the questionnaire showed that Participant 2(A) considered his knowledge of agile software development methods as at an average level (rating of 3).
The situation and driving forces to implement agile methods

At Company A, software projects deal with in-house software products and outsourcing products. In the past, the IT/IS department has had several successful IT/IS projects, but is less successful in managing project budgets. Company information showed that Company A historically followed traditional software development. The decisions to implement agile methods were derived from external and internal pressure. Participant 2(A) explained that the expansion of the capability of Company A to develop products presented the necessity for a more clearly defined approach to its software activities. Development of a prior version of the software project was handled by using unknown software processes and methods. It then came to the point that there was no way to deliver the software product without using particular methods.

Moreover, Company A found that the existing software process was not flexible enough to handle the issues surrounding the projects, such as poor estimation in terms of costs and schedule, and bad quality software products. The processes also did not meet the future demand of business. In regard to this, it came down to the decision that there was a need to implement methods that were well known, and that met customer requirements. As stated by Participant 2(A):

“We basically got to the point 2 years ago that we needed to do something. We had to choose, we had no scope definition, we had a lot of issues with poor estimation, bad quality software. We had a lot of traditional issues of software development, and we decided that we needed to go with methodology or group of methodologies that we know, and people can actually recognise. Agile technique fitted with what we wanted...and also it has essentially fitted the way we work”.

With a careful examination of how agile methods can impact in terms of cost, effort, and length, and how agile methods could help facilitate the development of IT/IS products, agile methods were implemented in 2006 to replace the old software development processes in order to enhance an organisation’s operation and provide
operational supervision. It was also observed that the decision to implement agile methods was not merely carried out for IT/IS’s own sake, but mainly to capitalise on business opportunities.

*IT/IS projects where agile methods are applied at Company A*

Company A has formed an agile team to work on the projects. Each project has four software development team members. At the time that this study was conducted, the company had around fifty software projects in hand. At Company A, agile methods have been adopted for building both commercial products and custom software solutions. In building software products, Company A refused to use one particular agile method; rather Company A took some aspect of agile methods such as Crystal, FDD, DSDM, and Scrum, then customised and made the adaptation their own method, as the most appropriate for their team. Company A’s methodology is presented in Figure 4.6.

**Figure 4.6: Company A’s methodology**

![Figure 4.6: Company A's methodology](image)

At Company A, IT/IS projects are one to three months in duration. The stages of development and scope were formed during iterations of the development process.
These iterations were kept short, about one to four weeks. The first stage involved planning and designing the scope of the project. The second stage involved daily development, which covered the typical activities on a daily basis such as daily brief, coding, code testing, and code analysis. The code was tested at the end of each iteration. Daily meetings were conducted to ensure that everyone in the team had the same understanding of what had to be done. The IT/IS manager worked closely with software development teams to ensure that software released meet specified requirements.

All IT/IS projects are headed by an IT/IS manager who also acted as project champion. The business manager acted as project sponsor. The decision for IT/IS projects was made in coordination between the top management and the IT/IS manager. At the start, the new software development team was also assigned to help implement the process. At the same time, an external agile consultant was hired to work within the operation team. Despite Company A having high technical skills and expertise to work on projects, in-house training sessions were still conducted in order to provide the developers with an overview of agile techniques. This also prevented high rate of staff turnover. It also appeared that the employees were more prepared to learn how to use the new approaches.

**Benefits acquired**

In discussion with Participant 2(A) with regard to the outcomes in implementing agile methods, Participant 2(A) acknowledged that since agile methods were implemented in software development projects, two of the major outcomes, improving feedback and improving communication, had been realised. According to Participant 2(A):

“We have had really good feedback from what we have done, both from clients and internally. As I said before, the main instigation was to drive the communication, that being the biggest benefits”.

The above outcomes of agile methods mentioned by Participant 2(A) appeared to be direct outcomes of how agile methods contribute to a software project. It was also
evident from the questionnaire that Participant 2(A) agreed (rating of 4) with the given six statements identified in Table 4.3 regarding the outcomes and benefits of agile methods. Therefore, these could be identified as additional benefits that Participant 2(A) believed that agile methods could provide.

Table 4.3: Results from questionnaire – Company A

<table>
<thead>
<tr>
<th>Potential benefits</th>
<th>Participant 2 (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Agile software development enhance the ability of my software teams to manage change priorities</td>
<td>4 (Agree)</td>
</tr>
<tr>
<td>(b) Agile software development helps my software teams meet customer requirements</td>
<td>4 (Agree)</td>
</tr>
<tr>
<td>(c) Agile software development helps my software development teams increase productivity of software development</td>
<td>4 (Agree)</td>
</tr>
<tr>
<td>(d) Agile software development enhances the quality of software products</td>
<td>4 (Agree)</td>
</tr>
<tr>
<td>(e) Agile software development reduces project risk</td>
<td>5 (Strongly agree)</td>
</tr>
<tr>
<td>(f) Agile software development reduces software development process complexity</td>
<td>3 (Neutral)</td>
</tr>
</tbody>
</table>

Given these positive outcomes of agile methods, Participant 2(A) indicated in the questionnaire that he was satisfied (rating of 3) with the current practice of agile methods. The results from the questionnaire also confirmed there have been successfully (rating of 3) adopted agile methods in their software development projects. This success can be explained by the fact that the project budget was managed effectively, while at the same time, the organisation received attraction and attention from their existing and potential customers. The following quote supports the above summaries:

“All those projects are running on budget now. We don’t have any issues with over budgeting. So the scope control has made that a lot better planned for those projects. Without having an agile technique in agile methodology, we wouldn’t be able to win the work we have won”.
Participant 2(A) also added:

“It’s has been very positive, and the client getting more buy-in, and more of an understanding where the project is at”.

Overall, agile methods play an important role in delivering a flexible and efficient way of developing IT/IS projects. This means that agile methods not only changed the way Company A competes, but provided a means for the organisation to build business value and enable the organisation to achieve its strategic goals and objectives. Figure 4.7 presents overall findings of the situation and how agile methods were implemented at Company A.

**Strategic alignment**

The purpose of this section is to identify the potential aspects of the alignment of business strategy and IT/IS strategy, where agile software development is applied.
Hence, participants were asked to discuss how they perceive this concept. Participant 1(A) stated that strategic alignment is something related to change of business strategy, where IT/IS strategy need to re-adapt in order to support business strategy. According to Participant 1(A):

“It is done where someone [management] goes I think we really need this, and that done on the sort of the main business strategy.....so our strategy [IT/IS] changes depending on what the company strategy is”.

Participant 2(A) stated that agile methods are part of IT/IS strategy as a necessity to support business operation. According to Participant 2(A):

“Company alignment of IT/IS strategy with implementation and practice of agile, taking more of IT/IS strategy for the business instead of dove tailing that into an agile implementation”.

The above quotes showed that both participants had different understandings of the concept of alignment of business strategy and IT/IS strategy, where agile software development is applied. The definition given by Participant 1(A) seems to be narrow, while Participant 2(A) used ambiguous and broad terms. Despite this, participants appeared to be consistent with the definition stated in the strategic alignment literature.

To find out how important business strategy and IT/IS strategy, where agile software development is applied, is to Company A, participants were asked to discuss this question. There was a high level of agreement between participants concerning the importance of strategic alignment. From Participant 1(A)’s point of view, he perceived that IT/IS plays a strategic role in helping the organisation to achieve their objectives and goals and success. Strategic alignment is, perhaps, the most crucial contribution that IT/IS can make to enhance operational effectiveness. Participant 1(A) commented as follows:

“The IT strategy needs a strong alignment with the business strategy in terms of what IT is going to produce as a goal to allow the business strategy to actually have its goal happened in the end. So we’ve got to stay closely knit with what the business
strategy is, and where it’s moving. To keep on top of where we need to make our strategy point to in the future. I guess the business won’t be able to operate effectively without a correctly aligned IT. We won’t be able to implement what they need, where the need it to make their strategy work”.

Participant 2(A) noted that it is crucial to apply agile methods as part of IT/IS strategy and that contributed to business strategy because it helps the organisation better achieve its goals and objectives: According to Participant 2(A):

“There are aspects, mainly to be innovative, be seen as a knowledge base of professional consulting, to be delivering quality project, and be seen as having a reputation. So, in terms of business strategy that is what we want to be and be seen as, without the agile techniques, we are not delivering that, so we didn’t have good quality software, we were not using best practice methodologies. We were not leading in this area. So, by aligning agile to fit those areas, to concentrate on improving those areas that has been a great benefit”.

From the above quote, both participants held a positive view and recognised the importance of business strategy and IT/IS strategy alignment, where agile software development is applied. Yet, when it came to do the rating, the results showed that participants are neutral agreed (average rating of 3.5) with this matter. Despite the fact that there was not a clearly presented alignment process of Company A, both participants felt that business strategy and IT/IS strategy, where agile software development is applied, should be aligned. Furthermore, on the question of whether the alignment of business strategy and agile methods has improved organisational performance, both participants agreed (average rating of 3) in this regard.

4.3.4 Summary and discussion of the finding of company A

The business strategy of Company A was to provide the most effective technology solutions to customers. It found that the characteristics of Company A is in the category of Analyser type from Miles and Snow (1978). Company A’s core strengths
include the ability to provide high quality products and services and show a high customer retention rate due to trust and loyalty. Their only weakness is if competition erodes the market, although entry cost is a formidable barrier (Miles and Snow 1978).

Company A has an IT/IS strategic vision to be the world’s best information systems services provider to the international mining sector. A comparison between business strategy and IT/IS strategy as proposed by Hirschheim and Sabherwal (2001) showed that there is a compatibility between business strategy and IT/IS strategy.

Figure 4.8: IT/IS strategy profile of company A

Figure 4.8 showed that the IT/IS strategy of Company A presents as Comprehensive. Company A strongly focuses and aims to replace old software processes with agile methods. Ideally, agile methods were implemented to enhance customer services and to have flexible control over product development, while reducing the cost of operation. The IT/IS function of Company A appeared to be managed by Shared structure, where the decision-making for IT/IS investment are shared between business management people and IT/IS management people (Peterson, O’Callaghan et al. 2000). For certain IT/IS functions, Company A tends to use Selective sourcing (approximately 20% of IT/IS functions are operated by a third party).
Based on the SAM of Henderson and Venkatramann (1993), Company A is in accordance with the *Technology Transformation* perspective. Figure 4.9 presents the relationship of this perspective.

**Figure 4.9: Technology Transformation perspective – Company A**

Based on Figure 4.9, considering the increasing customer demands of software products in the market, Company A needs to find new innovative solutions to be competitive. In this case IT/IS becomes a business enabler by providing the IT/IS technologies that help the organisation to respond to customer demand faster than competitors and, at the same time, create new business opportunities for the organisation.

With the maturity of IT/IS in Company A in line with strategy making, agile methods appeared to fulfil and correspond to the business needs. Given the impact domain in this case is IT/IS Infrastructure, Company A needs to develop new IT/IS architecture, particularly in the area of IT/IS governance and IT/IS competency. It was noticeable that there was a need for Company A to define the skill sets of employees to operate agile methods. A training program was established in order to transfer essential knowledge about the whole aspect of agile methods to the software development
teams, and to improve the ability of software development teams to be able to build and design software products that meet business requirements.

Henderson and Venkatraman (1993) suggest that the specific role of business manager in this perspective should be technology vision and the IT/IS manager should be a technology architect. When analysing the role of participants, the results illustrated that the role of Participant 1(A) is to communicate with the top management, and to take steps to design and implement both IT/IS infrastructure and processes to support business strategy and contribute to these in order to achieve the business results. The role of Participant 2(A) is more involved in selecting and choosing appropriate approaches for developing software projects. These findings were consistent with the strategic alignment literature (Henderson and Venkatraman 1993).

The findings from the interviews showed that most factors associated with strategic alignment presented in the literature existed in Company A. The finding of this study corroborated with Reich and Benbasat (2000) which indicated that Company A has had successful implementation of IT/IS in the past. This also could help to strengthen the creditability of IT/IS between the top management and IT/IS manager to introduce the new technology and lead to high level of communication. Luftman, Papp et al. (1999) and Teo and Ang (1999) discussed that successful alignment required business knowledge of IT/IS management. Supporting from the interview and observation, the findings of Company A showed that the IT/IS manager of Company A has strong knowledge of the organisation’s environment. He appeared to understand the issues of the organisation and how to use IT/IS to support business.

Moreover, the findings clearly showed that the top management of Company A appears to have strong support for IT/IS innovations. This finding was consistent with the strategic alignment literature. Based on these findings, it can be considered that most factors of alignment presented in Company A fell in the social dimension of strategic alignment. Since there was no clear evidence of shared domain between the top management and IT/IS manager, this study suggested that Company A is likely to achieve short-term alignment as discussed by Reich and Benbasat (2000). (Luftman, Papp et al. 1999). Throughout the case of Company A, there has been
acknowledgement and understanding of the current business and technology situation. Agile methods were implemented as technology choice in order to support business strategy of an organisation. It can be concluded that agile methods play an important role in enhancing software projects to be more effective, while increasing speed of delivery and better control over environment changes.

4.4 Case 3 – Company B

4.4.1 Company background

Company B is a leading media and entertainment company in Bangkok, Thailand. Company B’s mission is to allow customers to communicate with each other and access knowledge, information and entertainment as well as to create value for the organisation, employees and shareholders. Currently, Company B has more than 1000 employees, and is therefore categorised as a large enterprise. The main revenue of the company comes from its television business.

To achieve higher profits whilst dealing with a strong competitor, Company B positions itself in the market by offering a wider range of products and services. Company B also intends to respond rapidly to early signals of market needs, and consistently attempts to be at the forefront of new services and developments in its industry. Even though Company B is the only nationwide provider in media and entertainment, it views competitors from the international market, and also other entertainment alternatives, such as cinema and video, as a major threat. To provide high quality products and services and to maintain a position as the leader in the market, Company B invests in high technology, at the same time remaining price competitive and customer focused. Company B has a functional structure.

4.4.2 Observation and field notes

As explained in Chapter three the initial contact with participants was identified to be with the Business manager and IT manager. Unfortunately, in Company B only the business and product development manager expressed a willingness to participate in
this study. The following section presents the observations and field notes taken during the interview with this participant:

- **Participant (B) – Business and product development manager**

  Participant (B) is the business and product development manager of Company B. He had over ten years involvement within the organisations with prior background in IT management. After observations and discussion, it was noted that Participant (B) has had extensive experience and knowledge in the area of business, IT/IS and agile software development.

### 4.4.3 Analysis of the findings of Company B

#### Business strategy

At the beginning of the interview, Participant (B) was asked to discuss the term business strategy. However, Participant (B) did not answer this question. One reason could be that participant did not understand the term business strategy. With regards to the business strategy of Company B, Participant (B) believed that Company B was formulated around the concept that the company aspired to be the leader in the media and entertainment industry by offering customer products efficiently through the use of high technology. According to Participant (B):

“*Our business strategy is we wanted to be the leading operator in pay TV. We also wanted to provide and serve customers with high technology products at reasonable price*."

It was observed that Participant (B) has a clear understanding of the business strategy of Company B. He also answered the above question very confidentially. There are two possible explanations for this. *Firstly*, Company B may develop business strategy and share the information with employees, while at the same time it expects employees to know about the business strategy of the organisation. *Secondly*, Participant (B) kept the business strategy of the organisation in mind as part of his regular work.
The business strategy of Company B published on the company’s website can be summarised as follow:

- to be the leader in the delivery of superior entertainment
- to provide customer with a high quality of product.

As above, when comparing the findings from the interview with information given on the company’s website in relation to the business strategy of Company B, it seemed to be consistent. Overall, Company B seemed to have a clear view of how they should serve their customers. Company B also appeared to work towards strengthening its position as the leader in media and entertainment in the country. The emphasis on the quality of products has resulted in implementing high technology to meet customer needs, and maximise their productive capacity. Company B expects that this will eventually reach their potential customers. The core competencies of Company B are in the area of customer intimacy, product leadership, and operational excellent.

In relation to the commitment of the participant towards the business formulation of Company B, the results from the questionnaire indicated that Participant (B) has a large involvement in this matter (rating of 5). This could be explained by Participant (B)’s critical role as part of the management team. He may see himself as having strong commitment in this area. Moreover, Participant (B) responded in the questionnaire that neutral agreed (rating of 3) that Company B has a well formulated business strategy. Participant (B) might believe that Company B did not have a clear strategic view in place.

**IT/IS at Company B**

Company B’s IT strategy is to use effective IT/IS to improve and bring the world’s best information and entertainment to the Thai customers. The IT/IS competencies included the ability to produce high quality and effective software products. The IT/IS department is responsible for all internal IT/IS service and providing technology solutions for the organisation. Since Company B has a high level of IT/IS staff, all IT/IS functions, including development, are retained in-house.
Company B does not have a formal IT/IS plan. Investment in IT/IS in this company was only made as needed within the context of the business requirements. The investment in technology is also carefully selected and ensures that it supports and meets the overall company objectives and goals. The IT/IS functions of Company B are managed using a decentralised structure, where the business manager and IT/IS manager share decisions for IT/IS implementation (Peterson, O'Callaghan et al. 2000).

**Perception about agile software development methods**

The participant was asked to discuss the terms of agile software development methods based on his understanding. In response to this question, Participant (B) clarified the term agile methods as process. According to Participant (B):

“It is a development process that makes software production fast, with less bugs, and with very well managed requirements”.

From the above quote, it can be noted that Participant (B) had a view of agile methods similar to the definition that has been given in literature. The results from the questionnaire showed that Participant (B) considered his knowledge about agile software development methods at **average** level (rating of 3).

**The situation and driving forces to implement agile methods**

Company B coped with small software projects. In the past, Company B implemented an iterative and incremental process. Despite the fact that Company B had several successful IT/IS projects in the past, it encountered difficulties in managing the requirements. Agile methods were introduced to the company in 2007, aimed at improving and developing better quality products. The key change in software development processes emerged from two facts. Firstly, Participant (B) was concerned for the life cycle of products. He clearly indicated that the products have to develop faster in order to keep pace with rapid market changes. Secondly, Participant (B) was greatly influenced by another company that has successfully implemented agile methods. He has seen this as an opportunity to enhance the quality of products. He also believed that the use of agile methods can increase the
chances of success in the software projects of Company B. According to the interview with Participant (B):

“I would say that the main driving forces come from the fact that there is something to do with the product life cycle. I believe that at this point products have developed faster. I also have seen agile methods were successfully implemented by another company. Since then, I have been studying agile processes for quite a while, and I thought that we can adapt to our project. We are in stage that we are ready to change. So, when we started the new project here [Company B], I thought it is a good chance for us to implement agile processes to the new project”.

Apart from this, there was also strong support in choosing agile methods from the top management. Participant (B) claimed that he discussed this with top management before the new project started. He had convinced top management of how agile methods could deliver a better quality of software products. According to Participant (B):

“I have a meeting with the management team and discuss about this. At first, they don’t understand what agile methods were. I have explained to them what agile was”.

As above, one of the possible reasons for the acceptance of agile methods by top management may be that Participant (B) has a high level of experience and a track record for IT/IS implementation success in the past. Moreover, Participant (B) may have built trust and won the confidence of top management (Coram and Bohner 2005). It was also observed that top management of Company B did not have knowledge of certain technology, and therefore relied on its employees for such knowledge.

**Agile methods implementation at Company B**

In order to cope with agile methods, Company B has established an agile team. At the time that the interview was conducted, there were about six staff members working within the team. Decision-making to select IT/IS projects was made through
discussion between top management and the IT/IS manager. At Company B, agile methods are adopted for building software for commercial products. The core product of Company B is the set top box. Agile methods that are being used in Company B are XP and Scrum. This is presented in Figure 4.10.

Figure 4.10: Company B's methodology

![Diagram of Company B's methodology]

Basically, aspects of Scrum were implemented as the main methods to develop products, while XP was applied in terms of collecting all the requirements from users. Throughout the project, a daily meeting was set up within the team involving brainstorming session, and release planning. All product development projects are led by the business and product development manager. He also acts as project champion, while top management act as product sponsor. Agile methods play an important role by offering a degree of flexibility to support product development. The business and product development manager worked closely with the customers in order to ensure that the products satisfied their needs. Since agile methods were implemented, the team was enabled to deliver products at the end of a three month period.
One of the most significant challenges faced by Company B when agile methods were implemented was the availability of skill and knowledge of the IT/IS staff, since not all team members were familiar and proficient with agile methods. The existing staff members were asked whether they were capable or willing to take on the challenge of the new approaches. Apparently, some team members were resistant to this change, due to familiarity with the old processes, and some team members decided to leave the job. As a result, new staff was hired and training provided for both existing team members and new staff during the implementation phase.

**Benefits acquired**

Participant (B) provided a positive point of view of the benefits of agile methods as a useful approach for software development. The major benefit that Participant (B) recognised was that agile methods helped the company to gain greater customer satisfaction. Other three benefits of agile methods that Participant (B) identified are: reduced volume of bugs; reduced time for preparing documents; and improved management of requirements. Participant (B) noted:

“Since we applied agile methods to our project, we found that there are less bugs, we save a lot of time in preparing documents, we have better management of requirements, and the main important thing is our customers are happy”.

From the above quote, these are perceived to be direct outcomes of agile methods for Company B. To probe further, Participant (B) was asked to rate the potential benefits of agile methods. It was observed that Participant (B) answered with an average of 5 (see Table 4.4).

