Global Perspectives on Small and Medium Enterprises and Strategic Information Systems: International Approaches

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Chapter 11
The Alignment of Business Strategy with Agile Software Development within SMEs

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ABSTRACT

The alignment of business strategy and IT strategy has been recognised as a strategic weapon within organisations. Small and medium sized enterprises (SMEs) also recognise a need for new Information Technology and Information Systems (IT/IS) functions to support business strategies, and provide new services to the market. Agile methodologies support the timely and economical development of Web and Internet-based software, the technologies being exploited by organisations seeking to enhance their business performance. Based on multiple-case research, this paper explores the impact of agile software development on the alignment of business strategy with IT strategy in SMEs. Several models of strategic alignment developed for large enterprises were used to examine the SME environment. The findings suggest that agile methods are applied to provide added flexibility for organisations to create or react to new opportunities, to increase responsiveness to customer requirements not possible with traditional software development, and to gain competitive advantage. Personal interest was found to be a factor in adopting agile methodologies, in addition to IT maturity and technical IT sophistication. However, the use of agile methods in response to internal and external uncertainty may change the role of ICT in the firms, and hence impact on the alignment of business and IT/IS strategy.

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INTRODUCTION

In today’s dynamic market environment, many organisations have been driven by rapid change in both 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 technology to suit the new environment is also becoming more and more critical (Nerur & Mahapatra, 2005).

In particular, SMEs recognise a need for new Information Technology and Information Systems (IT/IS) functions to support business strategies, and provide new services to the market (Papp, 1999). In this study the term SMEs is defined as business establishments having less than 250 employees (European Commission, 2005). Since the late 1980s, IT/IS has played an increasingly strategic role in changing marketing characteristics (Johnston & Carrico, 1988). ICT (Information and Communications Technologies) has also been highlighted as a strategic weapon in gaining a competitive position in the marketplace for SMEs (Hussin, King, & Cragg, 2002; Ismail & King, 2007). Throp (1998) suggests successful utilisation of ICT (and the implied close alignment of business and IT/IT strategy) can provide sustainable competitive advantage for the organisation, regardless of size. However, Levy, Powell, & Yetton (2003) suggest that the alignment process in SMEs varies from larger organisations. In addition, ICT adoption decisions in SMEs are most frequently made by the owner, who often shows little concern for IT strategic planning.

The objective of the study that underpins this chapter is to explore how agile software development impacts on the alignment of business strategy with IT strategy in both large organisations and SMEs. The aims of this chapter are to focus on the roles that can/should be played by IT/IS in supporting business strategy formulation, particularly for SMEs, and to provide some insight into the role of agile software development in the small business environment.

This chapter is outlined into five sections as follow:

- The first section provides the introduction and background of the research
- The second section presents the existing literature
- The third section presents the cases and describes the research methodology used in this study
- The fourth section reviews the case study analysis and findings
- The last section provides cross-case findings and a conclusion.

BACKGROUND

During the last ten years, the attention on alignment of IT/IS to business strategies has increased, and research in the areas of strategic management and IT/IS management has focused on and contributed to this subject. It has consistently been one of the top concerns in the business strategy and IT literature (Rathnam, Johnsen, & Wen, 2004/2005; Reich & Benbasat, 2000). Strategic alignment in this context refers to the matching of process and outcomes of IT/IS strategy with business strategy (Reich & Benbasat, 2000).

The concept of strategic alignment is widely believed to improve organisational performance. The literature in the area of business and IT/IS alignment abounds with documents and frameworks that examine the need to align IT/IS strategy to business strategy (Chan, Huff, Barclay, & Copeland, 1997; Das, Zahra, & Warkentin, 1991). The benefits of alignment between business strategy and IT strategy have also been recognised, with alignment described as having significant positive impact on business and organisational performance (Bleistein, Cox, Verner, & Phalp, 2006; Chan & Huff, 1993; Henderson & Venkatraman, 1993; Kearns & Lederer, 2000). Avison, Jones et al. (2004) identify additional benefits, including
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. However, much of these discussions tend to focus on larger organisations, with less work undertaken in SMEs.