The results from both the interview and questionnaire showed that Participant (B) was *satisfied* with the current agile methods (rating of 4) applied. Even though agile methods had been implemented in the company for only a few years, Participant (B) agreed that they had been *successfully* implemented (rating of 3). This success was demonstrated by increased customer satisfaction.
Table 4.4: Results from questionnaire – Company B

<table>
<thead>
<tr>
<th>Potential benefits</th>
<th>Participant (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Agile software development enhance the ability of my software teams to manage</td>
<td>5 (Strongly Agree)</td>
</tr>
<tr>
<td>change priorities</td>
<td></td>
</tr>
<tr>
<td>(b) Agile software development helps my software teams meet customer requirements</td>
<td>4 (Agree)</td>
</tr>
<tr>
<td>(c) Agile software development helps my software development teams increase</td>
<td>5 (Strongly Agree)</td>
</tr>
<tr>
<td>productivity of software development</td>
<td></td>
</tr>
<tr>
<td>(d) Agile software development methods enhances the quality of software products</td>
<td>4 (Agree)</td>
</tr>
<tr>
<td>(e) Agile software development reduces project risk</td>
<td>5 (Strongly agree)</td>
</tr>
<tr>
<td>(f) Agile software development reduces software development process complexity</td>
<td>5 (Strongly agree)</td>
</tr>
</tbody>
</table>

Figure 4.11: Summary of agile methods implementation at Company B
In summary, agile methods were perceived as a crucial part of the success of software projects in Company B. It can be noted that agile methods not merely provided flexible development, but also provided strategic value and business opportunity for the organisation. Figure 4.11 presents overall findings of how agile methods were implemented at Company B.

**Strategic alignment**

In this section, the participant was asked to discuss the questions relating to the concept of the alignment of business strategy and IT/IS strategy, where agile software development is applied. Participant (B) indicated that business strategy and IT/IS strategy should support each other. In other words, they should be going in the same direction. Participant (B) noted that:

“I think it is the link between business strategy and agile methods or IT strategy. I mean IT needs to be able to support all business requirements and at the same time the business needs to support IT by providing all resources”.

As above, Participant (B) appears to provide a broad view of strategic alignment, but shared the common ground concept of strategic alignment that has been discussed in the literature.

Participant (B) believed that the alignment of business strategy and IT/IS strategy, where agile software development is applied, is important to the organisation. The results showed that Participant (B) provided an impression that he recognised the critical importance of this matter. Participant (B) explained that agile methods have emerged as the appropriate approaches that could help the organisation to achieve objectives and goals, and could bring the organisation success in the future. Participant (B) commented:

“Agile methods meet all business requirements, and I think it is important that if business wanted to be the leader in pay TV operator or technology. So, choosing the right technology to support those requirements will bring the business success in the future”.
The results from the questionnaire also consistently supported the above findings. Participant (B) provided a rating of 5, which means that he strongly agreed in this regard. Participant (B) further explained that the alignment of business strategy and IT/IS strategy, where agile software development is applied, helps the organisation to improve its performance, and to save time and cost (Avison, Jones et al. 2004). Participant (B) stated that:

“At this stage, I think the main benefit of this is, it helps business to save costs and time in operation”.

4.4.4 Summary and discussion of the findings

The business strategy of Company B is to be the leader in the delivery of superior entertainment. Based on the synthesis of the findings from interview, questionnaire, and the company’s website, it can be noted that Company B adheres to the Prospector strategic type, where the organisation maintains stable products, focusing on innovation, and new opportunities and growth (Miles and Snow 1978). Their strength is the ability to maintain their position in the market. However, their weakness involves high investment in technology and resources (Miles and Snow 1978).

Company B had an IT/IS strategic vision, which aims to use effective IT/IS to provide customers with the best information and entertainment systems. A comparison between business strategy and IT/IS strategy by Hirschheim and Sabherwal (2001) revealed that there was compatibility between business strategy and IT/IS strategy.

Figure 4.12 explained that Company B has IT/IS strategy as Opportunistic where agile methods play the flexibility role in improving products and services to meet business strategies and goals. The IT/IS functions of Company B were managed as Decentralised, where the IT/IS manager can make direct decisions and control IT/IS within their own operation (Peterson, O’Callaghan et al. 2000). In terms of IT/IS development, Company B relied only on the internal knowledge of IT/IS staff members in operating.
With regards to the SAM (Henderson and Venkatraman 1993), it appeared that company B demonstrated the *Strategic Execution* perspective (see Figure 4.13). As illustrated by Figure 4.13, Company B sought new technology solutions that were bound to create new business opportunities and increase efficiency. The IT/IS itself needed to respond to those demands. In this case, both business and product development manager believed that agile methods could help Company B to improve and develop better quality products and services for customers, and also provide new business opportunities for the organisation. As such, this put Company B in a position of changing the IT/IS Infrastructure to satisfy the needs of the organisation. An agile team was set up and made responsible for the core activities and processes within the production area. Highly skilled employees are required to perform the job. At the same time, a training program is provided for software development team members to ensure that all have a consistent understanding of agile methods. During agile methods implementation, communication between product manager and software developers were highly stimulated.

It appeared that Company B has clear and distinctive roles for employees. With regards to Participant (B), his roles are more committed in management and control in the area of production projects. These included responsibilities for the planning process, and selecting the technology, and the development process for software products. Henderson and Venkatraman (1993) believe top management should be a strategic formulator, while the IT/IS manager should be a strategic implementer. The
roles of Participant (B) as a strategic implementer appeared to be consistent with the strategic alignment literature (Henderson and Venkatraman 1993).

Figure 4.13: Strategic Execution perspective – Company B

In consideration of the preconditions for alignment, the study showed that most antecedents associated with strategic alignment presented in the literature existed in Company B. Luftman and Papp et al. (1999) and Reich and Benbasat (2000) identified that clear communication between business and IT/IS executives is essential for an organisation to achieve alignment. In the case of Company B, it was found that there was communication with regards to strategic direction of the organisation. The findings also demonstrated Company B has several successful IT/IS implementations in the past, which in turn increases the level of trust and confidence between top management and their business and product development manager (Teo and Ang 1999, Reich and Benbasat 2000).

Luftman and Papp et al. (1999) and Teo and Ang (1999) claimed that organisations are unable to achieve alignment without IT/IS management who are knowledgeable about business. In Company B’s case, the business and product development manager appear to have strong knowledge about the situation of Company B and are
able to choose the best IT/IS solutions that support an organisation’s mission and objectives. Drawing upon these findings, it is observed that most factors of strategic alignment presented in Company B are social dimension factors of strategic alignment. Since there is not enough evidence whether there is shared domain knowledge between business and IT/IS executives, it can be concluded that Company B is likely to achieve short-term alignment rather than long-term alignment as discussed by Reich and Benbasat (2000).

Overall, at Company B, there has been an awareness of market uncertainty. Ideally, the implement of agile methods have proven to increase business opportunities for Company B. By keeping flexible IT/IS Infrastructure using agile methods, this allows Company B to accommodate change within business requirements, which occurs during software product development. The implement of agile methods have provided rapid strategic value to Company B in terms of reducing time to delivery, and increased customer satisfaction. Since agile methods are characterised by process flexibility and adaptability, and requests the interaction between business manager and business development manager throughout the project, this can be beneficial in all areas of an organisation.

4.5 Case 4 – Company C

4.5.1 Company background

Company C is a large financial service firm that operates in Perth, Western Australia. The headquarters is located in the United Kingdom. Company C provides a full range of core and specialist business banking products and services to its customers including internet banking, financial planning, automated teller machines (ATMs), loans, mortgages, and many more. It should be noted that most of the company’s revenue is derived from financial services.

IT/IS development was identified as fundamentally important to support the business process. Company C also has a desire to provide and deliver a superior service to its customers. In an effort to do this, Company C made significant IT investments that improve the company’s ability to create and handle complex financial products and
services, and to be the best performer in the market. Company C has a significant market share in the local market and the interstate market. Although Company C is the market leader in WA, it still sees competitors from local banking, interstate, and international banking as a major threat. Company C is functional in structure.

4.5.2 Observation and field notes

As planned in Chapter three the original contact with participants was identified to be Business manager and IT manager. However, only the IT manager expressed interest in participating in this study.

- **Participant (C) – IT development manager**

  Participant (C) has been the IT development manager of Company C for the past three years. Participant (C) has responsibility for all the IT/IS activities within the department. During the interview with Participant (C), it was noted that Participant (C) was very knowledgeable and has extensive experience in the areas of business and IT/IS.

4.5.3. Analysis of the findings of Company C

**Business strategy**

Having gone through the interview questions with Participant (C), the interview session was started by asking Participant (C) to describe his understanding of the term business strategy. According to Participant (C):

“Business strategy is a large scale plan more or less for either growing more revenue, improving process, efficiency, effectiveness within the organisation. They plan to improve the way we are and to be more competitive”.

From the above quote, it can be noted that Participant (C) perceived the meaning of business strategy in the form of a *plan* which involves the way the organisation competes. This is similar to the definition that has been identified in the literature. In
terms of the business strategy of Company C, Participant (C) commented further as follows:

“At this stage, I think it’s no secret that we are attempting to grow quite quickly into the Eastern States. The focus at the moment is based on direct market initially in the absence of having physical presence over there. So our vision is to be the most approachable, best value and innovative company in Australia, with an absolute focus on customer service satisfaction”.

As above, Participant (C) acknowledged that the business strategy was formulated by focusing on customer value innovation, and dedicated to providing customer service. It was also observed that the participant answered the above question without any hesitation. He appeared to have a clear understanding of the business strategy of Company D. Two possible assumptions that can be made are that Company D has established the business strategy of the organisation and has communicated it throughout the organisation; and Participant (C) has taken the business strategy into account as part of everyday work. Overall, the business strategic objectives of Company C published on the company’s website can be summarised as follows:

- to focus on product innovation
- to deliver the best service to customers
- to increase customer satisfaction.

It was observed that the information from the interview was consistent with that on the website. The findings showed that Company C has clearly identified their strategic focus. At this point, Company C aspires to be the best for product innovation and customer service. This emphasis resulted in the implementing of technologies that better enable products and services. The core competencies of Company C are in the areas of customer satisfaction and operational excellent. The findings from the interview, company’s website, and questionnaire have confirmed that Company C has Analyser characteristics.

With regards to the level of commitment of the participant towards the business strategy formulation of Company C, the results from the questionnaire showed that
Participant (C) was not involved in any business strategy formation (rating of 2). Participant (C) explained that his role is in IT/IS planning, and implementing and developing IT/IS systems. This could be explained by the fact that Company C still use a traditional hierarchy structure, where the top management may see themselves as strategic formulators (Boone and Kurtz 2010), whereas the IT/IS people should concentrate on technical issues rather than contribute to the business strategy formulation. Participant (C) strongly agreed (rating of 5) that Company C has a well formulated business strategy. This could be explained as Participant (C) anticipating the company’s future growth.

**IT/IS at Company C**

The IT/IS vision of Company C is to use state of the art technology to improve the ability to grow. Basically, the IT/IS strategy focuses on three core capabilities. These include: to deliver quality solutions in a fast and high quality manner; costs control; and focus on customer satisfaction. The roles of the IT/IS department are to have responsibility for providing IT/IS solutions and helping the organisation to achieve their goals.

Company C adheres to both formal and informal IT/IS planning. The formal IT/IS planning focuses on the budgets and resources. The IT/IS planning is defined for one year or less, so that it can be changed each year depending on the environment. The IT/IS planning is prepared with the involvement of the top management and the CIO. The IT/IS structure was a shared structure, where the business manager and the IT/IS manager shared decisions for IT/IS implementation (Peterson, O'Callaghan et al. 2000).

**Agile software development methods**

In this section of the interview process, Participant (C) was asked to describe the terms of agile software development methods based on his understanding. In response to this question, Participant (C) described agile methods as:
“It [Agile] is a very broad meaning of being more responsive and quicker to market, new development techniques and in most cases, much more collaborative in the way you work”.

From the above quote, this indicates a solid understanding of agile methods by Participant (C), which is consistent with the literature. In the questionnaire, Participant (C) also indicated that he has extensive knowledge about agile methods (rating of 5).

**The situation and driving forces to implement agile methods**

In the past, Company C was among those organisations that followed a waterfall model for their system development. The issues involved in this process for developing software were that the project teams were given a massive roster of business requirements and it took a long time to produce and deliver the results. Over the past two years, agile methods were introduced to solve functional problems within the company. This major shift was driven by a strong wish from top management of Company C, who were influenced by another company that had been successful in implementing agile methods, and therefore believed that agile methods should work well for Company C as well. Participant (C) stated:

“It starts with someone influencing the management team. They went to a site visit and saw a company using agile, and believe it’s the right thing to do”.

Besides, the top management pushed for better, more effective uses of technology in the organisation. It also found that at one point that management had concern for, and was aware of, the market and competitive issues of products and services. There was considerable expectation from top management that product development needed to be delivered with shorter periods of development time. According to Participant (C):

“We are pushing for better scalability, which is one of the key things...There was in expectation at various points to do the development in a short period of time”.
The above findings suggested that the top management of Company (C) appeared to make an effort to maintain a grand vision of how IT/IS can be used to win customers and gain competitive advantage. They seemed willing to do anything necessary to keep the organisation on the right track. Yet it was observed that there was tension between top management and the IT development manager with regard to agile methods selection. Participant (C) felt that the top management actually did not understand the issues in IT/IS (Leonard 2007). Participant (C) asserted that, from a top management perspective, they want to reap the benefits of agile methods and they probably do not care too much how IT works.

“It’s more or less, due by their [management] needs, so to date they have tried to get things done quite quickly, and they have, more or less pushed a shopping list of things onto us...business [management] put pressure on me to do everything faster and getting little support or direction from them either. So they lack of understand of how things happened in IT”.

The IT development manager of Company C appeared to be ordered by the top management to implement agile methods, and did not have much engagement in choosing the methodology for the organisation. However, the IT development manager and top management had closely discussed the possibility of implementing agile methods in IT/IS projects. It can be noted the decision to implement agile methods was related to business needs.

**Agile methods implementation at Company C**

With regard to IT/IS project selection, the decision was made through discussion between top management and the IT development manager. Company C saw agile methods as a major approach in supporting product innovation, which is a key component of core business, and considered that it could help improve the efficiency of the existing software process in order to be more successful and meet future business growth. In order to cope with agile methods, an agile team was established. At the time that this study was conducted, there were more than twenty employees working on the project. Currently, the systems under development by agile methods
include billing systems and debt management application systems, and other business activities. Company C’s agile methodology is presented in Figure 4.14.

Figure 4.14: Company C’s methodology

At Company C, IT/IS project development lasted three month. The project focused on small releases by breaking a release into iteration processes. Each iteration was kept short, about one or two weeks. The software developer carried out test driven development. Participant (C) also claimed that since agile methods were implemented, top management was more involved in the project than previously. It also appeared that the communication between the top management and the IT/IS project manager was frequent throughout the whole project. Meetings between the IT/IS project manager and the software development team was set on a daily basis in order to ensure that the team understood the requirements. This implied that agile methods provided an adequate base for business and IT people to communicate. According to Participant(C):

“With agile project, these people [the management] have a lot more involvement than perhaps they would have in the past with Waterfall. So, each iteration that we are working on, they quite often get involved. They certainly turn up for the showcase at the end of each iteration”.

All IT/IS projects were headed by the IT development manager. He also acted as project champion, while top management acted as project sponsor. The IT
development manager also worked closely and had direct communication with top management. Prior to agile methods implementation, Company C had problems in understanding and implementing agile methods, since the IT/IS project manager and other team members did not have experience or familiarity with agile methods. As a result, Company C hired an external consulting company to coach them during the transformation, as they believed that the consulting company would be more knowledgeable in this matter. Beside, Company C also struggled with the existing IT/IS staff, since they are unwilling to accept the new process. Hence, training was given to existing and new staff. Moreover, new staff was hired in order to fulfil the job.

**Benefits acquired**

Even though Company C faced some challenges, it appeared that, since agile methods have been applied to software development projects, the most significant outcomes were seen in three areas. Reducing costs was clearly the biggest benefit, followed by reduced project risks, and increasing the ability to realise immediate benefits. In Participant (C) pointed out:

> “The cost for a start, same number of people can reduce the risk if you are realising benefits early. There are 3 aspects (1) reducing cost (2) reducing the risk (3) realise benefits in advance”.

Participant (C) also further explained that:

> “Reducing cost can be two fold, it’s more efficient, but also you are getting the most important things done first, and quite often there is scope that creeps into these projects, but doesn’t because you have already addressed the key features then people start to say we don’t really need the rest”.

The above findings suggested that these were direct benefits of agile methods to Company C. It was also evident from the questionnaire that Participant (C) mostly strongly agreed (average rating of 4.6) with the given statements regarding the potential benefits of agile methods (see Table 4.5).
Table 4.5: Results from questionnaire – Company C

<table>
<thead>
<tr>
<th>Potential benefits</th>
<th>Participant (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Agile software development enhance the ability of my software teams to manage</td>
<td>5</td>
</tr>
<tr>
<td>change priorities</td>
<td>(Strongly Agree)</td>
</tr>
<tr>
<td>(b) Agile software development helps my software teams meet customer requirements</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(Agree)</td>
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<tr>
<td>(c) Agile software development helps my software development teams increase</td>
<td>5</td>
</tr>
<tr>
<td>productivity of software development</td>
<td>(Strongly Agree)</td>
</tr>
<tr>
<td>(d) Agile software development enhance the quality of software product</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>(Strongly agree)</td>
</tr>
<tr>
<td>(e) Agile software development reduces project risk</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>(Strongly agree)</td>
</tr>
<tr>
<td>(f) Agile software development reduces software development process complexity</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(Agree)</td>
</tr>
</tbody>
</table>

At the same time, results from the interview and questionnaire showed that Participant (C) was satisfied (rating of 3) with the current agile methods being applied in IT/IS projects. Participant (C) also stated that agile methods were successfully implemented (rating of 3) at Company C. This success can be explained from the fact that the development costs have been reduced and customer satisfaction increased.

Overall, it can be noted that agile methods play an important role in software projects by offering a flexible and efficient process for development. Figure 4.15 presents the overall findings of the situation and how agile methods were implemented at Company C.
Strategic alignment

In this section, the concept of the alignment of business strategy and IT/IS strategy where agile software development is applied, was discussed with the participant. Participant (C) commented that:

“Business operates quite quickly and makes changes quite quickly, so they want to be competitive, and to be competitive you need to be able to move quite quickly….so in that sense they types of development we are in this case do things incrementally”.

The above quote implied that Participant (C) perceived his understanding of the strategic alignment at very broad level. Participant (C) understood that using agile methods as the major technology increased opportunities resulting from changes in the business environment in order to gain competitive advantage.
In discussion about the importance of business strategy and IT/IS strategy alignment, Participant (C) believed that the implementation of agile methods does not only provide technical solutions, but it also can be strategically aligned with an organisation’s objectives and goals, and gain competitive advantage. Participant (C) asserted that:

“... we get better value for money when we spend on a project to deliver things. We always run the risk of not being well focused on what is really required, what's absolutely needed in a solution. So using agile you get to use good techniques for prioritising and identifying what needs to be worked on, what must be done, and going through an iterative development process, you get to see the results very frequently and early. So, you have plenty of opportunities to adjust as you go”.

During the interview, it was observed that Participant (C) answered the above question quite confidently. In the questionnaire, Participant (C) has seen that the alignment of business strategy with IT/IS strategy, where agile software development is applied, is somewhat important (average rating of 3). Moreover, Participant (C) neutral agreed (average rating of 3) that the alignment of business strategy and IT/IS strategy, where agile software development is applied can improve organisation performance. Participant (C) provided this comment:

“I can’t say that we can qualify at this point because it is quite early, but I think it does”.

4.5.4 Summary and discussion of the findings of Company C

Based on the synthesis of the findings, it was recognised that Company C is consistent with an Analyser of Miles and Snow (1978)’s strategic typology. The core competency of Company C lies in the area of customer services and operational excellent. Having Analyser characteristics benefit Company C in terms of the ability to provide high quality products with lower costs, the ability to minimise risk, and at the same time maximise the profits for growth (Miles and Snow 1978). However,
their weakness can be the limitation of innovation related to products (Miles and Snow 1978).

The IT/IS strategy of Company C addresses the scope which aims to use state-of-the-art technologies to improve the ability to grow. A comparison between business strategy and IT/IS strategy profiles by Hirschheim and Sabherwal (2001) show that there is compatibility between business strategy and IT/IS strategy.

Figure 4.16 indicates that Company C has IT/IS strategy of Comprehensive. Agile methods were implemented in order to enhance the capabilities of products and services development. As such, agile methods play a strategic role in supporting IT/IS functions in terms of reduce cost of operation. Concurrently, the strategy supported the flexible control over project development. The IT/IS operations are managed through a Shared structured. The operation of the IT/IS function involved Selective Sourcing, where certain IT/IS functions are run by a third party. In the case of Company C, this included consultancy.

Figure 4.16: IT/IS strategy profile of Company C

Based on the SAM (Henderson and Venkatraman 1993), Company C can be considered to be in accordance with the Strategic Execution perspective. Figure 4.17 explains the relationship of this perspective.
Based on Figure 4.17, the findings indicated that the decision concerning agile methods implementation was driven by business strategy, based on the fact that Company C searches for new ways to improve the capability and quality of products and services. Hence, IT/IS needs to respond to the demands of the business. In this respect, the top management appeared to have a technology vision and found that agile methods were effective techniques for improving the core financial systems to be much more flexible and efficient, and thereby make their IT/IS projects become business opportunities.

Given that, it was necessary for Company C to build IT/IS Infrastructure to be more flexible and efficient. The capability of agile methods would drive change in the IT/IS infrastructure. This involves the role and skill set of the software development team. In order to ensure that all software development team members have an understanding of the whole aspect of agile methods, training sessions were established and provided to all software development team members.

In considering the role of participants, top management is more involved in formulating business strategy, and involved in making the decision to choose agile
methods to improve Company C’s competitive position in the particular market. Agile methods were implemented as it was believed that they could support the business needs. The role of the IT/IS manager is more involved in designing and implementing agile methods to enable the organisation and to ensure the support and delivery of IT/IS services as required by the top management. These findings are consistent with the research literature (Henderson and Venkatraman 1993).

Analysis from the interview and observation showed that the factors and antecedents of strategic alignment that has been discussed in the strategic alignment literature existed in Company C. Communication between business and IT/IS manager is one of the common factor that is essential for facilitating alignment (Reich and Benbasat 2000). The findings of this study support Reich and Benbasat (2000), which showed that there was a clear communication between the top management and IT/IS manager of Company C and also the strategic direction of the organisation. The findings also demonstrated that the top management of Company C has strong support for IT/IS investment. This is due to the fact that there was increased awareness of the necessity to implement agile methods by the top management at Company C. This finding support Luftman and Papp et al. (1999) who report that top management support for IT/IS is important factor for achieve alignment.

Moreover, Luftman and Papp et al. (1999) and Teo and Ang (1999) identified that knowledge of the IT/IS management about the business environment is important for facilitating alignment. The findings of this study showed that the IT/IS manager has a strong understanding of Company C’s business environment. Based on the findings of this study, it can be noted that Company C is likely to achieve short-term alignment. Overall, the strategic use of agile methods in Company C is not only to enhance the flexibility of IT/IS Infrastructure but to also put Company C in a position to be able to process a transaction that meets business goals and maintains change in a business strategy. Since agile methods are collaborative in nature, this may be benefit to an organisation in terms of increased communication, share understanding, and influential in the involvement of business manager and IT/IS manager during the development of an IT/IS product.
4.6 Case 5 – Company D

4.6.1 Company background

Company D is a small to medium size company operating in the food industry in Bangkok, Thailand. Company D has a vision of developing new products and services with high quality standards through the use of advanced technology. Company D is considered as a strong innovative firm which is central to business success. As such an innovative organisation, Company D is driven to give greater emphasis to the development of new knowledge and expertise through IT/IS applications, which helps the firm in finding new opportunities for innovation in products and services. As far as possible, the company moves to establish their own software house, and has invested in a flexible technology infrastructure that supports these knowledge functions.

Company D concentrates on narrow market segmentation, which recently led to a number of opportunities in overseas markets. The major strength of Company D is being innovative and the creation of new knowledge within the firm, which helps it to maintain its innovator position in the marketplace and enables the company to remain at the forefront of new products and services. However, Company D also takes risks in high technology investment with slow return on investment.

4.6.2 Observation and field notes

As described in Chapter three the original contact with participants was identified to be the Business manager and IT manager. Unfortunately, the business manager of this company was unavailable to participate in this study. The business development manager and managing consulting manager participated in this study. The following presents the observations and field notes taken during the interview with each participant of Company D.

- Participant 1(D) – Managing consulting manager/IT manager

Participant 1(D) has an IT background. With several years in this role, it was observed that Participant 1(D) is very experienced in project management and
agile software development methods. Further, Participant 1(D) appeared to have a very clear understanding of business objectives and sufficient understanding of general business principles

- **Participant 2(D) – Senior consultant – Business development manager**

It appeared that Participant 2(D) has strong experience and knowledge in various aspects of IT, particularly in agile software development methods. Moreover, he has a strong focus on the value of IT to the organisation.

### 4.6.3 Analysis of the findings of Case 4 – Company D

#### Business strategy

When participants were asked to describe the terms business strategy, it appeared that participants seemed to be confused and did not answer this question. Therefore, the interviewer moved on to the next question. In asking participants about the business strategy of Company D, Participant 1(D) stated that the business strategy of Company D was all about concentrating on the quality of products. Participant 1(D) stated:

“Business strategy here, we focused on providing the development of new products with high quality standard through the use of advanced technology. We also have the underlying philosophy that our business must be benefit to the country, the people, and the organisation”.

It was observed that when participants answered the above question, they felt confident. In general conversation with the participants, it was noticed that they always seemed to keep the vision and goals of the organisation in their minds. Ideally, the participants come to understand precisely what those objectives are and how they, personally, contribute to those objectives. One of the possible explanations can be that Company D has communicated their business strategy to their employees throughout the organisation.
Based on Company D’s of business strategy published on the company’s website, it can be summarised as follows:

- to be the world’s leading food producer
- to contribute to the deployment of agribusiness in the developing world
- to create ultimate benefits to the consumer and organisation by using advanced technology to develop high quality standard of new products and services.

Overall, there was a consistency between the response from participants and the information given on the website towards business strategy of the organisation. Company D’s core competencies are embedded in the areas of customer service, and product leadership. The value of an employee’s knowledge has always been viewed as critical to competitive advantage. Six underlying principles have been set up in order to instil employees to strive to achieve the objectives and goals: embracing change; learning and sharing; innovation; integrity and honesty; result oriented; and dedicated to the country. Specifically, the findings from the questionnaire indicated that Company D has Prospector characteristics.

Regarding the commitment of participants towards the business strategy formulation of the organisation, the results from the questionnaire indicated that both participants have large extent (averaging of 4) commitment in this matter. Moreover, participants strongly agreed (average rating of 5) that Company D has a well formulated business strategy. In this respect, one of the possible reasons may be that the objectives and goals of the organisation are well recognised and seem to be solid. Another reason may be that participants feel that Company D has reached its business goals and achieved high business performance.

**IT/IS at Company D**

Company D’s IT/IS strategy is to use state-of-the-art IT/IS to improve the IT/IS functions and make business functions more effective and efficient. The IT/IS competency of the company presents in terms of the capabilities of software development processes to improve the IT/IS and business functions. The role of the IT/IS department is to find business solutions and work to support business goals and
objectives. The IT/IS function of Company D is decentralised, where the IT/IS manager makes direct decisions in implementing IT/IS and control of IT/IS within his own operations (Peterson, O'Callaghan et al. 2000).

Company D has its own software house, since it considered that there would be opportunity to operate their systems more efficiently and effectively. At Company D, there is no formal IT/IS plan. Company D employs a short-term IT/IS plan which is one year or less. The IT/IS investment/implementation are kept within the budget allocation from the top management as much as possible. In investing in new technology, there is a commitment to investing in research and development. The selection of technology also ensures that it supports business needs.

**Agile software development methods**

In this part of the interview process, participants were asked to describe the terms of agile software development methods based on their understanding. According to Participant 1(D):

"Agile methods is a model of software engineering that emphasises quick development of software process”.

Participant 2(D) stated:

“I see agile as a process for managing the software project”.

Both participants expressed their understanding of the term agile methods consistent with the term that have been described in the literature. The data from the questionnaire showed that both participants have very extensive knowledge in agile methods (average rating of 5).

**The situation and driving forces to implement agile methods**

At Company D, IT/IS has been recognised as an essential part of their business process and development. Yet there were two underlying technology issues, which challenged the IT/IS department to search for ways to boost those functions. Firstly, even though the IT/IS department has a successful track record for IT/IS projects, Company D was faced with issues such as IT/IS delivery capabilities. In the past,
Company D was like other companies that implemented heavy processes such as RUP (Rational Unified Process)\(^3\) and CMMI. Company D was in the position where IT/IS projects were getting bigger. These processes were seen as complex, difficult to manage, and did not provide immediate value to an organisation in terms of quality. Secondly, with the constant focus and strong emphasis of the IT/IS department to improve the quality of business and IT/IS functions, Company D decided it was time to change its software approaches and started to look at implementing flexible solutions that can be easily scaled, managed, and adapted to satisfy a range of requirements. Given that, agile methods were chosen as the best option to pursue as the core software development process of Company D. As participant 1(D) stated:

“Because we are continuing and trying to improving efficiency our software development products, we know that we needed to change our software development methodology. At the beginning, we’ve no idea, we’ve tried several processes, but we found that those processes did not solve our problems. Then we decided to go with agile methods because they were closer to the way we work”.

Participant 2(D) expressed:

“Before we were using agile, we have the problem in managing the software development process. The software development process that we used before did not support our software planning process, and management of project. Then we found that agile process can solve the problems that we have. So, that is the main driving force for us”.

Prior to agile methods implementation, the IT/IS department had analysed how such methods might help them to improve the business and IT/IS function. There was also an expectation that this method would be more capable of enhancing effective and efficient business and IT/IS functions. Moreover, the interviews clearly showed that

\(^3\) RUP is a software engineering process. It provides a disciplined approach to assign tasks and responsibilities within a development organisation. Its goal is to ensure the production of high quality software that meets the needs of its end users within a predictable schedule and budget. Kruchten, P. (2004). *The rational unified process: An introduction*. Massachusetts, Addison-Wesley.
the decision-making process to implement agile methods was within the IT/IS department, and based upon the choice of the IT/IS manager. Participants explained that the IT/IS manager had been given decision-making authority to choose which processes or methods to implement and to deal with other operational incidents without referral to the top management. However, the choice of IT/IS projects was made jointly by top management and the IT/IS manager. Participant 1(D) asserted that:

“It is our job to find the best approach and process that fit to our project. Sometime, the top management did not care what we used”.

This implied that it seemed to be the responsibility of the IT/IS manager and project manager to take actions and keep up to date with the latest technologies and particular methods that provided greater flexibility in order to maximise the development of their software projects. Business management delegated the choice of IT/IS solutions to the IT/IS department, as they are more knowledgeable than business people.

**IT/IS projects where agile software development is applied at Company D**

With regard to IT/IS projects selection, the decision was made jointly between top management and the IT/IS manager. At Company D, agile methods were presented as an important tool in increasing capabilities and flexibility of several functions within the organisation. Company D has adopted a knowledge management system for knowledge sharing. Hence, the IT/IS functions were built around the concept of knowledge management in order to foster information sharing within the organisation. This system was also the source of the business knowledge, the organisation performance and improvement methods. There is only one aspect of Scrum that they have applied into the development context. This is presented in Figure 4.18.
Company D had three major releases a year as depicted in Figure 4.18. Within each release, the software development teams synchronised a four week sprint cycle. Daily meetings were arranged within the agile team, and provided a way for the software development teams to get an overview of the project situation and identify the issues quickly. It was acknowledged that during an agile methods implementation, communication among business managers, IT/IS managers, and software developers was highly motivated. The IT/IS manager of Company D acts as project champion, and the business management appears to act as project sponsor. The IT/IS manager and project manager work closely with the end user in order to ensure that the products are delivered as expected.

Participants also acknowledged that this significant shift has required Company D to develop or employ new staff skills to accommodate the impact of changes within IT/IS department. However, this appeared to be of little concern to the IT/IS department. Company D has strongly supported the existing IT/IS staff members, who are willing to learn and contribute to the new processes. Additionally, Company D prides itself on having talented IT/IS staff with high technical skills to cope with agile methods. Despite this, Company D is still aware of the potential threat of high staff turnover. To cope with this, individual training was given to new staff and
existing software development team members in order to ensure they have sufficient knowledge and understanding of the whole aspect of agile methods.

**Benefits acquired**

Participants identified positive outcomes of agile methods. In this regard, there were some differences and similarities in relation to participants’ views on the outcomes of agile methods. Participant 1(D) clearly emphasised that since agile methods were implemented, the communication within the team had improved. It also has proven to increase the ability to manage the software projects. Participant 2(D) had a similar view, but he further explained that agile methods have improved the way they manage the project, with better time management, and also it helped in reducing the number of documents. Participant 1(D) commented:

“I would say that agile helps us in improving communication within the team, and helps us in managing the project”.

Participant 2(D) added that:

“In my view, I think agile helps me in time management and planning the project. It also helps me in improving software development team, and reduced the amount of documentation”.

The above findings appeared to be the most directly accountable for the outcomes of agile methods from the participants’ point of view. To further enhance the above findings, it was also evident from the questionnaire that participants from Company D strongly agreed (average rating of 5) with the given six statements in Table 4.6, regarding the outcomes and benefits of agile methods.

Participants also have a very high level of satisfaction with current agile methods. The findings from the questionnaire indicated that both participants are very satisfied (average rating of 4) with the current agile methods. This implies that agile methods meet their needs and also reflects the positive outcomes of agile methods that they have achieved. Both participants also strongly agreed (average rating of 5) that they have successfully implemented agile methods. This success was presented in terms of an improved software process.
Table 4.6: Results from questionnaire – Company D

<table>
<thead>
<tr>
<th>Items</th>
<th>Participant 1 (D)</th>
<th>Participant 2 (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Agile software development enhance the ability of my software teams to manage change priorities</td>
<td>5 (Strong agree)</td>
<td>5 (Strong agree)</td>
</tr>
<tr>
<td>(b) Agile software development helps my software teams meet customer requirements</td>
<td>5 (Strongly agree)</td>
<td>5 (Strongly agree)</td>
</tr>
<tr>
<td>(c) Agile software development helps my software development teams increase productivity of software development</td>
<td>5 (Strongly agree)</td>
<td>5 (Strongly agree)</td>
</tr>
<tr>
<td>(d) Agile software development enhance the quality of software product</td>
<td>5 (Strongly agree)</td>
<td>5 (Strongly agree)</td>
</tr>
<tr>
<td>(e) Agile software development reduces project risk</td>
<td>5 (Strongly agree)</td>
<td>5 (Strongly agree)</td>
</tr>
<tr>
<td>(f) Agile software development reduces software development process complexity</td>
<td>5 (Strongly agree)</td>
<td>5 (Strongly agree)</td>
</tr>
</tbody>
</table>

Based on the findings, it can be noted that agile methods not only play an important role in supporting the project development of Company D, but also raise business opportunities. Figure 4.19 presents the summary of the overall findings of how agile methods were implanted at Company D.
**Business strategy and IT/IS strategy alignment**

In this section, participants were asked to discuss their understanding of business strategy and IT/IS strategy alignment, where agile software development is applied. Only Participant 1(D) answered this question. Participant 1(D) stated:

“I think it is a process of putting software development process in line with business strategy”.

From the statement above, Participant 1(D) understood strategic alignment as a process. It was observed that Participant 1(D) did not feel confident answering this question. It is possible that Participant 1(D) did not know what the actual term strategic alignment was. However, he made an effort to answer this question.
Participant 1(D) and Participant 2(D) shared similar views with regard to the importance of business strategy and IT/IS strategy alignment. Participant 1(D) acknowledged that there are changes in the business cycle that drive IT to respond quickly to the demands of business. In response to this question, Participant 1(D) commented as follows:

“Business cycle has changed quickly and that has already happened in many industries. When we talk about what technology can respond quickly to those changes and what technology can give good results when that change happened. I think what agile can do this, it can be adapted to whenever direction business has changed, and it does not required plan for it”.

Participant 2(D) provided an open discussion. However, he has given different answers from Participant 2(D). He stated that in many organisations, although agile methods can be aligned with business strategy, top management may not attempt to do this. Agile methods alone do not ensure that the organisation can achieve alignment, since agile methods are only one part of IT/IS. Hence, in order to achieve alignment, management might consider all aspects of IT/IS. According to Participant 2(D):

“I think agile methods are only one part of IT/IS strategy. In order to do the alignment you should consider IT/IS as a whole”.

Surprisingly, when it came to rate the relative importance of the alignment of business strategy and IT/IS strategy, both participants indicated that they did not see much importance (average rating of 3). This does not mean that strategic alignment will be ignored by the participants, but it is merely that the alignment of business strategy and IT/IS strategy, where agile software development is applied, is something that may not have been explicitly considered and may not be the top priority by either participant. One possible explanation can be the fact that participants did not see how strategic alignment influences the way the organisation invests or implements technologies in general.
4.6.4 Summary and discussion of the findings of Company D

The business strategy of Company D was set to be the world’s leading food producer. The synthesis of data analysis showed that that the characteristics of Company D can be classified under Prospector strategic type, where an organisation focuses on product innovation, risks, new opportunities and growth (Miles and Snow 1978). Taking advantage of Prospector characteristics could help Company D gain competitive advantage through price and quality of products and services (Miles and Snow 1978).

Company D’s IT/IS strategic vision is to use state-of-the-art IT/IS to improve both business and IT/IS functions to be more effective and efficient. The findings showed that there was concordance between business strategy and IT/IS strategy at Company D as discussed by Hirschheim and Sabherwal (Hirschheim and Sabherwal 2001). Figure 4.20: IT/IS strategy profile of company D

Figure 4.20 shows that Company D has IT/IS strategy as Opportunistic. Agile methods play a flexible role by offering quick response to market uncertainty. At the same time, it supports innovative IT/IS products and services and create new opportunities for the organisation. Moreover, the findings showed that Company D has a Decentralised IT/IS structured. The IT/IS functions are favoured by in-house development.
Based on the SAM, it is clear that Company D demonstrated the *Technology Transformation* perspective describing by Henderson and Venkatramann (1993). Company D currently best fits this perspective. Company D relies heavily on IT/IS and its capabilities to create new opportunities and achieve overall business objectives and goals.

**Figure 4.21: Technology Transformation perspective – Company D**

As shown in Figure 4.21, business strategy appeared to be the driving force for Company D to find new technology solutions and determine how the new technologies could support business strategy. As such, business strategy allows IT/IS to changes the IT/IS process, yet it remains active as a business visionary, setting out strategies. Due to the IT/IS maturity of Company D, agile methods were implemented to support the internal operation of the IT/IS function for the organisation, to be able to adjust to changing business requirements in order to meet the demand of business strategy, and to be product champion over competitors. Looking at the implementation of agile methods in Company D, there was a need to identify specific skill sets of software development team members to perform agile...
processes. Moreover, training sessions need to be provided to the software development teams to help them understand the whole aspects of agile methods.

In considering the role of the participants, Participant 2(D), being senior IT/IS consultant and business development manager, appeared to be more involved in choosing and implementing the technology that supported business needs. The consulting manager (Participant 1(D)) plays a key role in developing and planning IT/IS solutions for the company. He also has direct communication with the top management and is involved in decision-making on both the business and IT/IS sides. In the *Technology Transformation* perspective, the role of top management should be involvement in developing a vision for technology. The role of the IT/IS manager should also be involved in designing and integrating appropriate IT/IS for business. Therefore, these findings were consistent with the literature as identified by Henderson and Venkatraman (1993).

Analysis from interview and observation showed that the antecedents of strategic alignment discussed in the strategic alignment literature existed in Company D. A history of IT/IS implementation success is one common factor for achieving alignment (Reich and Benbasat 2000). The findings demonstrated that Company D had several successful IT/IS implementation in the past, which in turn strengthen trust and confidence from the top management (Teo and Ang 1999, Reich and Benbasat 2000). Moreover, the strategic alignment literature also stated that for successful alignment clear communication between the business and IT/IS executive was also necessary (Luftman, Papp et al. 1999). The findings demonstrated this to be the case at Company D.

The findings also showed that the business and IT/IS executive of Company D worked in partnership. The business management provided strong support for IT/IS investment at Company D (Luftman, Papp et al. 1999). Another important factor that affected alignment as recognised by Luftman and Papp et al. (1999) and Teo and Ang (1999) is knowledge of IT/IS management about business. The findings indicated that the IT/IS manager of Company D not only had technical knowledge, but he also had strong business knowledge. He knew what was best for the organisation to compete successfully in the marketplace. Since there was not enough
evidence in relation to the shared domain knowledge between the business and IT/IS executive at Company D, it can be concluded that Company D are more likely to achieve short-term alignment than long-term alignment as discussed by Reich and Benbasat (2000).

Throughout the case of Company D, it can be noted that during the implementation of agile methods there was a dynamic shift in IT/IS Infrastructure. By having a flexible IT/IS infrastructure which adopts agile methods, Company D enabled to react quickly to changing the market condition and appeared to be in a better position to respond quickly to business needs, thereby maintaining the organisational advantage. Considering the collaborative nature of agile methods, this helps an organisation to focus better on communication, share understanding, and the involvement of business manager and IT/IS manager in IT/IS project.

4.7 Chapter summary

This chapter presents within-case analysis of the five case organisations. The chapter began by providing an explanation of the presentation of data analysis used throughout the chapter. Then, each case study was analysed. Each case study explored business strategy, agile software development methods, and strategic alignment. The findings indicate that Company X has strong Defender characteristics and fits the Competitive Potential perspective of strategic alignment. Company A presents Analyser characteristics, and fits with Technology Transformation perspective of strategic alignment. Company B adheres to the Prospector strategic type, and represents the Strategic Execution perspective. Company C has the features of Analyser strategic type. The strategic alignment presents as Strategic Execution Company D presents Prospector strategic type. The strategic alignment is in line with the Technology Transformation perspective. The next chapter present the cross-case comparison.
5.1 Introduction

In the previous chapter, the five case organisations were analysed individually, focusing on key constructs of importance to this research, namely: business strategy; IT/IS strategy; agile software development methods; and strategic alignment. The case study evidence combined with insights from interviews has shown significant results that allow the researcher to draw some broad generalisations and compare the results across the organisations. Given that, the aims of this chapter are to present the cross-case analysis of the five cases, and address the sub-research questions: (1) How do agile methods contribute in IT/IS projects and how do organisations view current practices of software development?; (2) how do organisations achieve alignment?