This is an important concern, as the literature suggests findings for large organisations cannot generally be extrapolated to SMEs – they are not smaller versions of large firms (Welsh & White, 1981), and hence exhibit a different set of organisational characteristics. A review of the current published literature found few articles on strategic alignment in SMEs (these are discussed in the next section). This is supported by Bharati & Chaudhury (2009), who indicate that the space provided for research on the ICT aspects of SMEs in most standard journals has been limited. This is despite the innovative potential of SMEs as an industry growth driver (Morgan, 1997). Where research has been conducted, mostly during the 1990s, the focus has been on aspects other than alignment (eg, implementation, maturity, motivators/inhibitors, adoption or success, etc. (Cragg & King, 1993; Prananto, McKay, & Marshall, 2003)). More recently, however, the importance of business strategy (new products or markets) in driving technology adoption in SMEs has been confirmed (Levy, Powell, & Worrall, 2005), albeit tailored to the resources available to them (Edelman, Brush, & Manolova, 2005). Enhanced relationships with customers and trading partners, and improved market understanding have also been reported for more recent investment in Internet and Web-based technology (Merhrtans, Cragg, & Mills, 2001; Quale & Christiansen, 2004) within the sector.

At the same time, agile software development has emerged as a new paradigm for dealing with software development projects (Pedrycz, 2006). At a fundamental level, agile methodologies, which have evolved primarily to support the timely (Mekelburg, 2003) and economical development of high quality software that meets customer needs, are becoming an integral and strategic part of all modern software industry and commerce. Agile methodologies have been used primarily in Internet and Web software development contexts (Meso & Jain, 2006). These are technologies being exploited by organisations seeking to enhance their business performance. As discussed in Truex, Baskerville et al. (1999) this chapter considers agile software development methods as part of the IT/IS function. The interaction between strategy development and adoption of agile methodologies within the IT infrastructure of SMEs is explored in this chapter.

Business Strategy and IT/IS Alignment in SMEs

Prior research on business strategy has been discussed from various perspectives. Through such lenses, it is possible to identify critical issues, including the scope or boundaries of each business that satisfies customer requirements and which business units are necessary in order to achieve and maintain a competitive advantage in the market (Hofer & Schendel, 1978; Kotha, 1989; Wheelwright, 1984). Based on Chan & Huff (1992), business strategy can be described as a process of planning how a company will compete in the market in a given environment.

In order to provide a framework to underpin the discussions, this study utilises Miles and Snow’s (1978) typology to examine case organisations. They propose a useful model to identify strategic choice based on the following characteristics:

**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.
**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.

**Analysers.** 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.

**Reactor.** This type of organisation does not have 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.

Since the 2000s, business strategy and IT/IS alignment in SMEs has become an area of increased study, with different aspects of the alignment investigated. For example, Hussin, King et al. (2002) found that SMEs were influenced to develop alignment by three major factors: IT maturity, technical IT sophistication, and the CEO’s software knowledge. The study by Kyobe (2008) examines three different modes of strategy-making that influence aspects of alignment and performance: planned mode, adaptive mode, and entrepreneurial mode. That study found that each mode of strategy-making gives different results on certain aspects of alignment.

Levy, Powell et al. (2001) state that the key inhibitor and enabler of IT/IS investment in SMEs are market position and competitiveness. Hussin, King et al. (2002) also agreed that IT/IS investment serves SMEs as a strategic weapon to maintain their competitive advantage, and that therefore SMEs should look to developing an IT/IS strategy. However, it has been argued that some SMEs face difficulty due to limited resources to invest in IT/IS (Edelman et al., 2005; Fink, 1998). Boohalis (1996) and Chell, Hawarth, and Brearly (1991) indicate that informal management practices are a characteristic of SMEs, with decisions tending to be made only by the owners and top managers of small firms. Hussin, King et al. (2002)’s focus on development of IT/IS strategy suggests a continuing limitation in formal planning in this area within SMEs. In this study IT/IS strategy is defined as an outlining of the vision of how the organisation’s demand for Information Systems will be supported by technology (Ward & Peggard, 2002).

In order to understand the alignment process, this study applies the strategic alignment model (SAM) developed by Henderson and Venkatraman (1993). This model, depicted in Figure 1, describes the integration of business strategy with IT strategy. One important aspect of this model is to measure the contribution of IT/IS to the business requirements. Although the body of literature on strategic alignment that applies the Henderson and Venkatraman (1993) model is extensive, little has been reported on its use in small firms.