Figure 5.1: Structure of chapter 5

As illustrated in Figure 5.1, Section 5.1 presents an outline of the chapter. Section 5.2 presents a cross-case comparison of general findings as found in Chapter four. Section 5.3 and 5.4 present a cross-case analysis of sub-research question one and two respectively. Section 5.5 summaries overall keys findings found in the cross-case analyses.
5.2 Cross-case comparison

5.2.1 Organisational attributes

This study examined five case organisations. The case from Company X was a pilot study. Cases A, B, C, and D were actual case studies. Based on within-case analysis the general characteristics of the five cases are summarised in Table 5.1.

Table 5.1: Comparison among the studied companies

<table>
<thead>
<tr>
<th>Case</th>
<th>CASE X</th>
<th>CASE A</th>
<th>CASE B</th>
<th>CASE C</th>
<th>CASE D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td>Thailand</td>
<td>Australia</td>
<td>Thailand</td>
<td>Australia</td>
<td>Thailand</td>
</tr>
<tr>
<td><strong>Industry</strong></td>
<td>Software house</td>
<td>Consultancy</td>
<td>Media and Entertainment</td>
<td>Banking/Financial service</td>
<td>Food</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>Small</td>
<td>Small to Medium</td>
<td>Large</td>
<td>Large</td>
<td>Small to Medium</td>
</tr>
</tbody>
</table>

The five cases had different foci as far as industry (i.e. software house, mining consultancy, media and entertainment, finance, and food producer), size (i.e. small to large), and location of operation (Australia and Thailand) were concerned. This allowed the researcher to observe and identify the different or similar impact of the implementation of agile methods. The five case organisations in this study are known for their successful implementation of agile methods. Despite the fact that the organisations compete in different industries, they are using agile approaches for improving their operations.

The following sections draw upon evidence from the five individual case studies, which are relevant to the issues of business strategy, IT/IS strategy/agile methods, and strategic alignment.

5.2.2 Business strategy of organisation – drawn from interview

Several sources of evidence were used for analysing the data in order to seek to identify the strategic orientation of each organisation. Hence, the information from the interviews and questionnaires was reviewed, and aligned with documents and the
company’s website. Table 5.2 presents quotes given by participants with regard to the business strategy of their organisation.

Table 5.2: Business strategy of organisation – interview

<table>
<thead>
<tr>
<th>Case</th>
<th>Business strategy of organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>“We focus on a strategy where we pick on a niche market, our business strategy is warmer partners for long term, our business strategy is to focus on a large scale enterprise, our strategy is to develop our own product”</td>
</tr>
<tr>
<td>Company A</td>
<td>“It basically to be a leading provider in professional services within the mining industry”</td>
</tr>
<tr>
<td>Company B</td>
<td>“Our business strategy is we wanted to be the leader in pay TV operator. We also wanted to provide and serve customers with high technology products with reasonable price”</td>
</tr>
<tr>
<td>Company C</td>
<td>“At this stage, I think it’s no secret that we are attempted to grow quite quickly into the Eastern States. The focus at the moment is based on direct market initially in the absence of having physical presence over there”</td>
</tr>
<tr>
<td>Company D</td>
<td>“Business strategy here, we focused on providing the development of new products with high quality standard through the use of advanced technology”</td>
</tr>
</tbody>
</table>

Based on Table 5.2, the business strategy of the organisation described by participants from each case was a useful starting point for analysis and discussion. These findings are also used for interpreting the business strategy based on Miles and Snow (1978)’s typology, and for comparing with the business strategy of the organisation that has been published on the company’s website, in order to identify whether there is any inconsistency. During the interview, it was observed that all participants were able to explain the strategic focus of the organisation.

5.2.3 Business strategy of organisation – drawn from company’s website

The business strategy of the organisation published on the company’s website is summarised in Table 5.3.
Table 5.3: Business strategy of organisation – company’s website based evidence

<table>
<thead>
<tr>
<th>Case</th>
<th>Business Strategy of organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>The overall business strategy as documented was aimed at delivering IT/IS solutions to its customers with low costs.</td>
</tr>
<tr>
<td>Company A</td>
<td>At broad level, the business strategy was focused on improving software products and technology solution to customers by using the latest technology</td>
</tr>
<tr>
<td>Company B</td>
<td>The bold statement of company business strategy is focus on adding valued to customers by providing a fast delivery of product and provide high quality of service. The company continues to develop products in order meet the demand of customers</td>
</tr>
<tr>
<td>Company C</td>
<td>The company focused on product innovation. The company seek to achieve products and services and attempt to difference in service, developing additional specialisations and greater flexibility</td>
</tr>
<tr>
<td>Company D</td>
<td>The overall business strategy emphasises on product innovation,</td>
</tr>
</tbody>
</table>

An analysis of Table 5.3 clearly points to a business strategy being adopted by each organisation. It was shown that Company X positions itself by focusing on a small niche market and making a strong relationship with business partners. Company A focused on providing a wide range of products and services, and focused on innovation. Similarly, Company C embarked on product innovation while at the same time remaining cost effective.

Company B emphasised adding value to its customers. It also continued to push itself to a new level of competition through the use of high technology. Similarly, Company D centred on innovation of new products by integrating state-of-the-art technology. Drawing on the analysis of the questionnaire, interviews and documents and the companies’ websites, it can be asserted that the information obtained from those sources was consistent. It is notable that in all cases, products and services enhancement are important and key drivers for improving their IT/IS function and operation.
5.2.4 Strategic oriented based on Miles and Snow

As alluded to above, utilising Miles and Snow (1978)’s typology to identify business strategy profiles for each case, it was possible to verify from the characteristics of each company which category they matched. Of the five cases, Company X presented Defender characteristics. Companies A and C exhibited strong Analyser characteristics, while Companies B and D followed a Prospector strategic type. Data obtained from the questionnaire supported this classification. The questionnaire also confirmed the strategic orientation of each company. The findings indicated that SMEs and large size organisations adopted different characteristics of strategic orientation. This is presented in Table 5.4.

Table 5.4: Comparison of strategic orientation amongst the five case organisations

<table>
<thead>
<tr>
<th>Case</th>
<th>Company X</th>
<th>Company A</th>
<th>Company B</th>
<th>Company C</th>
<th>Company D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small to medium</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategic oriented</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defender</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prospector</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Analyser</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

By comparing the characteristic of business strategic orientation with the size of organisations, it was evident that Defender strategy was presented in a small company (Company X). Analyser (Companies A and C) and Prospector (Companies B and D) strategy were presented in both medium sized companies and in large sized companies. These mixed results of business strategic orientation showed inconsistency among the five cases. This implies that the size of organisation may not relate to the choice of strategic orientation. Within the cases, business strategy may rather be related to the environment in each country. Further study may be necessary to confirm this.
Based on quantitative data, the cross-case analysis considered whether the five case organisations have a well formulated business strategy.

Table 5.5: Information based business strategy formulation

<table>
<thead>
<tr>
<th>Question</th>
<th>Case X</th>
<th>Case A</th>
<th>Case B</th>
<th>Case C</th>
<th>Case D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business strategy formulation</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 5.5 revealed that Companies X and B rated neutral (average rating of 3) that their company have well formulated business strategy. On the other hand, Companies A, C, and D agreed (average rating of 4) that their current business strategies are well formulated. All participating companies, regardless of size and sector, appeared to hold a non-negative perception regarding the business strategy formulation of their organisation. One possible explanation for this finding may be that the organisation’s reputation and success has made it believable to participants that their organisations have a well-formulated business strategy.

**5.2.5 Cross-case findings about IT/IS strategic profiles**

Drawing upon the coverage from secondary data sources and on interview responses of participants, Table 5.6 provides a comparative summary of the scope of IT/IS strategy amongst the five case organisations.

Table 5.6 showed that the five case organisations appeared to have an articulated IT/IS vision statement, and that it seemed to reflect business strategy. In addition, the five case organisations presented both different and similar IT/IS vision statements. For example, Company X’s IT/IS vision statement places emphasis on delivering service. Company A’s IT/IS vision statement, like that of Company C, stresses the company’s positioning through the use of the state-of-the-art IT/IS, but with more focus on financial performance. The IT/IS vision statements for Companies B and D have shared commonalities in terms of products and services enhancement. It was notable from the five case organisations that IT/IS strategy was set to face the challenges resulting from the chosen business strategy.
Table 5.6: IT/IS strategy of the five cases

<table>
<thead>
<tr>
<th>Case</th>
<th>IT/IS vision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>To deliver technology solutions to customers</td>
</tr>
<tr>
<td>Company A</td>
<td>To improve application of IT/IS for mining industry by using the best</td>
</tr>
<tr>
<td></td>
<td>approaches</td>
</tr>
<tr>
<td>Company B</td>
<td>To use effective IT/IS to improve quality of product and bring the world’</td>
</tr>
<tr>
<td></td>
<td>best information and entertainment to the Thai customers</td>
</tr>
<tr>
<td>Company C</td>
<td>To use state of art technology to improve the ability to grow</td>
</tr>
<tr>
<td>Company D</td>
<td>To use IT to improve IT/IS area to make more effective and efficient.</td>
</tr>
</tbody>
</table>

In order to identify the characteristic of IT/IS strategy of the five case organisation, the interpretation of IT/IS profile is based on Hirschheim and Sabherwal (2001)’s framework. It can be noted that the role of agile methods in the five case organisations becomes clearer when looking at the IT/IS strategy profiles. Based on the interview, it was found that the IT/IS department of the five organisations make an effort to respond to business needs. At Company X, since efficiency is the underlying theme of the company, the implementation of agile methods aimed to provide an efficient solution for developing software products. In this case, it appeared that agile methods play an Efficiency role in IT/IS strategy. This enables Company X to improve operational efficiency and develop products and services, which support to business strategy.

At Companies A and C, product innovation appeared to be the underlying theme. Hence, agile methods play a Comprehensive role in IT/IS strategy. The implementation of agile methods was considerable to support product innovations. In such cases, agile methods enable the organisation to provide the flexibility and efficiency of products and services. In contrast, for Companies B and D, product process appeared to be a core concern. Hence, agile methods play an Opportunistic role in IT/IS strategy. In these cases, agile methods enabled organisations to be responsive to market opportunities. This new form of software product development, which the organisation applied in order to reduce cycle time of product development, enables organisations to secure their competitive position in the marketplace.
In considering IT/IS structure, it was found that the IT/IS departments of each company are both similar and different in terms of their structure. At Company X, since they were one small company, they preferred to keep the structure as simple as possible. Hence, their IT/IS structure could be managed through centralised control. At Companies A and C, it appeared that the IT/IS structure was shared, where the business manager and the IT/IS manager shared decision-making for IT/IS implementation. Companies B and D presented a more decentralised IT/IS structure, where the IT/IS managers have a direct decision-making role in implementing IT/IS and control of IT/IS within their own operation.

Despite evidence that the IT/IS department of each organisation was supported and run by capable and experienced IT/IS people, there were slight differences in terms of how organisations carried out IT/IS activities. At the interview, the findings showed that Companies B and D only had the internal IT/IS expertise to operate the IT/IS activities. In contrast, in Companies A and B, external IT/IS professionals were involved in IT/IS projects, especially during agile implementation.

Table 5.7: IT/IS strategy profile

<table>
<thead>
<tr>
<th>Case IT/IS strategy profile</th>
<th>Company X Defender</th>
<th>Company A Analyser</th>
<th>Company B Prospector</th>
<th>Company C Analyser</th>
<th>Company D Prospector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role of agile methods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunistic</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Comprehensive</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>IT/IS Sourcing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outsourcing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insourcing</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Selective sourcing</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>IT/IS Structure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centralised</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decentralised</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Shared</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Based on the findings above, the overall results of an IT/IS strategy profile amongst the five case organisations is presented in Table 5.7. It can be noted that the IT/IS strategy of the five case organisations appeared to support business strategy.

5.2.6 Perception about business strategy

This section presents the findings of the interpretation towards the understanding of business strategy, agile software development methods, and strategic alignment given by participants.

A comparison of the understanding of business strategy

The findings from the interviews showed the individual interpretation of business strategy by participants. These were quoted and presented in Table 5.8.

Table 5.8: The understanding of business strategy by participants

<table>
<thead>
<tr>
<th>Case</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>P (X) “We define business strategy as a company direction, company vision. So in our business, when we keep company direction strategy, we have to envision where the market with that business section going to be”</td>
</tr>
</tbody>
</table>
| Company A  | P1 (A) “It means the future of business…the strategy is a meaning of getting from how we are now, to how we are going to be in the future. So it could be an actual plan or it could be an idealistic view”  

P2 (A) “It is a plan or company approach of business for long-term and/or short-term strategy for its position in the market. It is path where we want to get to, and its process, in which it will get there” |
| Company C  | P1 (C) “business strategy is a large scale plan more or less for either growing more revenue, improving process, efficiency, effectiveness within the organisation. They plan to improve the way we are and to be more competitive” |
| Company D  | P1 (D) “I think it is an elements of mission, vision” |
Table 5.8 showed that participants provided similar views of understanding of business strategy. Overall, participants understood the fundamental meaning of business strategy in a sense of direction and plan. These terms were consistent with the basic definition of business strategy described in the literature discussed in Chapter two. Although most participants in this study came from an IT background and specific expertise, they have a good understanding of the meaning of business strategy.

A comparison of the understanding agile software development methods

Table 5.9 presents the quotes from participants of how they described the term agile software development methods.

Table 5.9: The understanding of agile methods by participants

<table>
<thead>
<tr>
<th>Case</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>P (X) “Agile, if you look up in dictionary, agile means ability to re-change and more adapt to change easily. So, agile methodologies means you adapt to, you able to adapt to whatever happened around you. So in this case we adapt to change”</td>
</tr>
<tr>
<td>Company A</td>
<td>P2 (A) “Agile is using tools or mechanisms to be able to be flexible and understanding of scope requirements, understanding deliverable requirements, deployment requirement, functional requirements, being able to adjust.”</td>
</tr>
<tr>
<td>Company B</td>
<td>P (B) “It is a development process that makes software production fast, less bug, and very well management requirement”</td>
</tr>
<tr>
<td>Company C</td>
<td>P1 (C) “Agile is a very broad meaning of being more responsive and quicker to market, new development techniques and in most cases, much more collaborative in the way you work”</td>
</tr>
<tr>
<td>Company D</td>
<td>P1 (D) “Agile methods is a model of software engineering that emphasise on quick development of software process”</td>
</tr>
<tr>
<td></td>
<td>P2 (D) “I see agile as a process for managing software project”</td>
</tr>
</tbody>
</table>
According to Table 5.9, there was a high level of similarity on the views of the participants regarding the meaning of agile methods. Upon further consideration, all participants made a clear definition similar to the definitions discussed in Chapter two. For example, at Company X, the participant understands agile methods in terms of an adaptive process. At Company C, the participant understands agile methods in terms of a collaborative process. Similarly, participants from Companies A, B and D, understand agile methods in terms of a development process and tool.

The overall findings showed that participants were perceived agile methods to be very much as process and tool. Based on these findings, it can be noted that participants provided prescriptive and narrow definition of agile methods rather than a broad view. This may be explained by the fact that all participants were not new to agile methods. The backgrounds, knowledge and experiences of participants may have led them to hold specific views of what agile methods were.

**A comparison of the understanding of the alignment business strategy and IT/IS strategy, where agile software development is applied.**

Table 5.10 presents the quotes from participants of how they described the term alignment of business strategy and IT/IS strategy through agile methods.

A comparison of the quotes presented in Table 5.10 shows similarities in the meaning of terms found among participants in each company. For example, at Company X, the participant perceived that agile methods serve as a mechanism that bonds execution outcomes of business objectives and goals. At Company D, the participant understood business strategy and IT/IS strategy alignment as a process that uses the software development process to support business direction. Similarly, at Company C, the recognition by this participant was to use agile methods as the major technology to increase an opportunity resulting from the changes in business environment in order to gain competitive advantage. Participants from Company A on the other hand, perceived that agile methods are part of IT/IS strategy, and a necessity to support business operation.
It was observed that those definitions of business strategy and IT/IS strategy alignments, given by participants, appeared to be very broad and were not consistent with the definition of the concept discussed in the literature review. It may be assumed that in reality participants may view strategic alignment differently from the academic and scholar. Despite this, the overall findings showed that participants seemed to have a fundamental understanding in this area. Even though most participants in this study occupied different positions, when discussing their understanding of business strategy and IT/IS alignment, where agile software development is applied, participants in all cases were able to discuss the concepts openly and quite knowledgably.

Table 5.10: Definition of business strategy and IT/IS strategy alignment

<table>
<thead>
<tr>
<th>Case</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>P1 (X) “Agile like one point in business strategy, in business strategy defines by your objective, your goals. So for us, our business strategy is to be in the marketplace with product focus and customer development, with agile is being core concept”</td>
</tr>
<tr>
<td>Company A</td>
<td>P1 (A) “It is done where someone goes I think we really need this, and that done on the sort of the main business strategy. So our strategy [IT/IS] change depending on what the company strategy is”</td>
</tr>
<tr>
<td></td>
<td>P2 (A) “Company alignment of IT/IS strategy with implementation and practice of agile, taking more of IT/IS strategy for the business in stead of dove timing that into an agile implement”</td>
</tr>
<tr>
<td>Company B</td>
<td>P1(B) “I think it is the link between business strategy and agile methods or IT strategy. I mean IT need to be able to support all business requirements and at the same time the business need to support IT by proving all resources”</td>
</tr>
<tr>
<td>Company C</td>
<td>P1 (C) “At this stage, the business operates quite quickly and makes changes quite quickly, so they [management] want to be competitive, and they want to see benefits. So, in that sense the type of development we are in this case we doing thing incrementally in order to support”</td>
</tr>
<tr>
<td>Company D</td>
<td>P1 (D) “I think it is a process of putting software development process in line with business strategy”</td>
</tr>
</tbody>
</table>
5.3 Cross-case analysis of research question one

Research question one looks at the question *How do agile methods contribute in IT/IS projects and how do organisations view current practices of software development?* In order answer this question, data analysis was split into four parts: *firstly*, illustrate the types of IT/IS projects amongst the five case organisations; *secondly*, identify the choices of agile methods; *thirdly* identify the value and attitude towards benefits of agile methods; *finally*, identify whether organisation are satisfied with the current agile methods. A comparison of the five case organisations was conducted in order find out whether there was any similarity or difference. The additional data from the questionnaire was also analysed in order to ascertain whether these findings are consistent.

5.3.1 The characteristics of the projects

This section attempted to identify the types of IT/IS projects that the five case organisations were undertaking at the time this research project was conducted.

Table 5.11 indicated that the five case organisations have similar and different types of IT/IS projects, but they were unique in terms of software products. Companies X, A, and B were software products and services providers and dealt with commercial software products, while for Companies C and D, software projects were built to serve internal business functions and external users. In all cases, it was observed that every project appeared to share similar emphasis on maintaining and producing the best quality of software products and IT/IS systems, deliverables and schedule, and maintaining minimum costs of operations. It was also observed that most software projects being handled by the five case organisations were supporting business needs with the potential to have an impact on organisational’ profitability.
Table 5.11: The types of IT/IS projects

<table>
<thead>
<tr>
<th>Case</th>
<th>Type of IT/IS projects</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>Commercial software products project</td>
<td>E-finger print, Live scan, Golf online, and Network planning management</td>
</tr>
<tr>
<td>Company A</td>
<td>Commercial software products project targeted at mining industries</td>
<td>Mining software products</td>
</tr>
<tr>
<td>Company B</td>
<td>Commercial software products project</td>
<td>Set top box</td>
</tr>
<tr>
<td>Company C</td>
<td>Internal Financial and Banking systems</td>
<td>Billing systems</td>
</tr>
<tr>
<td>Company D</td>
<td>ICT service development project/ Internal and external IT/IS systems</td>
<td>Web-based knowledge</td>
</tr>
</tbody>
</table>

5.3.2 The choice of agile methods

Although, the literature on agile methods identified various types of agile methods (Highsmith 2002), selecting development methods is an important decision when building IT/IS systems (Dhaliwal and Onita 2007). Based on this view, it was important to identify which types of agile methods have been implemented in software development projects by each organisation.

Table 5.12: The choice of agile methods

<table>
<thead>
<tr>
<th>Case</th>
<th>Agile methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>No certain methods</td>
</tr>
<tr>
<td>Company A</td>
<td>Tailor agile approach (combination of XP, Scrum, FDD, Crystal, and DSDM)</td>
</tr>
<tr>
<td>Company B</td>
<td>XP and Scrum</td>
</tr>
<tr>
<td>Company C</td>
<td>Test-driven development (XP)</td>
</tr>
<tr>
<td>Company D</td>
<td>Scrum</td>
</tr>
</tbody>
</table>

Table 5.12 revealed that Companies A and B applied more than one aspect of agile methods for their software development, unlike Companies C and D. Company C
applied only some aspects of XP practice such as Test-driven Development for every project. In Company D, Scrum methods seemed to be the preference. Company A preferred to tailor agile approaches by combining several aspects of different agile methods to match their needs, whereas Company B preferred to combine the two main methods and applied them to each project. In Company X, there was no specific method being applied. The choice of agile methods was dependant on the project situation.

Further, the results showed that Scrum was seen as the most common method, selected by three cases, Companies A, B, and D. Based on the evidence from observation and interview scripts, it was acknowledged that in selecting single or multiple methods, the choice of agile methods was dependent upon team size, culture of the organisation, and the specific problem of the IT/IS project, thus supports the literature (Keenan 2004, Dijk 2011).

5.3.3 Perception on the value of agile methods

The perception of the benefits of agile methods was investigated through the interview questions asking about the overall benefits of agile methods towards the project outcomes. Table 5.13 presents a summary of the key findings of each case that emerged from the interviews.

As can be seen from the Table 5.13, there were a number of differences and similarities found between organisations in perceiving the outcomes of agile method on software development. The most common benefits of agile methods was improved communication within the team, cited by four case organisations (Companies X, A, B, and D). The other outcomes were improved customer satisfaction and improved management of software process. Further, a number of specific views on the outcomes of agile methods varied across the cases. For instance, Company C identified outcomes of agile methods in terms of cost reduction, reducing risk, and realising on future benefit. Company X, on the other hand, recognised the outcomes of agile methods as improved testing process.
Table 5.13: A summary of the key findings of the value of agile methods

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Company X</th>
<th>Company A</th>
<th>Company B</th>
<th>Company C</th>
<th>Company D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved customer satisfaction</td>
<td>$Y$</td>
<td></td>
<td></td>
<td></td>
<td>$Y$</td>
</tr>
<tr>
<td>Improved management of software process</td>
<td></td>
<td>$Y$</td>
<td>$Y$</td>
<td></td>
<td>$Y$</td>
</tr>
<tr>
<td>Improved communication within the team</td>
<td>$Y$</td>
<td>$Y$</td>
<td>$Y$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$Y$</td>
</tr>
<tr>
<td>Reduced the risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$Y$</td>
</tr>
<tr>
<td>Realised benefit in advance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$Y$</td>
</tr>
<tr>
<td>Improved testing process</td>
<td>$Y$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: $Y$ (addressed), [blank] (not addressed)

Although common outcomes of agile methods were found among Companies A, B, D and X, Company C provided a completely different perspective in this regard. This was probably due to the fact that each agile technique put a different emphasis on the outcomes of the project (Aguanno 2004). In addition, it was observed that the benefits of agile methods described by participants seemed relatively straightforward and seemed to be direct benefits that they actually achieved.

### 5.3.4 A comparison of attitude towards the benefits of agile methods

From a quantitative perspective, it was showed that participants also came up with positive views toward a series of statements related to outcomes and benefits of agile methods. This may be explained by the fact that participants may be impressed with the results in the IT/IS projects in which agile methods were applied. The results are presented in Table 5.14.
Table 5.14: Comparison of means between the cases

<table>
<thead>
<tr>
<th>Potential benefits</th>
<th>Case</th>
<th>X</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Agile software development enhance my software teams to manage change priorities</td>
<td></td>
<td>5.0</td>
<td>4.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>4.8</td>
</tr>
<tr>
<td>(b) Agile software development helps my software teams meet customer requirements</td>
<td></td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>5.0</td>
<td>5.0</td>
<td>4.2</td>
</tr>
<tr>
<td>(c) Agile software development helps my software development teams increase productivity of software development</td>
<td></td>
<td>3.0</td>
<td>4.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>4.4</td>
</tr>
<tr>
<td>(d) Agile software development enhances the quality of software products</td>
<td></td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>5.0</td>
<td>5.0</td>
<td>4.4</td>
</tr>
<tr>
<td>(e) Agile software development reduces project risk</td>
<td></td>
<td>3.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>4.6</td>
</tr>
<tr>
<td>(f) Agile software development reduces software development process complexity</td>
<td></td>
<td>4.0</td>
<td>3.0</td>
<td>5.0</td>
<td>4.0</td>
<td>5.0</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Closer examination of the ratings scale showed that there were slight dissimilarities between the five cases with some of certain benefits of agile methods. For instance, the participant from Company X only neutral agreed (rating of 3) with regards to agile methods reduced project risks and agile methods helps software team increase productivity, (rating of 3), while participants from all other Companies (e.g., A, B, C, and D) strongly agreed (average rating of 5) in this regard. The differences in rating may be explained in that Company X may implement agile methods in a different context: the participant may perceive that agile methods only go some way to reducing project risks.

Moreover, Company A neutral agreed (rating of 3) that agile methods reduced the complexity of software processes, while all other Companies (e.g., X, B, C, and D) agreed (average rating of 4) in this respect. A possible explanation for the difference in the rating of certain benefits of agile methods may be that participant faced different experiences and did not actually believe or did not feel that agile methods offer that kind of benefits to their IT/IS projects.
5.3.5 A comparison of the attitudes towards the satisfaction of agile methods

All participants appeared to provide a positive rating in relation to the level of satisfaction with agile methods. The results were obtained from the questionnaire and appeared to support the results from the case interviews.

Table 5.15: Result from questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Company X</th>
<th>Company A</th>
<th>Company B</th>
<th>Company C</th>
<th>Company D</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction of agile methods</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4.2</td>
</tr>
</tbody>
</table>

According to Table 5.15, the cross-case results indicated that there was no remarkable difference in responses between the cases, with most participants agreed that they were satisfied with the current agile methods that were being implemented. It was observed that participants answered this question without any hesitation. This satisfaction suggested that the companies were likely to achieve the desired outcomes rather than negative outcomes with agile methods.

5.3.6 A comparison of the attitude towards the successful implementation of agile methods

The results from the questionnaire also showed the positive results in relation to the level of successful implementation of agile methods within an organisation.

Based on Table 5.16, the cross-case findings indicated that participants from Companies X, A, B, and D identified their successes in implementing agile methods in similar ways. Despite the participant from Company C providing a different rating, he still accepted that agile methods were successfully implemented in IT/IS projects. Apart from this, the results from the interview found both similar and different views towards the successful implementation of agile methods. Company X viewed the success of implemented agile methods through customer satisfaction. Similarly, Companies B and D referred to their success in terms of customers and
users satisfaction, as well as better control on budgets and schedule. However, Companies A and C were more focussed, in addressing the successful implementation of agile methods, on the aspect of better budget control.

Table 5.16: Result from questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Company X</th>
<th>Company A</th>
<th>Company B</th>
<th>Company C</th>
<th>Company D</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful implement of agile methods</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>4.2</td>
</tr>
</tbody>
</table>

In summary, the five case organisations presented evidence that the more benefits agile methods provided, the more participants were satisfied with agile methods. Most of the key benefits of agile methods described by participants arise from IT/IS project management enhancement. Considering the research findings allowed the researcher to conclude that the implementation of agile methods provided a means to boost the strategic value of IT/IS projects and support IT/IS strategy.

5.4 Cross-case analysis of research question two

The second research question seeks to understand How do organisations achieve the alignment of business strategy and IT/IS strategy, where agile software development is applied? In order to answer this question, it is necessary first to identify driving forces involved in the decision-making to implement agile methods. Then, the alignment perspective is examined to identify which perspective is the most relevant in the current business condition, and investigate the roles of participants in strategic alignment. After that, which alignment factors have already emerged amongst the five organisations are identified.

5.4.1 The perception on the need and driving force to implement agile methods

The purpose of examining the need for agile methods was to determine what has motivated organisations to implement agile methods. In most cases, past IT/IS projects were implemented using heavyweight software development methodologies
such as waterfall-based processes. These have not always been so successful. Table 5.17 compares the perception of the need for implementing agile methods within the five case organisations.

Table 5.17: Identification of the need for agile methods

<table>
<thead>
<tr>
<th>Case</th>
<th>Identification of the problem and the need for agile methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>(P 1 X) Short cycle of software product/quick time to market</td>
</tr>
<tr>
<td>Company A</td>
<td>(P1 A) Limitation and failure in traditional software development process</td>
</tr>
<tr>
<td>Company B</td>
<td>(P1 B) Inspiration from the previous project</td>
</tr>
<tr>
<td>Company C</td>
<td>(P1 C) Inspiration by other company. Demand by top management</td>
</tr>
</tbody>
</table>
| Company D | (P1 D) Searching for change  
           | (P 2 D) Issues in managing software process |

Table 5.17 presents a number of reasons regarding the key issues and drivers in implementing agile methods. For example, Company X placed major emphasis on the issue of short software life cycle, and was concerned about time to market. This is due to the fact that the company had product champions who aim to push their software product into the market as fast as possible. The existing software processes were not always able to meet their current needs.

In contrast, Company A suffered from such issues as failure and limitations of the traditional software development process, and there was frustration in identifying the scope of the project. An expansion of software projects meant a necessity for clearer defined activities within the software development project. At Company C, the top management was inspired by other companies who successfully implemented agile methods, and demanded change in IT/IS systems. Management required IT/IS managers to evaluate how the agile methods could address their needs.

Similarly, at Company B, the participant noted that he was concerned about the life cycle of products, and he also was inspired by another organisation that had successful implemented agile methods. Company D was faced with issues in the
management of traditional software process, at the same time searching for improvement in the software development process. As such, the need for agile methods was raised by the need for change and better processes and to be a fast mover in the market.

Based on these findings, it appeared that failure of traditional software development was not the only issue that some participants encountered. In addition, issues such as time to market of products were also recognised by participants. These issues can be seen as the predominant reasons why organisations were demanding processes and practices that can build and improve quality software faster. In addition, these issues forced participant organisations to provide technical solutions that improved the way day-to-day operations of IT/IS functions were undertaken.

**5.4.2 Comparing the perspectives of Henderson and Venkatraman (1993) strategic alignment model**

This section sought to identify the process of alignment amongst the five cases. Table 5.18 summarises the environment and situation of the five cases organisations, which are relevant to the research issues that emerged from within-case analysis.

Based on the situations of the five case studies stated in Table 5.18, the implementation of agile methods reflected both strategy-driven and technology-driven approaches. The cross-case comparison showed that while some organisations fitted in the same perspectives of strategic alignment, other participant organisations were different. Given that, the findings indicated that Companies A and D exhibited a *Technology Transformation* perspective. Although these organisations were different in IT/IS projects undertaken, in both cases business strategy appeared to be the driver for change. To support the current position of the organisation in the marketplace, IT/IS needed to find the best possible ways to implement a technology that enhanced the capability of IT/IS functions in order to support business needs. In this light, agile methods perform a strategic role, with IT/IS operations well resolved by IT/IS managers.
Table 5.18: Indication of strategic alignment

<table>
<thead>
<tr>
<th>Case</th>
<th>Description</th>
</tr>
</thead>
</table>
| Company X | • The focus of the organisation is to provide efficiency of product to the customer  
• The implementation of agile methods was aimed at gaining a competitive position for the company. The company business strategy is realised on the technology implemented  
• Training provided for existing and new staff members |
| Company A | • The focus of the organisation is to use high technology to improve software products  
• Business strategy is the driver to implement agile methods. The implementation of agile methods impacts positively on IT/IS competency and make IT/IS more efficient and effective in delivering business needs  
• The implementation of agile methods provides agility to the organisation to be pioneer in the adoption of new IT/IS solutions in its industry  
• Training provided for existing and new staff members |
| Company B | • The focus of the organisation is to provide quality of service to customer  
• Business and product development manager has the vision of agile methods and believed that agile methods could help an organisation to improve the quality of software product  
• The implementation of agile methods aimed at improving software products  
• Highly skilled IT/IS staff was hired to support operations, and training provided for existing and new staff members |
| Company C | • The focus of the organisation is on product innovation  
• Top management has concerns about competitive issues and looked for new technology solutions for improving business function  
• In implementing agile methods, company have specialised consultancies working onside to assist in implementing process  
• Training provided for existing and new staff members |
| Company D | • The business scope of the organisation is to be the world best food producer  
• The implementation of agile methods impacts positively on IT/IS competency  
• IT/IS looked upon as something that provides efficiency and flexibility  
• Training provide for existing and new staff members |

The situations of Companies B and C were closer to a Strategic Execution perspective. Within these companies, the business strategy dictated both organisational infrastructure and the IT/IS infrastructure design. With particular attention regards to market and competitive issues, the businesses searched for new
IT/IS solutions to improve their IT/IS operations. In these cases, agile methods play a key role in supporting IT/IS operations in order to guarantee that the IT/IS projects are delivered with the best quality to their customers. Company X, on the other hand, was best fit in a *Competitive Potential* perspective. Company X focused on the maximum use of the opportunities offered by new IT/IS approaches to gain competitive advantage. In this case, the choice of technology implemented could be shaped by the business strategy of the organisation.

Drawing upon the case analysis, it can be noted that although a strategic alignment process takes place in each organisation, the companies that are less impacted by the alignment process appeared to be Companies A and D. This is due to the fact that overall business strategy is still controlled by the management, with the secondary involvement of IT/IS manager. Moreover, the organisational design is not affected by the transformation process. On the other hand, Companies B, C, and X appeared to be more challenged by the alignment process. This is due to the fact that business strategy is a driver of change. Any change in the business strategy will eventually have a significant change in organisational infrastructure and IT/IS infrastructure.

### 5.4.3 The role of participants

Henderson and Venkatraman (1993) stated that each perspective of alignment should include specific roles needed to be carried out by business and IT/IS managers and executives. This section investigated whether the participants have appropriate roles and/or are consistent with specific roles described by Henderson and Venkatraman (1993). From Table 5.19, it can be verified that the five case organisations seemed to have necessary roles of business and IT/IS managers and executives, and appeared to be consistent with Henderson and Venkatraman (1993)’s model. More specifically, the findings from the interview and observation provided a clearer picture of the roles of participants. Table 5.19 summarises the role of participants based on the interview and observation.
Table 5.19: Identification of the role of participants

<table>
<thead>
<tr>
<th>Strategic alignment perspective</th>
<th>Role of business and IT/IS managers and executives</th>
<th>X</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Execution</td>
<td>Top management&lt;br&gt;Role: Responsible for the strategy formulation.</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IT/IS manager&lt;br&gt;Role: Strategic implementation.</td>
<td></td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology Transformation</td>
<td>Top management&lt;br&gt;Role: Develop technology vision that can support chosen strategy.</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IT/IS manager&lt;br&gt;Roles: Elaborate appropriate information architecture.</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive Potential</td>
<td>The top management&lt;br&gt;Role: Need to be business visionary.</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IT/IS manager&lt;br&gt;Role: Help business manager to understand the potential opportunities and risks for the organisation.</td>
<td>Y</td>
<td></td>
<td></td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

The findings in Table 5.20 indicated that all participants carried far more strategic responsibilities than expected. In the case of Company A, Participant (1) recognised that he had direct contact and communication with the CEO. Participant (2) reflected on his role in designing and choosing software processes for the company.

In Company D, Participant (1) played a vital role in the planning, designing and implementing of the strategic plan and made decisions in choosing the software development process for IT/IS projects. Participant (2) worked closely with IT/IS manager and at the same time was in charged with the development all software projects. At Company X, Participant (1) was managing director. He was also IT/IS manager. As the managing director of the company, Participant (1) had a role as business strategic formulator. As IT/IS manager, he played a role in decision-making in choosing agile methods. At Company B, the participant played an important role in choosing agile methods. In Company C, the participant played a key role in having direct communication with the CEO. Even though this study was not able to interview the business manager, it was observed that the business executive of
Company C was more involved in business strategy formulation and held a strategic vision with regards to IT/IS implementation within an organisation.

Table 5.20: The results from interview

<table>
<thead>
<tr>
<th>Case</th>
<th>Job Title</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>P (1) – Managing Director/IT/IS manager</td>
<td>Managing and selecting software approaches for software project and decision maker</td>
</tr>
<tr>
<td>Company A</td>
<td>P (1) – IT/IS manager</td>
<td>Direct contact and communication with CEOs</td>
</tr>
<tr>
<td></td>
<td>P (2) – System</td>
<td>Selecting and choosing software approach</td>
</tr>
<tr>
<td>Company B</td>
<td>P (1) – Business and product and development manager/IT/IS manager</td>
<td>Managing software project</td>
</tr>
<tr>
<td>Company C</td>
<td>P (1) – IT/IS manager</td>
<td>Designing and implementing software processes</td>
</tr>
<tr>
<td>Company D</td>
<td>P (1) – IT/IS consultant and IT/IS manager</td>
<td>Developing and planning IT/IS solution and responsible for overall success of the projects</td>
</tr>
<tr>
<td></td>
<td>P (2) IT/IS manager</td>
<td>Choosing and implementing software processes and responsible for overall success of the projects</td>
</tr>
</tbody>
</table>

5.4.4 A comparison of the attitude toward the importance of business strategy and IT/IS strategy alignment

In the interviews, participants were asked to discuss the benefits of the alignment of business strategy and IT/IS strategy, where agile software development is applied. As Table 5.21 shows, there was evidence that all participants generally acknowledged and responded positively to the potential benefits and the importance of business strategy and IT/IS alignment.
### Table 5.21: Overall potential benefits of business strategy and IT/IS alignment through agile methods

<table>
<thead>
<tr>
<th>Case</th>
<th>Overall potential benefits of business strategy and IT/IS alignment through agile methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>“I think its benefits is to help your bottom line and delivery solution quick enough”</td>
</tr>
<tr>
<td>Company A</td>
<td>“The IT strategy needs a strong alignment with the business strategy in terms of what IT is going to produce as goal to allow the business strategy to actually have its goal happen in the end”</td>
</tr>
<tr>
<td>Company B</td>
<td>“I think the main benefit of this is, it help business to save costs and time in operation”</td>
</tr>
<tr>
<td>Company C</td>
<td>“I think is reduced cost and to get things done faster”</td>
</tr>
<tr>
<td>Company D</td>
<td>“Business cycle have changed quickly and that has already happened in many industries. When we talk about what technology can respond quickly to those changes and what technology can give good results when that change happened. I think what agile can do this, it can be adapted to whenever direction business has changed”</td>
</tr>
</tbody>
</table>

A comparison across the cases shows that the five organisations seemed to hold a similar attitude towards the potential benefits and importance of business strategy and IT/IS strategy alignment. The results from Company X showed that the participant described the importance of business and IT/IS strategy alignment in terms of helping the company *increase the bottom line*. Similarly, the participant from Company B described the overall benefit of strategic alignment as helping the company in *saving cost and time or operation*. In contrast, the participants in Companies A and D noted that strategic alignment could help the company to achieve its goals.

The overall results showed that most participants acknowledge the benefits and the importance of strategic alignment. These findings were also consistent with the overall perceptions of project outcomes in each case, which were summarised in Section 5.2.6. This finding implies that the participants in all cases might understand and expect that strategic alignment would present the same outcomes as provided by agile methods, and vice versa. Along with the information collected from interview and compared with the results in questionnaire in Table 5.22, the answer given by some participants in relation to this question appeared to be inconsistent.
Table 5.22: Result from questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Case X</th>
<th>Case A</th>
<th>Case B</th>
<th>Case C</th>
<th>Case D</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>The important of business strategy and IT/IS strategy alignment</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3.6</td>
</tr>
</tbody>
</table>

There was considerable debate on the answer in the interview and the questionnaire. Even though during the interview participants from Companies C and D were able to provide an answer with respect to the potential benefits of strategic alignment, in the questionnaire the answer appeared to be inconsistent. One of the possible explanations may be that these participants perhaps did not have any individual interest and/or were unsure that strategic alignment can solve organisation problems. They may feel that this matter should be recognised by the top management.

In contrast, participants from Companies X, A, and B, seemed to answer consistently and showed positive indications in this regard. From participant (X)’s point of view, having a strong feeling of ownership could reflect the consideration and the importance in this aspect. In brief, the findings suggested that the implementation of agile methods reflected two directions of alignment, namely, business driven and technology driven.

5.4.5 A Comparison the antecedents and implications of strategic alignment

The strategic alignment literature has explained the way in which organisations can best achieve alignment (Luftman, Papp et al. 1999, Teo and Ang 1999, Reich and Benbasat 2000) by contributing to the factors involved. The analysis of data is based on the factors that have been recognised in the literature. Based on narrative findings, some antecedents and critical success factors associated in strategic alignment were observed in this study. These included communication, IT/IS professional knowledge about business and top management software and IT/IS knowledge. Each is discussed in turn below.
5.4.5.1 Communication

Communication is one of the common factors to facilitate alignment (Luftman, Papp et al. 1999, Reich and Benbasat 2000). Luftman, Papp et al. (1999) claim communication in organisations involves the exchange of ideas, sharing of information and knowledge between the business management and IT/IS manager, ensuring that both parties have an understanding of the organisation. In this study, communication was found in two different dimensions. The first is communication through the strategic direction of the organisation. Evidence of this could be seen in terms of the discussion with participants with regard to the business strategy of the organisation. With an exception of the participant of Company A, it was acknowledged that most of participants in this study have the ability to express and speak knowledgeably about the business strategy of their organisation. The findings implied that organisations in all cases have developed an articulate vision statement, and have passed down/or shared that vision with generalised departments in the organisation. At Company A, the participant appeared to struggle to express the business strategy of the organisation.

The second is communication between the top management and IT/IS manager. The evidence showed that, in all cases, communications between top management and IT/IS management was found to occur during software development projects. This communications path seemed to have been increased by the adoption of agile methods, as exemplified by comments from Participants (C) and 1(D). It was also evident that there was direct and indirect communication and formal and informal communication existed within the five case organisations. Participants (X) and 1(D) commented specifically about this aspect. Moreover, there was frequent informal communication between IT/IS manager and software development team.

5.4.5.2 The involvement of IT/IS manager in business strategy formulation

The involvement of the IT/IS manager in business strategy formulation has been demonstrated as an important factor for strategic alignment (Luftman, Papp et al. 1999). The strategic alignment literature requires equal involvement in business strategy between top management and IT/IS management (Britt 2002). The
questionnaire examined whether participants were involved in business strategy formulation of the organisation.