**Agile Software Development Methods**

The concept of agility is outlined by the Agile Manifesto (Beck & Andres, 2005), and combines methods and techniques that share 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**.
Given the concept of agile methods described above, Melnik and Maurere (2005) define agile software development methods as “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” (p.197). There are a number of major types of agile methodologies currently available in the market (eg Extreme Programming (XP), Scrum, Adaptive Software Development (ASD), Crystal family, Dynamic Systems Development Method (DSDM), Feature Driven Development (FDD)) (Bauer, 2004; Highsmith, 2002), with choice of methodology generally based on the requirements of the project undertaken.

The literature on software development methods uses two terms to distinguish software development processes: lightweight, now called agile processes, and heavyweight, which refers to traditional methodologies. There is a strong emphasis on planning and processes in traditional methodologies, with numerous rules involved, whereas agile methods focus on short iteration cycles. In order to achieve a better understanding of how agile processes and traditional software processes differ, Tsui & Karam (2006) identified six different characteristics and compared these:

- **requirements** in agile processes are uncertain and will change all the time, while in traditional processes the requirements are perceived as consistent and will not change
- **design** in agile processes is informal and follows an iterative model, but in traditional software processes is formal and uses upfront design
- agile processes have **user involvement** throughout the project, whilst with traditional software processes the user is in-
involved only at the beginning and at the end of the project

- in terms of documentation, agile processes have minimal documentation while traditional software processes tend to be document-driven
- processes complexity and overhead are low in agile processes, while very high in traditional software processes.

Due to the management characteristics noted above, great benefits can be derived by SMEs from the adoption of agile methods in developing software products. However, a review of literature (e.g. Aydin, Harmsen et al. (2005); Turk, France et al. (2005); Pikkarainen and Passoja (2005)) indicates that current research focuses on the agile methods being used in larger organisation, rather than in SMEs, and on adaptability and practice, rather than on agile management in organisations.

THE CASE STUDIES

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”. In the field of IS, case study has been used extensively among researchers (Shanks & Parr, 2003). This study is concerned with an investigation of cases to explore the level of alignment between business strategy and IT-IS strategy where agile software development is a component of the IT infrastructure. In order to investigate any cross-cultural aspects of the findings, both organisations based in Thailand and Australia were included. Case study research typically combined 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 artefacts. The interview was considered as the primary data source for this study, supported by other sources including documentation, field notes, and internet sources such as the company website.

This chapter reports on those cases where the organisation was identified as an SME. Organisations that practice agile software development were approached to participate in the study through in-depth interviews using both structured and semi-structured questions for triangulation of data. The semi-structure interview instrument consisted of eight open-ended questions addressing participants’ understanding of business strategy and agile development and their perception of the level of alignment within their firm. The questionnaire consisted of fifteen standardised, closed questions addressing the same topics. Response to these structured questions was based on a 5-point Likert scale. Both the interview guide and survey questionnaire are written in English, and translated into Thai as required. Subsequently, the responses have been translated back into English. Interviews with participants were taped and later translated (where required) and transcribed. In each case, the Business Manager and IT Manager were identified as the most likely to be able to discuss and describe the organisation’s stance on business/IT alignment. Where possible (but not in all cases), interviews were conducted with the persons who fulfilled these roles.

Case organisations were defined in terms of the work of Miles and Snow (1978). They proposed a framework for characterising business strategy traits, and describe four types of business strategy: Defender, Prospector, Analyst, and Reactor. The important elements of this typology are that it includes dimensions such as product/market attitude, technology, organisational structure and management characteristics, and reflects on a complex set of environment and organisation processes (Croteau & Bergeron, 2001; Smith, Guthrie, & Chen, 1989). The typology assumes that organisations act to create their own environ-
ments through a series of choices regarding market, product and technologies (Parnell, 2002). An additional value of this model is that it has been tested extensively in SMEs (Aragon-Sanchez & Sanchez-Marín, 2005; O’Regan & Ghobadian, 2006), and has been cited as the most appropriate in the case of SMEs (O’Regan, Ghobadian, & Gallear, 2006).

The model for analysing strategic alignment applied in this study is Henderson and Venkatraman (1993) strategic alignment model (SAM). As indicated in Figure 1, 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 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 ICT 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 ICT to support business strategy, and migrating the IT/IS infrastructure in support. This perspective therefore has strong implications for the ICT domains – impacting on IT/IS strategy with subsequent changes in IT/IS infrastructure. The third and fourth perspectives view ICT as the enabler or enhancer of business strategies, with corresponding organisational implications. The Competitive Potential perspective involves taking advantage of emerging ICT 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 model is valuable in this study in that it shows, through identified relationship between the domains, how alignment can be accomplished.

IT/IS strategy is a multidimensional construct and can be defined in different ways (Hirschheim & Sabherwal, 2001). Therefore, in order to interpret the IT/IS strategy of case organisations, this study applies the 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 IS strategies are considered harmonious.

As indicated in Figure 2, 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 ICT products and services are provided, and Structure – which reflects the configuration of the ICT 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 ICT facility as well as outsourcing a component.
- Structure – centralised indicates IT/IS decision-making is concentrated within the corporate structure; decentralised has responsibility within 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 has 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 have 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 has a shared IT/IS structure.
Company X: Defender

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 to the value of alignment. Company X has, as one of its goals, to create 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 places emphasis on cost effectiveness rather than high margins. At the same time, it maintains and improves the standard of quality of its products and services. The emphasis on quality is high as a mechanism to prevent new entrants from entering the market. In company X, agile methods were implemented to develop and customise software products, with the types of agile methods selected dependent on the characteristics of the project. Being as a small software house, the company has a flat hierarchy, with employees organised into functional groups and the managing director overseeing these. It adopts small working teams, and all employees have the flexibility to adapt to change when the circumstance or working environment has changed.

Based on the comments made during the interview, together with secondary data such as the company’s information given on the Website, it can be noted that company X has the features of Defender with respect to Miles and Snow (1978)’s strategic model:

*We focus on a strategy where we pick a niche market, our business strategy is to work closely with business partners for long term relationship, 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.*

*We do lots of small projects. In our case, we position ourselves 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.*

However, it should be noted that while the managing director indicated that he has a role to a great extent in terms of business strategy formation of company X, he was neutral in agreeing that company X has a well-formulated business strategy. This may, perhaps, be based on his perception of how the firm is placed, compared to other companies in the same industry. In relation to IT/IS strategic alignment profiles, the IT/IS strategy of company X would be expected to display Utility characteristics. Company X sought improvement in their software development processes in order to strengthen their ability to deliver quality software products and be able to compete in the market. The major focus of company X is to maintain a stable market and growth area. The IT/IS of this company seemed to play an Efficiency role: agile methods were selected as a major technology to improve the operation processes and were recognised as a mechanism to gain efficiency.

The interviews highlighted issues with significant implications in developing software for company X in terms of the capability to deliver quality software products based on customer need. Short software development cycles were the main driver for the implementation of agile methods. The strategic value of agile methods is identified:

*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. 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.*
Moreover, the benefit of the alignment of business strategy and IT strategy was perceived as helping the company increase their bottom line. The managing director of company X agreed there is a need to have agile methods addressed as part of IT/IS strategy, and aligned with business strategy.

With reference to the SAM model (Henderson & Venkatraman, 1993), company X fits into the Competitive Potential perspective. In this case, IT/IS strategy is the driver for choosing 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. According to the managing director of company X:

*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.*

**Company A: Analyser**

Company A is a mining consultancy service that operates in Perth, Western Australia. The vision of the organisation is to improve ICT in the mining and exploration industry. Company A has a significant market share in the Australian market. Further, in order to keep its profitability up, company A has decided to branch out and innovate in a new market off-shore. Company A sees both local and international competitors as the major threat. The organisational structure of this company is functional based. A CEO and a board of directors govern each division.

To achieve improvements in ICT within their industry, company A has invested in technologies which allow the firm not only to save on time but most importantly to better understand the needs and expectations of its customers. In company A, agile methods were adopted for building both commercial products and custom software solutions. The organisation had moved to agile to defuse issues with traditional software development. Agile methods are considered to be dynamically evolving within each software development project: in building software products, company A refuses to use one particular agile method - rather the organisation takes some aspects of agile methods such as Crystal, FDD, DSDM, and Scrum, customises them and adopts this selection as their own method.