As shown in the questionnaire results in Table 5.23, it was found that not all IT/IS manager were uniformly involved in business strategy. For example, participants from Companies A and C indicated that they were not part of formulating business strategy nor played any role in the strategic actions related to business strategy, whilst participants from Companies X, B, and D felt that they were involved in the business strategy formulation of the organisation. At Company X, the IT/IS manager is also the business owner. Hence, he is highly involved in this regard. At companies B and D, the involvement of participants in business strategy mostly presents in terms of an advising capacity.

Table 5.23: The results from questionnaire

<table>
<thead>
<tr>
<th>Case</th>
<th>Company X</th>
<th>Company A</th>
<th>Company B</th>
<th>Company C</th>
<th>Company D</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>The level of involvement of participant in business strategy formulation</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>3.2</td>
</tr>
</tbody>
</table>

The difference amongst the five cases can be explained by the strong and interdependent relationship between the top management and IT/IS manager and development manager, and also the culture created within the organisation. These findings suggested that in some of the five case organisations, IT/IS professionals are no longer working only as technologists who provides technology solutions, but are more likely to be a business-savvy strategic players.

5.4.5.3 IT/IS professional knowledge about business

The strategic alignment literature claims that IT/IS management is expected to be knowledgeable about the business and to play an important role of the organisation in order to achieve alignment (Teo and Ang 1999). In this study, the IT/IS professional
knowledge about business was examined through cross-functional knowledge at the individual level of IT/IS professional.

**Participant background**

IT/IS professional knowledge about business was examined through IT/IS professional background and experience.

Table 5.24: Participants background

<table>
<thead>
<tr>
<th>Case</th>
<th>Job title</th>
<th>Background/ Business and IT/IS experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company X</td>
<td>(P.1) Director/Owner</td>
<td>IT background over 8 years working</td>
</tr>
<tr>
<td>Company A</td>
<td>(P.1) IT manager</td>
<td>IT background. 6 years with company A with business knowledge</td>
</tr>
<tr>
<td></td>
<td>(P.2) Systems Analysis</td>
<td>IT background. 9 years at company A with business knowledge</td>
</tr>
<tr>
<td>Company B</td>
<td>(P.1) Business and products</td>
<td>IT background 8 year with company B. with significant experience in products and</td>
</tr>
<tr>
<td></td>
<td>development manager</td>
<td>development business knowledge and experience</td>
</tr>
<tr>
<td>Company C</td>
<td>(P.1) IT manager</td>
<td>IT background in financial services, and business experience</td>
</tr>
<tr>
<td>Company D</td>
<td>(P.1) Executive consultant</td>
<td>IT, business, and consulting background with significant knowledge of the industry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and business. Has close working relationship with top management</td>
</tr>
<tr>
<td></td>
<td>(P.2) Senior consultant</td>
<td>IT background. Familiarity and understanding though the IT/IS lens. Have close working</td>
</tr>
<tr>
<td></td>
<td></td>
<td>relationship with top management and IT project team</td>
</tr>
</tbody>
</table>

Table 5.24 shows that most of the participants came from IT/IS background with business knowledge. At the interview, it was observed that participants in all cases not only presented their technical skills, but have broad business knowledge. In all cases, participants appeared to understand and be able to see the need from the overall company viewpoint and seemed to recognise their contribution to achieving business goals, and ensuring that the organisation more effectively exploited IT/IS for business advantage. One possible explanation may be that changes in the business environment force IT/IS professionals to acquire business knowledge to perform
their job. In general, the IT/IS professionals appear to be in the high level of management and involved in many aspects of an organisation and its activities. Hence, it is important for them to understand the big picture of the organisation and determine how IT/IS can best support business goals and assist the organisation to gain competitive advantage. These findings indicate that, the more cross-functional and industry knowledge the IT/IS professional has, the more likely they would be to have a greater understanding of implementation issues and would bring about closer alignment.

**Participant knowledge about agile methods**

In all cases, the cross-case findings indicated that participants were very knowledgeable and familiar with agile methods. The data obtained from interviews also support this result.

Table 5.25: Results from questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Case X</th>
<th>Case A</th>
<th>Case B</th>
<th>Case C</th>
<th>Case D</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge about agile methods</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3.6</td>
</tr>
</tbody>
</table>

Table 5.25 showed that, on average, all participants agreed that they have *extensive knowledge* of agile methods. A closer analysis showed that participants from Companies X and B provided different rating from the others. In such cases, participants may consider that they may not have a deep level of knowledge of agile methods. The level of knowledge could be explained through participants’ past and current work experience in an IT/IS role, and their involvement in implementing agile methods. These results suggested that the higher level of the knowledge of agile methods that participants had, the more likely they would present a greater understanding in this area.

**5.4.5.4 Business executives support for IT/IS**

Successful alignment requires the commitment and involvement of top management in IT/IS projects (Luftman, Papp et al. 1999). Table 5.26 provided results observed during the interview.
Table 5.26 revealed that the five case organisations show both similarity and difference with regards to decision-making in implementing agile methods. At Companies X and C, the top management, along with the IT/IS manager, took the decision to implement agile methods. In these cases, it appeared that top management was the project champion and had a vision for technology. They seemed to know and understand what is the best for them in order to compete successfully in the marketplace. In contrast, in Companies A, B, and D, the decision to implement agile methods was made by the project manager. In these cases, the IT/IS manager seemed to be the project champion, and the decision to implement agile methods appeared to be part of the job responsibility.

Table 5.26: The commitment and involvement of top management in IT/IS project

<table>
<thead>
<tr>
<th>Case</th>
<th>Company X</th>
<th>Company A</th>
<th>Company B</th>
<th>Company C</th>
<th>Company D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision Making</td>
<td>• Managing Director</td>
<td>• Project manager</td>
<td>• Business &amp; development manager</td>
<td>• Top management</td>
<td>• Project manager</td>
</tr>
<tr>
<td>Approval Levels</td>
<td>• Managing Director</td>
<td>• Top management</td>
<td>• Top management</td>
<td>• Top management</td>
<td>• Top management</td>
</tr>
</tbody>
</table>

Apart from Companies X and C, it appeared that top management did not have much commitment and involvement in choosing technology for the organisation. One possible explanation can be that top management may see itself as business oriented rather than a technology person. In all cases, top management was found to be the key decision maker in the approval of budget and financial support. These findings suggested that the involvement of top management would assist in reaching an understanding of the business plan and opportunities. It facilitates the identification of areas for development with the best return on investment.

5.4.5.5 Share knowledge between business and IT/IS executives

Knowledge sharing is essential for organisations to achieve alignment as suggested by the literature (Teo and Ang 1999, Reich and Benbasat 2000). Shared domain
knowledge is the ability of business and IT/IS executive to understand each other’s domain (Reich and Benbasat 2000). When business and IT/IS executives are knowledgeable about both the business and IT/IS, they have the possibility to develop shared understanding (Chan, Sabherwal et al. 2006).

The findings from the interviews showed that not all organisations uniformly present shared domain knowledge between the top management and IT/IS manager. The clearest evidence was observed in the case of Companies B and C. At Company B, it was observed that the top management did not have much knowledge about certain technology such as agile methods. In this case, the business and product development manager helped top management to understand the advantages and limitations of agile methods. He also shared knowledge with the top management of the possibilities to implement agile methods. By doing so top management was able to see the potential of the agile methods, which in turn increased their commitment to the agile IT/IS projects. At company C, there was the discussion between the top management and IT/IS manager before agile methods were implemented. Table 5.27 provided evidence to support this claim.

<table>
<thead>
<tr>
<th>Case</th>
<th>Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company B</td>
<td><em>I have a meeting with the management team and discuss about this. At first, they don’t understand what agile methods were. I have explained to them what agile was.</em></td>
</tr>
<tr>
<td>Company C</td>
<td><em>The top management came to us [IT/IS manager] and we discussed about the possibility to implement agile methods.</em></td>
</tr>
</tbody>
</table>

Even though this research did not cover the top management perspectives, from the IT/IS professional voices in Companies A, B, and D it became clear that business management was not familiar and did not have knowledge about agile methods. The two possible explanations can be that, on one hand, in many organisations, it may not be necessary for top management to have knowledge and to be fully involved in technical aspects. In many cases, top management might delegate the IT/IS responsibility to IT/IS management. As in Companies A, B, and D, top management
may recognise the important of IT/IS in general, but they may not have to know about development in detail.

In summary, five factors observed in this study appeared to be social factor and may be perceived to have important implications for organisations to achieve alignment.

5.5 Chapter summary

This chapter presented a cross-case analysis of the five case organisations. The aim of this chapter was to present analysis and findings for the two research sub-questions. It began by summarising the data across all the organisations. Then, it identified the differences and similarities in the data across the cases. This chapter also looked at the quantitative data and then discussed whether it supported the interview data. While there were differences and similarities in terms of the choice of agile methods being implemented among the five cases, the outcomes of agile methods were generally positive.

The overall results indicated that the five organisations share different and similar views towards the alignment of business strategy and IT/IS strategy, where agile software development is applied. This chapter concluded with a summary of the cross-case discussions. The next chapter presents the discussion on research findings, and also compares these findings with the existing literature on business strategy and IT/IS strategy alignment.
6.1 Introduction

In the previous chapter, the research findings were presented in detail. The information from multiple data sources provides strong evidence which allows the research questions to be addressed. This chapter presents an overall summary of the study, together with a discussion of the highlights of the major findings based on the five case organisations.

Alignment between business and IT/IS has been studied for over 30 years with different aspects, such as framework to examine the alignment of business strategy and IT/IS strategy (Henderson and Venkatraman 1993, Luftman, Papp et al. 1999, Reich and Benbasat 2000, Sabherwal, Hirschheim et al. 2001), critical success factors and antecedents that influence alignment (Teo and Ang 1999, Reich and Benbasat 2000, Avison, Jones et al. 2004), and the outcomes of strategic alignment in relation to organisational performance (Chan and Huff 1993, Luftman, Lewis et al. 1993, Ramaswamy, Thomas et al. 1994, Sabherwal and Chan 2001). However, there are still questions left unanswered.

The overriding purpose of this study was to examine whether organisations which apply agile software development can align their business strategy with their IT/IS strategy. In order to examine the research objective, the following two research sub-questions were developed:

- **Sub-question 1**: *How do agile methods contribute in IT/IS projects and how do organisations view current practices of software development?*

- **Sub-question 2**: *How do organisations achieve the alignment of business strategy and IT/IS strategy, where agile software development is applied?*
Answers to these questions have some important contributions and implications for the research within the domain of strategic alignment and software engineering. This research makes a substantial contributions to theory and knowledge by addressing the issues in strategic alignment literature (Issue 1: The nature of the alignment between business strategy and IT/IS strategy, where agile software development is applied; Issue 2: There has been insufficient research focused on the dynamic process and sustainable of alignment; Issue 3: there has been minimal comparative research on strategic alignment between countries). The findings of this study provide a fresh view synthesising and clarifying why an organisation should align business strategy and IT/IS strategy, where agile software development is applied. Moreover, the findings of his study are not only be beneficial to practicing managers, to gain insight into how the flexibility and value of agile methods can facilitate the alignment process, but also will be a significant beneficial to scholars who start studying strategic alignment, especially where the focus on two theoretical concepts: strategic alignment and software development. The scholars may use the findings of this study as a meaningful reference when conducting further studies.

Although this research has obtained satisfactory results, there may be limitations due to its choice of research methodology and design, time constrains, and sensitive information and participants’ bias. To overcome these limitations, this research addresses and makes suggestions which might be helpful for future researchers. Based on the findings of study, this research suggests four major recommendations and possible avenues for future research that could be explored in further studies in relation to strategic alignment.

This chapter is structured in eight sections. It begins with an introduction of the chapter (Section 6.1). The summary of the study is presented (Section 6.2), followed by the discussion of the research findings from the five case studies (Section 6.3), and the discussion and conclusion of the research issues (Section 6.4). Next, it discusses the contributions and implications of the research (Section 6.5), and addresses the limitations that the researcher encountered during the research project (Section 6.6). Finally, the recommendations and suggestions for future research are discussed (Section 6.7), and the summary of the chapter is presented (Section 6.8). Figure 6.1 illustrates the structure of this chapter.
6.2 Overview of the study

In Chapter one, the background of research was presented together with the problem statement and motivation to conduct this study. In search of knowledge, this study sought to understand whether organisations which apply agile software development can align their business strategy with their IT/IS strategy. Chapter two provided the theoretical background to the study and presents the foundations of the empirical research to be followed. The importance of strategic alignment is well known and has been documented in the literature over several decades. Fundamentally, the literature notes that to maximise the return on their IT/IS investment and gain competitive advantage, organisations must ensure that their business strategy and IT/IS strategy are aligned. Misalignment may result in loss of strategic focus and loss of competitive advantage. The literature review also demonstrated that time-to-market and addressing uncertainty in the business environment is how the IT/IS department can provide the best IT/IS solution for an organisation. Agile methods were introduced as one solution to the issues identified.

Upon reviewing prior strategic literature related to this subject, three major issues were found: firstly, the strategic alignment literature has claimed that even though strategic alignment brings many benefits to organisations, it is still difficult to
achieve and sustain over time, especially under an unstable business setting (Hirschheim and Sabherwal 2001). It was also noted that agile methods stand for a more flexible way of developing software and can respond and react quickly to uncertain market condition (Dyba and Dingsoyr 2008). Hence, in order to maintain strategic alignment, this study argues that it is important to consider agile methods as part of IT/IS strategy. However, the strategic alignment literature exhibits a lack of focus on the alignment of business strategy and IT/IS strategy, where agile software development is applied; secondly, it was found that the strategic alignment literature has mainly investigated the outcomes of strategic alignment rather than focusing on the process. It was considered that a process view of alignment is important since it is one step that could pinpoint whether alignment is appropriate and where alignment needs more remedial managerial attention. However, the prior literature on strategic alignment lacks of the attention on this aspect; finally, the existing literature on strategic alignment has generally been conducted in a single country. The nature of strategic alignment literature lacks comparison studies between countries and is limited in generalisability of the research results.

Chapter three included the discussion of the chosen research methodology and design. This study was set to be exploratory in nature, with, the positivist case study identified as an appropriate research strategy. This chapter also explains the rationale and justification for the specific methods for data collection. The unit of analysis was organisations in Australia and Thailand. Five case organisations were selected to investigate using a convenience sampling method. These organisations are known for their successful implementation of agile methods. Of the five case organisations, Company X was investigated as a pilot case study in order to gain better understanding of this subject. Companies A, B, C, and D were investigated as specific case studies.

With regards to the participant selection, inclusion criteria were developed to ensure that appropriate participants were identified for the interview. Two participants from each organisation were nominated to participate in this study: the business manager and IT/IS manager. Participants, who hold other positions were also considered as potential participants, but only after meeting the criteria. Each participant was interviewed individually. A semi-structured interview was adopted as the main
method for data collection. In addition, data from the interviews was triangulated with other data collection techniques such as questionnaires, observation, and information found on the company website.

In Chapter four, analysis of individual cases was presented. Each case study analysis commenced by describing the organisational background. The data was analysed based on three themes, namely Business strategy, IT/IS strategy/Agile software development methods, and Strategic alignment. Three separate models discussed in Chapter two were applied for data analysis. First, Miles and Snow (1978)’s typology was applied to clarify the business strategic profile of the organisation. Second, Hirschheim and Sabherwal (2001)’s IT/IS strategy model was utilised in order to identify the characteristics of IT/IS strategy of an organisation. Third, Henderson and Venkatraman (1993)’s strategic alignment model was applied in order to identify the current state of the process of strategic alignment.

Based on data analysis, Company X had strong Defender characteristics and had IT/IS strategy for Efficiency. In terms of strategic alignment perspective, this organisation displayed a Competitive Potential perspective. Company A presented Analyser characteristics and had a Comprehensive IT/IS strategy. In terms of strategic alignment, the situation of this organisation was in accordance with a Technology Transformation perspective. Company B adhered to the Prospector strategic type and had IT/IS strategy for Flexibility. In terms of strategic alignment, this organisation represented a Strategic Execution perspective. Company C had the features of Analyser strategic type. The IT/IS strategy presented as Comprehensive. The strategic alignment perspective was presented as Strategic Execution. Company D presented the Prospector strategic type, while the IT/IS strategy of this organisation presented as Flexibility. The strategic alignment perspective was in line with Technology Transformation. The findings demonstrated that the factors and antecedents to facilitate alignment described in the strategic alignment literature were appropriate for the five case organisations. The findings suggested that the five case organisations have the possibility to achieve alignment.

Chapter five presents a cross-case comparison. The cross-case analysis also addresses the research questions: (1) How do agile methods contribute in IT/IS
projects and how organisations view current practices of software development?; (2) how organisations achieve the alignment of business strategy and IT/IS strategy through agile methods. The findings showed that there were similarity and differences across the cases. A comparison of results between the five case organisations allowed identification of areas of strength and concern on the level of alignment. The discussion and summary of the research findings are presented in the following sections.

6.2 Conclusion of research findings

In this section, the discussion of research findings is based on the research question and the existing literature of business strategy and IT/IS alignment. The discussion is presented, together with the possible explanations. This study sought to understand why organisations should align business strategy with IT/IS strategy where agile software development is applied?

To respond to the main research question, two sub-questions were proposed and answered during the data analysis in Chapter four and Chapter five.

6.2.1 Conclusion about first research issue

The first research issue involves the question of:

*How do agile methods contribute in IT/IS projects and how do organisations view current practices of software development?*

The findings of the study presented evidence and addressed decision-making and factors in the area of agile methods. Consistent with the study by Vijayasarathy and Turk (2008), three reasons were found: failure in traditional software methods; personal interest in agile methods; and having a strong belief in the potential benefits and value of agile software development. However, other factors were identified through analysis of the case studies. These supplemented the existing literature, and included: organisations searching for improvement in the software development process; high time to market pressure; and experience and inspiration from other projects or organisations.
The findings affirmed that IT/IS manager and top management play a key role in the implementation of agile methods. In some cases, the decision to implement agile methods was made by IT/IS manager, while in other cases, the decision was made between IT/IS manager and the top management. From this finding, it can be noted that, having the involvement from top management in the decision-making process not only demonstrating the level of support from the top management, but also could make agile methods implementation much easier. The findings showed that Scrum and XP are favoured and are the most actively used methodologies amongst the five case organisations. Slaughter, Levine et al. (2006) suggest that the selection of software methods depend on how an organisation competes and is also depends on the variety of product requirements.

The findings of this study captured three major benefits of agile methods that organisations have achieved so far. These included: communication; customer satisfaction; and improved management of the software process. Additional benefits of agile methods that, however, seemed to be of less concern to participants, but do supplement the benefits of agile methods discussed in the literature included: reduced cost; reduced project risk; realised benefit in advance; and improved testing process. From this finding, it can be understood that organisations may achieve these benefits only gradually over time. Overall, the five case organisations were very positive about the potential benefits of agile methods for their organisations. This result implied that, for organisations that rely heavily on products, there may be huge potential to leverage a major change to make the organisation more competitive in the marketplace.

The results of this study show that agile methods have been well facilitated and successfully implemented in all cases and have achieved the expected business benefits. As such, the findings explored the two common factors that can be considered as the key factors to identify the successful implementation of agile methods. The first is customer satisfaction. Customer satisfaction is a subject regarding the level of acceptance and usage of agile approaches. Based on the five case organisations, it observed that the customers can be either internal or external customers. In all cases, the participants claimed that customers were satisfied with
the way in which agile methods have taken place and delivered high quality products within an expected time frame. The second is better control of projects. This can exhibit as control of schedule, risk or budget amongst other project management issues.

Considering the research findings, the implement of agile methods becomes part of the overall IT/IS strategy and that supports the business strategy of an organisation. The five case organisations regard the implement of agile methods as a better way to cope with the business needs and also they have seen agile methods as a solution to IT/IS project success. It is undeniable that agile methods play a key role in IT/IS and business functions of organisations. In this context, it is clear that agile methods increase the flexibility of IT/IS Infrastructure, which means that organisations enable to quickly respond to change in the business environment. At the same time, it enhances efficiency and effectiveness of IT/IS projects, and thus contributes to competitive advantages and supports business value.

6.2.2 Conclusion about the second research issue

The second research issue concerned the questions of:

*How do organisations achieve the alignment of business strategy and IT/IS strategy, where agile methods is applied?*

Drawing upon the research findings indicated that the strategic alignment process was met in the five case organisations. The three alignment perspectives proposed by Henderson and Venkatraman (1993) were identified in this study: *Strategic Execution* (Companies B and C); *Competitive Potential* (Company X); and *Technology Transformation* (Companies A and D). Henderson and Venkatraman (1993) pointed out that strategic alignment is not a steady process: when the business environment changed or the role of IT/IS changed, an organisation may need to consider a different perspective of alignment. For example, if an organisation was driven by business strategy, then *Strategic Execution* or *Service Level* perspective may be appropriated.
The SAM also identifies the specific role of top management for the success of alignment. The findings of this study attempted to capture information on the role of top management and the IT/IS manager within the participant organisations. Their roles appear to have visibility which corresponds and is consistent with the strategic alignment literature (Henderson and Venkatraman 1993). It ought to be acknowledged that the five case organisations have practical steps which can be used to promote strategic alignment.

In an attempt to understand how organisations can best achieve alignment, prior research has examined what influences IT/IS alignment, and notes that alignment can be influenced by a wide range of factors (Luftman, Papp et al. 1999, Teo and Ang 1999, Reich and Benbasat 2000). This study observed contributing factors that lead to successful outcomes in strategic alignment and identified whether an organisation can achieve alignment. The findings of this study were condensed into a five core factors that appeared support the existing strategic alignment literature, but also provided some differences.