Based on the comments made during the interview, combined with secondary data such as the company’s information given on the Website, it can be noted that company A has the characteristics of Analyser with respect to Miles and Snow (1978)’s strategic model. The IT vision of company A is to be the world’s best IS services provider to the mining sector. By mapping company A’s IT vision with IT/IS strategic alignment profile, the results show that IT/IS strategy of this company should be identified as having Alliance characteristics.

Agile methods were adopted as a core technology with a comprehensive role within the IT/IS strategy of the organisation.

The interview with participants revealed that traditional software development was regarded as an operational problem contributing to the failure of software development projects. It became apparent to the firm that the traditional way of software development was not flexible enough to handle the issues surrounding company A’s projects. Poor estimation in terms of costs and schedule, and low quality software products were provided as examples of issues. Traditional
software development also did not meet the future demands of business:

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.

Despite recognition of the importance of agile software development within the business-IT/IS strategy alignment, there was not a clearly presented alignment process in company A. However, both participants felt that business strategy and IT/IS strategy should be aligned and agreed that agile methods has improved organisational performance.

Company A followed the Technology Transformation perspective of the Henderson and Venkatraman (1993) alignment model. Based on the findings of the interviews, it was recognised that, in company A, business strategy was a principal driver for the choice of agile methods for building their software products, and creating new business opportunities for the firm. As mentioned by a participant:

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.

With the maturity of IT in company A in line with strategy making, agile methods appeared to fulfil and correspond to the business need, with the IT infrastructure changing in terms of the roles of employees and their skills. The IT strategy within company A was shaped around organisational objectives and goals, in order to meet the demand of the chosen business strategy.

**Company B: Prospector**

Company B is a food industry organisation that operates in Bangkok, Thailand. Company B has a vision of developing new products and services with high quality standards through the use of advanced technology. Company B considers itself as a strongly innovative firm where innovation is central to business success. As such, company B is driven to give greater emphasis to the development of new knowledge and expertise through IT/IS applications to enable the firm to find new opportunities for innovation in products and services. The products under development within the software house within company B included web-based knowledge, web-data and information, and web-technology. Company B has been using agile methods for two years, using Scrum exclusively. Company B is divided along functional lines. Each division is led by managing director who reports directly to the CEO.

The data gathered from the interviews and secondary sources show that company B has the features of Prospector with respect to Miles and Snow (1978)’s strategic model. According to participant:

*Business strategy here, we focused on providing the development of new products with high quality standard through the use of advanced technology.*

Company B’s ICT vision is aimed at using information to enable the IT domain to be more effective and efficient. The IS strategic alignment profiles show that IT/IS strategy of this company would be expected to present Infusion characteristics. The adoption of agile methods focuses on flexibility and quick response to market uncertainty, to allow the firm to gain advantage
over its competitors. Overall, by embedding agile methods as part of the IT strategy, it appears the IT/IS strategy of Company B plays an opportunistic role, due to the fact that agile methods support innovative IT products and services and create new opportunities for the firm.

In the interview, participants identified the issues that led to the use of agile methods: the existing software development process failed to support the management structure in terms of planning and resources. According to one participant:

*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 the project. Then we found that agile process can solve the problems that we have. So, that is the main driving force for us.*

The IT manager and project manager acknowledged a responsibility to keep up to date with the latest technologies and any methods that provide greater versatility in developing software projects effectively. The interviews indicated that company B has not clear focus on the importance of the alignment between business strategy and IT infrastructure. One participant indicated that in many organisations, although use of agile methods can be aligned with business strategy, top management may not attempt to do this. His concern was that, as agile methods are only one component of ICT, in order to undertake alignment, management must consider the IT domain as a whole. This perspective suggests alignment across the external/internal domains is not well developed in Company B.

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 a plan for it.

Due to the technical maturity of company B, agile methods were implemented to support the internal operation of the IT/IS function in order for the firm to be able to adjust to changing business requirements. Looking at the use of agile methods in Company B, it was claimed that the capabilities of agile methods were the driver of change in IT infrastructure in order to meet the demand of business strategy.