The findings of this research showed that Companies X and C highlighted that top management has knowledge and understanding of agile methods. This is consistent with the conclusion of Teo and Ang (1999) and Hussin, King et al. (Hussin, King et al. 2002) who emphasised that the key essential to help organisation to achieve outcomes from their IT/IS investment is when business executives have a good understanding of IT/IS. However, the findings from Companies A, B and D show that success may be achieved even where this understanding is not prominent. The imperative to be innovative and/or market-respondent in these high-technology dependent organisations are key drivers for good outcomes from IT/IS investment.

Communication between business and IT/IS executive is a key factor that influences strategic alignment. The factors that facilitate alignment observed in this study were consistent with Reich and Benbasat (2000) and Luftman, Papp et al. (1999). In this study, communication was found in terms of being informed about business strategy and IT/IS strategy of the organisation. The five case organisations showed that the IT/IS professionals appear to understand the organisation’s business and IT/IS
strategy. They seem to have a clear understanding of what the organisation is trying to achieve, and how IT/IS supports that achievement.

Furthermore, the findings of this research are consistent with existing strategic alignment literature which concluded that a broader business knowledge by IT/IS professionals is a key essential for organisations to achieve alignment (Teo and Ang 1999, Bassellier and Benbasat 2004, Silvius, Waal et al. 2009). In this study the business knowledge of IT/IS professional is presented as three aspects: firstly, business knowledge related to the overview of the organisation, where the IT/IS professionals understand what their organisation is about (Bassellier and Benbasat 2004); secondly, business knowledge created through their roles and responsibilities. This occurs when the IT/IS professionals feel responsible for organisational performance (Bassellier and Benbasat 2004). Lastly, knowledge of IT/IS-business integration which is created through the business situation where the IT/IS professional acts as business problem solvers (Bassellier and Benbasat 2004). This last aspect is critical – the participant organisations are highly dependent on technology to achieve their business outcomes. IT/IS therefore is seen as critical to addressing market issues encountered.

The findings also revealed that there was involvement and commitment of top management in IT/IS project development. This finding is consistent with the strategic alignment literature (Luftman, Papp et al. 1999, Teo and Ang 1999, Reich and Benbasat 2000). Collaboration between top management and IT/IS manager can identify areas where technology offers significant opportunity (Britt 2002). In most cases, the findings show that top management is involved in IT/IS projects by (at the least) allocating appropriate and adequate resources for implementing the new software processes, and are part of key decision-making in choosing projects as well as development approaches. In some cases, such as Companies B and C, top management has a commitment to IT/IS projects in terms of decision-making in selecting software approaches. Company C shows that there was discussion between the top management and IT/IS manager to implement agile methods, whereas in Company D top management was happy to delegate such decisions to the IT/IS manager.
Overall, the findings show that most of antecedents and CSFs that have been highlighted in the strategic alignment literature exist in the five case organisations.

Moreover, these antecedents appeared to involve the social level of strategic alignment. With the support of the data collected, it can be identified that five factors have the potential to influence the alignment activities within the organisations, namely: communication; the involvement of IT/IS management in business strategy; business executives support for IT/IS; IT/IS executive knowledge about business strategy; and shared domain knowledge. Based on the SAM together with the overall findings, Figure 6.2 presents a comprehensive view of strategic alignment process.
Figure 6.2: Comprehensive view

- Communication
- The involvement of IT/IS management in business strategy
- Business executive support for IT/IS
- IT/IS executive knowledge about business
- Shared domain knowledge
6.3 Conclusion about the research problem

The cross-case analysis provided significant findings considering issue related to the first and second research sub-question which, finally, led to answer the main research question: *Do organisations which apply agile software development align their business strategy with their IT/IS strategy?*

It has been noticed that the five case organisations are acting in a highly competitive environment. Hence, the business strategy can be various, depending on the environment context encountered by each organisation. Under Hirschheim and Sabherwal (2001)’s IT/IS strategy model, it was apparent that there was a strong link between the overall business strategy and IT/IS strategy of organisations. It is important to note that an operational issue and a market issue are major in determining the necessity to implement agile methods. These issues appeared to have affected the top management decision to support IT/IS and to exploit the capabilities of agile methods as a strategic element. Based on the SAM, three strategic alignment perspectives were found to be relevance to the situation amongst the five case organisations. The analysis revealed that perspectives of strategic alignment may diverge, in a sense that how an organisation takes action and how the role of agile methods has been framed in order to support business strategy and organisation functions.

The strategic alignment literature demonstrated that strategic alignment is still difficult to achieve, due to one or more of several key drivers such as strategic alignment being unsustainable (Hirschheim and Sabherwal 2001), characteristics of IT/IS investment, and lack of social interaction between business and IT/IS department (Chan and Huff 1993). In the context where organisations encountered with uncertainty, it can be argued for an organisation to achieve strategic alignment, the choosing of appropriate emerging technology to support business strategy and IT/IS strategy of an organisation is important. The specific technology choice such as agile methods have been chosen as technology solutions for IT/IS functions. It is clear that agile methods play important roles in organisations by enhancing the flexibility, efficiency and effectiveness of IT/IS functions. As such, an organisation
may yield strategic return and formulate competitive advantages around the capability of agile methods, which in turn could potentially convert into business value.

The findings from the interview and the questionnaire supported existing literature with respect to the importance and benefits of strategic alignment. Even though some participants in this research believed that their organisation did not have a strategic alignment process, they agreed that implementing one would have a significant positive impact on their organisation. Consistent with Avison, Jones et al. (2004), all the case organisations in Thailand and Australia recognised that the alignment of business strategy and IT/IS strategy, where agile methods are applied, can be beneficial to organisations in terms of assisting the organisation in gaining competitive advantages while reducing cost and providing time improvements.

Considering the findings of this research together with existing research, it can be concluded that an organisation should treat agile methods as a strategic approach, since they provide the business and IT/IS manager with the flexibility to respond to the dynamic changes in the environment (Grant 2010). Given the situation that organisations deal with uncertainty and the pressure of time to market, it is worthy to note that the flexible software development cycles implemented with agile enabled a better fit with business strategy, enabling adaption to dynamic environments more efficiently. Overall, this study provided support from interviews that the alignment of business strategy and IT/IS strategy, where agile software development is applied, would be expected to:

- reduce barriers and inhibitors of strategic alignment
- facilitate the strategic alignment process
- increase flexibility and credibility of the IT/IS functions
- increase business value from IT/IS projects
- enhance competitive advantage.
6.4 Contribution and implication of the research

This research provides a contribution to body of knowledge in the field of business strategy and IT/IS strategy alignment and also has some practical implications for management and practitioners.

6.4.1 Contribution to theory and knowledge

The overarching objective of this study is to understand the interplay between business strategy and IT/IS strategy alignment with agile software development methods. Overall, the findings of this study make several contributions to the current literature on strategic alignment. In addition, some important insights from the five case organisations are worthy for practitioners to take into account. First, the prior literature reveals that there have been many attempts to identify success factors and influence factors to implement agile methods (Vyver, Koronios et al. 2003, Turk, France et al. 2005, Chow and Cao 2008, Pikkarainen, Haikara et al. 2008, Vijayasarathy and Turk 2008). Moreover, there was considerably less discussion in prior literature as to whether agile methods help facilitate the alignment process. Thus, this study addressed the issue in the literature (Issue 1: The nature of the alignment between business strategy and IT/IS strategy, where agile software development is applied has not been investigated) and made contribution to software development knowledge and the growing research on of this study provide evidence in regards to the importance of agile methods as a mechanism in facilitating strategic alignment and making strategic alignment more possible. As a result of changing business environment, organisations in a volatile environment need more adaptable IT/IS infrastructure. In other words, an IT/IS Infrastructure should be robust in sustaining the current business needs and be flexible enough in meeting the future demands of business. Taking into account the two strategic roles of agile methods found in this study implies that the flexibility and capability of agile methods provide real strategic value to organisations. At the strategic level, agile methods play a flexibility role by which an organisation has the ability to adapt to change and respond quickly to the market. At the operational level, agile methods support project management through lower costs, a better quality of product, and shorter time-to-market.
As strategic alignment literature suggests, strategic alignment generally depends upon key roles such as communication, business executive’s support for IT/IS, shared domain knowledge, and the involvement between business manager and IT/IS managers. Yet, these roles are difficult to comprehend. This study advocates that the implementation of agile methods creates a conducive environment for organisations to achieve alignment, thus minimising strategic alignment issues. Since agile methods are a human-centric approach, which not only engages customers and software developers in the software development project, but also keeps top management and IT/IS managers working closely together throughout the development process.

Second, this study contributes to the current debate and addressed the issue in the strategic alignment literature, which focuses on the outcomes of strategic alignment. Despite the discussion in relation to outcomes of strategic alignment that have been described in the literature, there is lack of agreement as to how organisations do and should align (Issue 2: There has been insufficient research focus on the dynamic process of strategic alignment). The findings of this study extend the notion of strategic alignment as a continuous process which an organisation needs to evaluate and maintain when it encounters changing market conditions. Based on the analysis of existing strategic alignment perspectives, the results show that the five case organisations appear to have a high intermediate profile with respect to strategic alignment.

It is recommended that strategic alignment should be taken with the appropriate decision framework that suits the organisation in the specific environment. If organisations seek to achieve operational efficiency and effectiveness, the Strategic Execution perspective would be applicable. The Service Level perspective would be appropriate when organisations aim to develop systems that meet end-user demand and support key area of the organisational functions. The Competitive Potential perspective would be effective if the organisation wanted to emphasise technology leadership. If organisations are concentrated on extending IT/IS Infrastructure, then Technology Transformation would be applicable. Besides, the process of alignment needs to be clearly linked to benefits for the organisation. If agile methods make the
organisation more robust, efficient and effective, then the alignment is adding value to the organisation.

Furthermore, the findings from this study contribute to the growing pool of knowledge in strategic alignment literature. Aligned with previous literature (Luftman, Papp et al. 1999, Teo and Ang 1999, Reich and Benbasat 2000), the study has found that five factors of strategic alignment appeared to have direct effect on the alignment of business strategy and IT/IS strategy, where agile software development is applied. These are communication, the involvement of IT/IS management in business strategy formulation, business executives support for IT/IS, IT/IS executive knowledge about business, and shared domain knowledge. These factors can be the indications and references to whether an organisation can achieve alignment. In addition, the comprehensive view proposed in this study helps to explain which antecedents of strategic alignment are already existing in the organisations. In other word, it can be indicated that they may be the foundation for establishing strategic alignment and they may be important factors in determining the readiness of organisations for the strategic alignment.

Third, given that most of previous studies in relation to strategic alignment were conducted in a single country, the findings of this research not only made a contribution to addressing research Issue 3: there has been minimal comparative research on strategic alignment between countries, but also contributed to the body of knowledge by extending the generalisability of the results across the countries (Thailand and Australia) and industries (e.g. software house, consultancy, media and entertainment, banking, and food industry). By comparing the Australia and Thailand organisations, this study provided evidence that the organisations from both countries are likely to put value on the alignment of business strategy and IT/IS strategy, where agile software development is applied. The findings of this study would also help to advance understanding of how different organisations, in different industries, incorporate such methods into their IT/IS investment and business operations.

Finally, the findings of this study contribute to the enrichment of the research in the field of agile methods by identifying a wider set of related factors that influence organisations to implement agile methods, which previous studies may not have been
able to provide. The new factors identified in this study are organisations searching for improvement in the software development process, high time to market pressure, and experience and inspiration from other projects or organisations.

6.4.2 Implications for management and practice

In light of the results presented in this study, there are some important implications for academia as well as management and the practitioner to take into account. This research presents a first attempt to incorporate the role of agile methods software in strategic alignment, as no other published work was identified. Hence, it is anticipated that the findings of this research can provide meaningful evidence, to help practitioners to better define when and how strategic alignment could happen, and what the implications of such are.

This research provides some insights into the mechanisms for management and practitioners in considering the alignment of business strategy and IT/IS strategy, where agile software development is applied. It is important for management and practitioners to understand the underlying benefits of the way that agile methods can keep pace with change and provide insight as to aspects that foster the alignment process. The findings of this study are able to guide and direct decision making as to whether an (technology-dependent) organisation wants to go ahead with strategic alignment. By identifying agile methods as an effective mechanism for organisations to achieve strategic alignment, the perspective of management of an organisation implementing flexible software development processes such agile methods may be changed.

The findings of this study indicate of the ways in which the organisation understands the overall context of strategic alignment. The four perspectives of strategic alignment analysed in this study assist management and practitioners with decision-making roles in choosing the right perspective of strategic alignment that suits their organisational situation. Further, the comprehensive model would also help the organisation to clarify what they have already been doing and/or how ready they may be to develop strategic alignment processes.
What is clear from this study is that the implementation of agile methods does not only bring software project success, but it also responds to uncertainty in the business environment and deliver business value in terms of cost benefits and customer satisfaction. Hence, it is believed that business executives who are directly responsible for the management of the organisation might benefit from the insights this research provides into the extent to which agile methods can support future change in business strategy and enable organisations to remain competitive and at the forefront of their respective industries in the future.

Based on the findings of this study, it is possible to determine the most important areas which management and practitioners should be aware of and prioritise in order to achieve strategic alignment. Firstly, the business managers should understand the potential and value of agile methods provided to an organisation. Secondly, top management and IT/IS managers should be able to understand how their roles assist in achieving strategic alignment. Thirdly, top management and IT/IS managers should share the responsibility and work as a partnership to discuss and choose the most appropriate software development processes to support organisation functions. Finally, the business executive and IT/IS manager may have to understand that strategic alignment is a dynamic practice, which needs frequent adjustment when the business environment changes. This final point may be the most difficult to achieve, particularly where the organisational culture (on the business side, specifically) is a conservative one. Point one above (the potential and value of agile methods within the business) can act as motivation for this to occur.

In addition, the findings of this study provide a very useful means to encourage business management and scholars to promote the alignment of business strategy and IT/IS strategy, where agile software development is applied. Given the fact that an organisation is faced by changes and uncertainty in market conditions, what matters is the underlying capability of a software development process that enables quick adaptation to changing business environments and support business goals and objectives. From the findings, we see there is placed emphasis in the case organisations on using agile methods as an approach to building the flexibility of organisational functions in order to keep pace with changes in market conditions.
The key implication, based on the findings of this study, is that, since agile methods are considered human-centric, the implementation of agile methods not only delivers to an organisation efficiency and effectiveness of function, but also facilitates and eases the processes of strategic alignment. This is achieved through, among other characteristics, its focus on communications, which in turn helps organisations to achieve strategic alignment.

6.5 Limitations of the study

This section discusses the issues and limitations encountered during the research process. The following limitations were considered to have the most impact on this research, and were beyond the control of the researcher:

- **Limitations associated with the research methodology and design**

  Due to the busy schedules and limited access to the CEO and CIO roles, the researcher lacked the opportunity of gaining information from these perspectives. The researcher believes that the CEO and CIO of an organisation may hold different perspective and perceptions regarding business strategy and IT/IS alignment. The findings generated in this study were based on the views of a particular group of participants such as business manager, IT manager, business and product development manager, and consultant. The results of this study may be limited only to these specific groups. Therefore, the results of this study would need to be considered with this in mind. Future research, however, could contribute to the literature by investigating the perception of those in CEO and CIO roles toward the alignment of business strategy and IT/IS strategy, where agile software development is applied, in order to clarify and reinforce the results of this study.

  Since data collection also took place in Thailand, the interviews have been conducted in the Thai language. Due to language differences, it was difficult to translate the responses Thai to English, since specific words in Thai may be understood differently in English. Although the translation has been done carefully and the researcher has been aware in this matter, the language difference may affect this research in terms of understanding and interpretation of
meaning. It is acknowledged that interpretation remains an issue where a translation process is included in the data collection/analysis stages of the research.

- **Time constraints**

There was also limitation which arose from time constrains. This research was conducted to fulfil the requirements of the award of a Doctoral degree, with a need to complete the research in a specific time frame. As such, the data collection was done in short bursts of time, as well as in the available time of participants. In most cases, the researcher was unable to go back and undertake further investigations related to issues uncovered with respect to the research subject as needed, especially with the data collection conducted in Thailand. The researcher believes that extra time would have allowed more extensive investigation, improving the quality of data. If possible, future research should be undertaken over longer time periods for data collection, and/or with careful choice of research instruments that take into consideration time constraints.

- **Sensitive information and participants bias**

Since participants were very concerned in sharing confidential information with the researcher, there is no absolute guarantee that the participants provided true information of their organisations. This limitation may affect the research in a way that could be misleading of results and the given information may be minimal in detail. In addition, the information given by single participant in some of the participating organisations may present some bias and be inaccurate in terms of perception of situation. This could affect the validity of results of this study.

**6.6 Recommendations and directions for future research**

The research findings as well as the limitations of this study bring forth some fruitful and interesting points for future research:

- the findings of this research serve as an initial effort to explore the possibilities and opportunities of how organisations would better
achieve and sustain the alignment of business strategy and IT/IS strategy in an agile software development environment. Even though existing research on strategic alignment in the literature show theoretical frameworks in relation to strategic alignment, it appears to be lacking attention to the strategic alignment theory associated with flexibility of the software development process. Likewise, when it comes to achieving strategic alignment, the strategic alignment literature has been inconclusive regarding a holistic picture that accounts for the decision-making to develop strategic alignment. As such, the research in this area still needs to be understood in-depth and thus requires future research, to propose a new model and/or a theoretical framework, in order to provide a comprehensive understanding of how agile methods can be embedded in the concept of strategic alignment effectively, and how such alignment can be achieved in a practical manner.

- The findings of this research serves as an initial effort to explore how agile methods play an important role within organisations. However, this research has not inquired into the interaction of agile methods with each component of strategic alignment (i.e. business strategy, IT/IS strategy, organisational infrastructure and process, and IT/IS infrastructure and process). A fruitful area of future research, therefore, should involve an empirical investigation into the mutual interaction of each component of strategic alignment and how agile methods respond and/or change any process of strategic alignment.

- Another direction for future research to look into whether agile software development is necessary to ensure IT flexibility and how do agile methods compare to other human-centric approaches.

- Even though the findings in regards to the benefits of the alignment of business strategy and IT/IS strategy where agile software development is applied has been delivered in this study, there may be increasing questions such as in what ways this alignment enhances organisation
performance. Considerably, future research is required to clarify and validate whether the implementation of agile methods influences and/or sustains better performance of organisations.

- Since the strategic value of agile methods in relation to strategic alignment have been recognised in this study, it is important for future research to investigate further whether agile methods can be a primary driver for organisations to implement strategic alignment.

- The findings of this study are based on the country level. Within the Australian context, the findings of this study have shown only the perception from specific organisations in Perth, Western Australia. It is recommended for future research to be carried out in other states in order to see whether the results are similar or different across the nation. In Thailand, an alignment of business strategy and IT/IS strategy has become a more strategic option for organisations to maximise return on IT/IS investment. However, alignment where agile software development is implemented is not very well understood, and therefore there is a need for future research promoting strategic alignment throughout Thailand organisations.

- This research was conducted within high-technology industries, where there is a focus on implementing agile methods. Further studies should be considered to conduct research in alternative industries and/or different sectors since different industries or organisations may have different performance goals and the way they achieve strategic alignment may be different. For example, the future researcher may look at the government sector or non-profit organisation in order to see whether the results present in the same way.

- The findings of this study showed that Scrum and XP are the most popular methods being implemented by organisations at the time of the research. Future research is required to investigate whether any
particular agile methods will best facilitate the strategic alignment process and/or have impact on strategic alignment process

- An interesting extension for future research is due to a lack of awareness of the benefits of agile software development to the alignment of business strategy and IT/IS strategy. It is, therefore, recommended that future research take into account the CEO or CIO’s point of view, as they have a high level of authority and responsibility in their organisation. Future research may undertake in-depth interviews in order to yield insight of how the CEO or CIO roles perceive the benefits of the alignment of business strategy and IT/IS strategy, where agile software development is applied.

6.7 Chapter summary

This chapter started with the discussion of research findings. Then, the chapter discussed the contributions and implications of this researcher. Based on the research findings, it can be concluded that agile methods could change the role of ICT in strategic alignment. The findings of this research help identify the factors that provide management with a better understanding of the way in which agile methods can be offered in order to achieve business objectives. The results confirmed that small, medium and large size organisation can achieve strategic alignment where agile methods are applied.

- End of the Chapter-
### APPENDICES

**Appendix A: The characteristics of Defender**

<table>
<thead>
<tr>
<th>Entrepreneurial problem</th>
<th>Engineering problem</th>
<th>Administrative problem</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem:</strong> How to “seal off” a portion of the total market to create a stable set of products and customers</td>
<td><strong>Problem:</strong> How to produce and distribute goods or services as efficiently as possible</td>
<td><strong>Problem:</strong> How to maintain strict control of the organisation in order to ensure efficiency</td>
</tr>
<tr>
<td><strong>Solutions:</strong> 1. Narrow and stable domain</td>
<td><strong>Solutions:</strong> 1. Cost-efficient technology</td>
<td><strong>Solutions:</strong> 1. Financial and production experts most powerful members of the dominant coalition; limited environmental scanning</td>
</tr>
<tr>
<td>2. Aggressive maintenance of domain (e.g., competitive pricing and excellent customer service)</td>
<td>2. Single core technology</td>
<td>2. Tenure of dominant coalition is lengthy; promotions from within</td>
</tr>
<tr>
<td>3. Tendency to ignore developments outside of domain</td>
<td>3. Tendency toward vertical integration</td>
<td>3. Planning is intensive, cost oriented, and completed before action is taken</td>
</tr>
<tr>
<td>4. Cautious and incremental growth primarily through market penetration</td>
<td>4. Continuous improvements in technology to maintain efficiency</td>
<td>4. Tendency toward functional structure with extensive division of labour and high degree of formalisation</td>
</tr>
<tr>
<td>5. Some product development, but closely related to current goods services</td>
<td></td>
<td>5. Centralised control and long-looped vertical information system</td>
</tr>
</tbody>
</table>

**Costs and benefits:**
- It is difficult for competitors for to dislodge the organisation from its small niche in the industry, but a major shift in the market could threaten survival
- Technological efficiency is central to organisational performance, but heavy investment in this area requires technological problems to remain familiar and predictable for lengthy periods of time
- Administrative system is ideally suited to maintain stability and efficiency but is not well suited to locating and responding to new product or market opportunities

Source: (Miles and Snow 1978)
### Appendix B: The characteristics of Prospector

<table>
<thead>
<tr>
<th>Entrepreneurial problem</th>
<th>Engineering problem</th>
<th>Administrative problem</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem:</strong> How to locate and exploit new product and market opportunities</td>
<td><strong>Problem:</strong> How to avoid long-term commitments to a single technological process</td>
<td><strong>Problem:</strong> How to facilitate and coordinate numerous and diverse operations</td>
</tr>
<tr>
<td><strong>Solutions:</strong> 1. Broad and continuously developing domain</td>
<td><strong>Solutions:</strong> 1. Flexible, prototypical technologies</td>
<td><strong>Solutions:</strong> 1. Marketing and research and development experts most powerful members of the dominant coalition</td>
</tr>
<tr>
<td>2. Monitors wide range of environmental conditions and events</td>
<td>2. Multiple technologies</td>
<td>2. Dominant coalition is large, diverse, and transitory; many include an inner circle</td>
</tr>
<tr>
<td>3. Creates change in the industry</td>
<td>3. Low degree of routinisation and mechanisation; technology embedded in people</td>
<td>3. Tenure of dominant coalition not always lengthy; key managers may be hired from outside as well as promoted from within</td>
</tr>
<tr>
<td>4. Growth through product and market development</td>
<td></td>
<td>4. Planning is broad rather than intensive, problem oriented, and cannot be finalised before action is taken</td>
</tr>
<tr>
<td>5. Growth may occur in spurts</td>
<td></td>
<td>5. Tendency toward product structure with low division of labour and low degree of formalisation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Decentralised control and short-looped horizontal information systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Complex coordination mechanisms and conflict resolved through integrators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Organisational performance measured against important competitors; reward system favours marketing and research and development</td>
</tr>
</tbody>
</table>

**Costs and benefits:**
- **Entrepreneurial problem:** Product and market innovation protectors the organisation from a changing environment, but the organisation runs the risk of low profitability and overextension of its resources
- **Engineering problem:** Technological flexibility permits a rapid response to a changing domain, but the organisation cannot develop maximum efficiency in its production and distribution system because of multiple technologies
- **Administrative problem:** Administrative system is ideally suited to maintain flexibility and effectiveness but may underutilise and misutilise resources

Source: (Miles and Snow 1978)
## Appendix C: The characteristics of Analyser

<table>
<thead>
<tr>
<th>Entrepreneurial problem</th>
<th>Engineering problem</th>
<th>Administrative problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem:</td>
<td>Problem:</td>
<td>Problem:</td>
</tr>
<tr>
<td>How to locate and exploit new product and market opportunities while simultaneously maintaining a firm base of traditional products and customer</td>
<td>How to be efficient in stable portions of the domain and flexible in changing portions</td>
<td>How to differentiate the organisation’s structure and processes to accommodate both stable and dynamic areas of operation</td>
</tr>
<tr>
<td>Solutions:</td>
<td>Solutions:</td>
<td>Solutions:</td>
</tr>
<tr>
<td>1. Hybrid domain that is both stable and changing</td>
<td>1. Dual technological core (stable and flexible component)</td>
<td>1. Marketing and applied research most influential members of dominant coalition, followed closely by production</td>
</tr>
<tr>
<td>2. Surveillance mechanisms mostly limited to marketing; some research and development</td>
<td>2. Large and influential applied research group</td>
<td>2. Intensive planning between marketing and production concerning stable portion of domain; comprehensive planning among marketing, applied research, and product managers concerning new products and markets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Moderately centralised control system with vertical and horizontal feedback loops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Extremely complex and expensive coordination mechanisms; some conflict resolution through product managers, some through normal hierarchical channels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Performance appraisal based on both effectiveness and efficiency measure, most rewards to marketing and applied research</td>
</tr>
<tr>
<td>Costs and benefits:</td>
<td>Costs and benefits:</td>
<td>Costs and benefits:</td>
</tr>
<tr>
<td>Low investment in research and development, combined with limitation of demonstrably successful products, minimises risk, but domain must be optimally balanced at all times between stability and flexibility</td>
<td>Dual technological core is able to serve a hybrid stable-changing domain, but the technology can never be completely effective or efficient</td>
<td>Administrative system is ideally suited to balance stability and flexibility, but if this balance is lost, it may be difficult to restore equilibrium</td>
</tr>
<tr>
<td>Source: (Miles and Snow 1978)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Appendix D: Sampling strategies

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Extreme or deviant case sampling</td>
<td>Learning from highly unusual manifestations of the phenomenon of interest, such as outstanding successes/notable failures, top of the class/dropouts, exotic events, crises.</td>
</tr>
<tr>
<td>2. Intensity sampling</td>
<td>Information-rich cases that manifest the phenomenon intensely, but not extremely, such as good students/poor students, above average/below average.</td>
</tr>
<tr>
<td>3. Maximum variation sampling</td>
<td>Document unique or diverse variations that have emerged in adapting to different conditions. Identifies important common patterns that cut across variations.</td>
</tr>
<tr>
<td>4. Homogeneous sampling</td>
<td>Focuses, reduces variation, simplifies analysis, facilitate group interviewing.</td>
</tr>
<tr>
<td>5. Typical case sampling</td>
<td>Illustrates or highlights what is typical, normal, average.</td>
</tr>
<tr>
<td>6. Stratified purposeful sampling</td>
<td>Illustrates characteristics of particular subgroups of interest; facilitates comparisons.</td>
</tr>
<tr>
<td>7. Critical case sampling</td>
<td>Permits <em>logical</em> generalisation and maximum application or information to other cases because if it’s true of this one case it’s likely to be true of all other cases.</td>
</tr>
<tr>
<td>8. Snowball or chain sampling</td>
<td>Identifies cases of interest from people who know people who know people who know what case are information-rich, that is, good examples for study, good interview subjects.</td>
</tr>
<tr>
<td>9. Criterion sampling</td>
<td>Picking all cases that meet some criterion, such as all children abused in a treatment facility. Quality assurance.</td>
</tr>
<tr>
<td>10. Theory-based or operational construct sampling</td>
<td>Fining manifestations of a theoretical construct of interest so as to elaborate and examine the construct.</td>
</tr>
<tr>
<td>11. Confirming and disconfirming cases</td>
<td>Elaborating and deepening initial analysis, seeking exceptions, testing variation.</td>
</tr>
</tbody>
</table>
**Sampling strategy (continued):**

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. Opportunistic sampling</td>
<td>Following new leads during fieldwork, taking advantage of the unexpected, flexibility.</td>
</tr>
<tr>
<td>13. Random purposeful sampling</td>
<td>Adds credibility to sample when potential purposeful sample is larger than one can handle. Reduces judgment within a purposeful category. (Not for generalisations or representativeness.)</td>
</tr>
<tr>
<td>14. Sampling politically important cases</td>
<td>Attracts attention to the study (or avoids attracting undesired attention by purposefully eliminating from the sample politically sensitive cases)</td>
</tr>
<tr>
<td>15. Convenience sampling</td>
<td>Save time, money, and effort. Poorest rationale; lowest credibility. Yields information-poor cases.</td>
</tr>
</tbody>
</table>

Source: Patton (1990)
Appendix E: Letter of consent

Dear Sir/Madam,

My name is Pattama Kanavittaya, and I am a Doctor of Information Technology student in the School of Information Technology at the Murdoch University in Western Australia.

I am currently engaged in a research project entitled “The alignment between business strategy and agile software development”. The objective of this research is to explore how large software organisations align their business strategy with agile software development. Therefore, your organisation is invited to participate in this project. I believe that because you are actively involved in this area, you may be able to provide information that would be useful for my study.

Participation in this study is voluntary. It will entail an interview of approximately 45 minutes in length. In addition to this interview, the participant will be asked to complete a survey questionnaire that takes approximately 10 minutes. You may decline to answer any of the questions if you wish. Further, you may decide to withdraw from this study at any time without any negative consequences by advising the researcher. With your permission, the interview will be audio-taped for verification of findings and future analysis.

The direct benefit to you for participating in this study is that you will have the opportunity to verbalise your perception on the alignment between business strategy and agile software development. There are no potential risks associated with participation in this research.

Please note that all data collected in this research will be held in the strictest confidence through the assignment of a coded identification number. Any information obtained from the conversations between yourself and the researcher will be used exclusively for research purposes only. Your name or your organisation will not appear in any thesis or report resulting from this study.

If you are willing to participate in this study, could you please complete the details below. If you have any questions about this study, or about participating in this study, you may contact:

- Myself, as researcher on (08) 9360 7447 or by email at piiipat@hotmail.com.
- My supervisor, Dr Jocelyn Armarego on (08) 9360 7351 or by email at J.Armarego@murdoch.edu.au.
If you wish to talk to an independent person about your concerns you can contact Murdoch University’s Human Research Ethics Committee on (08) 9360 6677 or by email at ethics@murdoch.edu.au.

If you wish to receive a copy of the research results, please indicate your request at the end of a survey questionnaire, and the results will be sent to you via email in a written summary.

Your sincerely,
Pattama Kanavittaya.

--------------------------------------------------------------------------------

Participant’s copy

“The alignment between business strategy and agile software development”

Participation consent

I have read the information presented in the information letter about a study being conducted by Pattama Kanavittaya of the School of IT at Murdoch University.

I acknowledge that this interview session may be taped.

I understand that I am free to skip any question, or to withdraw this consent and discontinue participation in this interview at any time.

I understand that my individual responses are confidential, and will not be released by the investigator.

Participant’s Name: Investigator’s Name:
Signature: Signature:
Date: Date:
"The alignment between business strategy and agile software development"

Participation consent

I have read the information presented in the information letter about a study being conducted by Pattama Kanavittaya of the School of IT at Murdoch University.

I acknowledge that this interview session may be taped.

I understand that I am free to skip any question, or to withdraw this consent and discontinue participation in this interview at any time.

I understand that my individual responses are confidential, and will not be released by the investigator.

Participant’s Name: Investigator’s Name:
Signature: Signature:
Date: Date:
Appendix F: Interview questions

THE ALIGNMENT BETWEEN BUSINESS STRATEGY AND AGILE SOFTWARE DEVELOPMENT

RESEARCH INSTRUMENT

Introduction

In order to respond to new dynamic market and new customer requirements on software development products, contemporary software organisations are now focusing on agile software development methodologies. This is because agile software development offer betters outcomes for software development projects when compared to traditional development approaches (Vinekar, Slinkman et al. 2006). At the same time, the notion of business strategy and IT/IS alignment was introduced, as it provides benefits to organisations such as helping organisations to obtain the highest value from IT/IS investment and helps organisations to gain competitive advantage through IT/IS (Avison, Jones et al. 2004). Therefore, by taking this concept into account, it will be beneficial for software organisations to become leaders in successful agile software development by aligning business strategy with agile software development.

Purpose and Approach

The purpose of this study is to explore how large software organisations align business strategy with agile software development, and to determine the benefits and issues in aligning business strategy with agile software development.

Definitions of terms used in this research

The following definitions of terms used in this research are provided to aid in the understanding of business strategy and agile software development alignment.

- **Business strategy**
  The road-map for the organisation to perceive its processes, structure, and position in the market, and it guides the organisation to take action to change its environment in order to achieve its business’s goals.
• **Alignment**
  The process of employing IT/IS strategy, and is supported by the business strategy.

• **Agile software development**
  Methodologies for designing software to be more effective in dealing with changing requirements during development.

• **Business strategy and Agile software development alignment**
  The process of producing agile software development methods, and is in harmony or supported by the business strategy.

---

**Interview structure**

This interview is divided into four parts:

- **Part One:** Business strategy
- **Part Two:** Agile software development methods
- **Part Three:** Strategic alignment
- **Part Four:** Survey.

---

**Participation**

- This interview will take approximately 45 minutes to complete.
- All responses will be treated in strict confidence and will not be able to be individually identified in the report.
PART 1: BUSINESS STRATEGY

Questions:

1. What do you understand by the term business strategy in general?
2. Can you describe the business strategy of your organisation?
3. What are your business unit’s priorities?
4. Can you briefly outline your organisation structure?

PART 2: AGILE SOFTWARE DEVELOPMENT

Questions:

1. Can you briefly describe your project?
2. What is your understanding of the term agile software development in general?
3. Has there been any previous project use of agile software development methods?
   a) If yes, which method was used?
   b) If no, what software development process has been used on previous projects?
4. Can you describe agile method(s) that is/are used in your organisation?
5. Can you explain the driving force behind your choice of selected agile methods?
6. Does your organisation use other methods for software development other than agile methods?
   a) If yes, what methods are being used? Can you explain what problems you have encountered with selected methods?
7. Can you explain how the agile process improves software development projects? Do you have any examples that you might like to share?

PART 3: STRATEGIC ALIGNMENT EXPERIENCE

Questions:

1. What do you understand by the term business strategy and agile software development alignment?
2. Can you explain the alignment process in your organisation? How is your organisation managing this process?
3. Can you explain what roles you take in the alignment process?
4. Can you explain the main objectives in aligning business strategy and agile software development in your organisation? Why you think it is important?
5. What does your organisation do to assist in aligning business strategy and agile software development?
6. Can you describe the main benefits from the alignment of business strategy and agile software development, or the main benefits of the alignment in general?
7. Can you describe the major problems you have encountered in the alignment of business strategy and agile software development in your organisation?
8. Is there any evaluation of the success or failure of the business strategy and agile software development alignment practice in your organisation?
   a) If *yes*, could you please explain the evaluation process?
   b) If *no*, how would you judge the success or failure of the alignment process in your organisation?

9. Can you give an example of how the alignment has helped your organisation improve its performance?

************************************************************************ END************************************************************************
PART 4: SURVEY QUESTIONNAIRE

THE ALIGNMENT BETWEEN BUSINESS STRATEGY AND AGILE SOFTWARE DEVELOPMENT

RESEARCH INSTRUMENT

Introduction

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• **Alignment**  
*The process of employing IT/IS strategy, and is supported by the business strategy*

• **Agile software development**  
*Methodologies for designing software to be more effective in dealing with changing requirements during development*

• **Business strategy and Agile software development alignment**  
*The process of producing agile software development methods, and is in harmony or supported by the business strategy.*

---

**Survey structure**

This interview is divided into four parts:

- **Part One: Demographic Information**
- **Part Two: Business strategy**
- **Part Three: Agile software development**
- **Part Four: Strategic alignment**

---

**Participation**

- Please answer all the questions
- Respondents should be able to complete the survey within 10 minutes
- All responses will be treated in strict confidence and will not be able to be individually identified in the report.
- Please add any comments about the questionnaire at the end.
PART 1: DEMOGRAPHIC DATA

1. Age: ………………
2. Gender: [ ] Male [ ] Female
3. What is the title of your current position?
   ……………………………………
4. How long have you been working in your current position?
   ……………………………………

ORGANISATIONAL DATA

1. What is the ownership structure of your organisation?
   [ ] Australian-owned [ ] Thai-owned
   [ ] Foreign Subsidiary [ ] Other (Please specify)………
2. How many years has your business been operating in Thailand/Australia?
   ………………………………………
3. What is the approximate number of employees in your organisation?
   ………………………………………
4. How many years has your organisation been involved in alignment?
   ………………………………………
5. How many years has your organisation been using agile software development?
   ………………………………………
6. Which of the following would best describe your organisation structure? (Choose one only)
   [ ] Functional structure or [ ] Project structure
   [ ] Hierarchical or [ ] Flat
   [ ] Matrix structure or [ ] De-centralised
   [ ] Centralised or [ ] Other (Please specify)………
PART 2: BUSINESS STRATEGY

This part of the questionnaire contains three main questions. Please indicate your answer with a tick in the box /indicate the number beside your chosen answer.

1. Which of the following best describes your organisation? (choose one only)

☐ This organisation does not attempt to maintain a specific service niche or be a leader in service innovation. When other organisations provide similar services in the same area, we prefer to conserve resources and eliminate offerings rather than attempt to defend our service area. Although the organisation tries to avoid the risks associated with new programs or services, it occasionally develops new offerings to keep up with other providers. Generally, the organisation responds to environmental pressures rather than elaborating and implementing a single strategic thrust

OR

☐ This organisation attempts to locate and maintain a secure niche in a relatively stable service area. The organisation tends to offer a more limited range of products or services, but those it does offer are unique in quality and type. The organisation is not at the forefront in service innovations; it tends to ignore change that have no direct influence on current operations but concentrates instead on doing the best job possible in its service area

OR

☐ This organisation usually operates within a broad service area to meet the needs of a variety of customers. In addition, our service areas undertake periodic redefinition. The organisation values innovation and regularly experiments with new service strategies. The organisation responds rapidly to early signs concerning new opportunities for funding and program development. Given its innovative orientation, this organisation does not try to maintain superiority in all the areas it services.

OR

☐ This organisation attempts to maintain a stable, limited set of services while at the same time moving quickly to follow a carefully selected set of promising developments in our service area. The organisation is seldom an innovator of services or strategies but regularly adopts new services or strategies from others and modifies those strategies to meet customer needs
2. To what extent are you involved in business strategy formation within your organisation?

No extent  Little extent  Some extent  Large extent  Great extent

1  2  3  4  5

3. To what extent do you agree that your organisation has a well formulated business strategy?

Strongly Disagree  Neutral  Agree  Strongly Agree

1  2  3  4  5

PART 2: AGILE SOFTWARE DEVELOPMENT

This part of the questionnaire contains five main questions. Please indicate your answer with a tick in the box / indicate the number beside your chosen answer.

1. How would you rate your knowledge of agile methodologies?

Very Limited  Limited  Average  Extensive  Very Extensive

1  2  3  4  5

2. What kind of agile method(s) do you practice? (choose one or more)

☐ Extreme Programming  ☐ Crystal
☐ Scrum  ☐ FDD
☐ DSDM  ☐ Adaptive Software Development
☐ Other (Please specify) ………

3. How would you rate your satisfaction with your current agile software development methods?

Not at all Satisfied  Not Satisfied  Somewhat Satisfied  Satisfied  Strongly Satisfied

1  2  3  4  5

4. How would you rate your success of current agile software development methods?

Very Unsuccessful  Unsuccessful  Neutral  Successful  Very Successful

1  2  3  4  5

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5. To what extent do you agree with each of the following statements? (1 = Strongly Disagree, 5 = Strongly Agree)

a) Agile software development enhances the ability of my software teams to manage change priorities
b) Agile software development helps my software teams meet customer requirements
c) Agile software development helps my software teams increase productivity of software development
d) Agile software development enhances the quality of software products
e) Agile software development reduces project risk
f) Agile software development reduces software development process complexity

PART 3: STRATEGIC ALIGNMENT

This part of the questionnaire contains nine main questions. Please indicate the number beside your chosen answer or write in the spaces provided.

1. How well do you consider your understanding in the concept of alignment?

   Not at all Understanding Not well Understanding Somewhat Understanding Well Understanding Very well Understanding
   *------------------------*------------------------*------------------------*------------------------*------------------------*------------------------*------------------------*
   1 2 3 4 5

2. To what extent are you involved in business strategy and agile software development alignment within your organisation?

   No extent Little extent Some extent Large extent Great extent
   *------------------------*------------------------*------------------------*------------------------*------------------------*------------------------*------------------------*
   1 2 3 4 5

3. How would you rate the importance of alignment between business strategy and agile software development alignment?

   Not at all Important Not important Somewhat Important Important Very important Important
   *------------------------*------------------------*------------------------*------------------------*------------------------*------------------------*------------------------*------------------------*
   1 2 3 4 5

4. To what extent do you agree that your organisation has managed alignment process?
5. To what extent do you agree that the alignment of business strategy and agile software development have improved your organisation performance?

Strongly Disagree Disagree Neutral Agree Strongly Agree
*----------------------------------*-----------------*-----------------*-----------------*-----------------*
1 2 3 4 5

6. How would you rate the success in business strategy and agile software development alignment in your organisation?

Very Unsuccessful Unsuccessful Neutral Successful Very Successful
*----------------------------------*-----------------*-----------------*-----------------*-----------------*
1 2 3 4 5

7. Please provide your perspective on the alignment of business strategy and agile software development.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

8. If you have any further suggestions or recommendations that could be useful for this study, please note them below.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

9. If you wish you receive a copy of the results of this study, please provide your email address below.

_________________________________________________________________

Thank you for your cooperation!
REFERENCES


Papadopoulos, G. (2014). Moving from traditional to agile software development methodologies also on large, distributed projects. Social and Behavioral Sciences, 175: 455-463.