**CROSS-CASE FINDINGS**

The findings of each case were compared in order to search for similarities and differences between them. Obvious differences (as far as their industries and location of operation are concerned) did not appear to have major impact on the perception provided by interview participants in relation to business and IT/IS strategy within their organisations.

Utilising Miles and Snow (1978)’s typology to underpin the comparison of cases, the firms described in this chapter exhibited features of each of three typology profiles. Company X aligned with a Defender profile, while Company A exhibited strong Analyser characteristics and Company B, followed a Prospector strategic type. In terms of the characteristics of IT/IS strategy profiles of Hirschheim & Sabherwal (2001), as a Defender, the IT/IS strategy of company X is characterised as Utility. In contrast, company A’s IT/IS strategy can be classified as Alliance, and Company B’s IT/IS strategy would be classified as Infusion. However, although the Role played
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Figure 3. Result of strategic alignment perspectives (Adapted from Luftman (1996))

by the IT/IS function appears to align with the appropriate profile, neither the Sourcing nor the Structure of the case organisations would seem to do so. Companies X, A and B maintain strong internal ICT functions, with very little, if any, outsourcing undertaken. In addition, company X’s decision-making is highly centralised, while company A appears to have shared decision-making. Decision-making in Company D, on the other hand, appears to be undertaken in a decentralised manner. This indicates the model may not apply to SMEs adopting agile methods. Further study is required to confirm this suggestion. Nevertheless, based on responses from participants, each firm appears to have a good understanding of the business environment in which they operate. The IT/IS strategy of each company was seen to be in some harmony with the chosen business strategy.

With respect to the SAM model proposed by Henderson and Venkatraman (1993), the findings indicated that two types of strategic alignment perspectives were shown by the firms (see Figure 3): company A and company B demonstrate the Technology Transformation perspective and company X the Competitive Potential profile. These results indicate that the level of alignment in company X is operations driven, while companies A and B are strategy driven. It is perhaps not surprising that a Strategic Execution perspective was not evident in these cases – representing a classic, hierarchical view of strategic management, this perspective may be exhibited more frequently in large firms.

Although companies A and B were different in terms of the choice of business strategy (Analysers and Prospectors, respectively), the need for flexibility and innovation required both firms to exploit new techniques and methods that could meet their business and market need in order to achieve their goals. Agile methods served as a flexible technology that each applied to their products and services in order to improve their competitive position in the market. In addition, each case exhibited the characteristics of the appropriate IS
alignment profiles as described by Hirschheim & Sabherwal (2001). Therefore companies A, B and X have the possibility of achieving a high level of alignment. Both models appear to be relevant in the SME environment.

The three organisations utilised agile methods to support or enable business strategy. However, the motivation behind the adoption of agility differed markedly. Company A suffered from such issues as failure and the limitation of traditional software development processes. Agile methods, therefore were considered a means of maximising growth opportunity while minimising risk. Company B actively searched for improved processes – agility was deemed a core mechanism for competitive advantage. Company X was concerned with the rapid pace of change in IT and the impact on the software life cycle. Agile methods were considered as methods that embraced change in order to build competitive advantage. Based on the results of the interviews, it therefore appeared that traditional software development was not the only issue that some participants encountered. Speed to market was also a factor in the choice of agile methods.

As indicated by the findings, the issues that led to the decision to apply agile methods in software development derived from two major factors: the failure in traditional software methods and search for improvement in the software development process, and speed to market. In addition, some participants agreed that they have personal interest in agile methods and recognised the benefits of agile software development. These findings were similar to the recent study by Vijayasarathy and Turk (2008) that included personal interest and the benefits of agile methods as being significant in their adoption. The findings also confirm that strategic alignment is facilitated by factors such as IT maturity, technical maturity, and managing director’s software knowledge. These results are consistent with the literature (Hussin et al., 2002).

Despite a difference in motivating factors, a core similarity exists for the outcomes of agile method utilisation. For instance, improve management of the project, and improve communication within the team were common outcomes that company A, B, and X identified. Improved customer satisfaction was another outcome of agile methods that was seen by company B. Company X on the other hand identified improved the quality of testing process and provided quick delivery software products as the outcomes of agile methods. Study participants from each organisation perceived the importance and benefits of business strategy and IT/IS alignment in that the alignment could assist the firm in gaining competitive advantages while providing cost and time improvements. This is in accordance with the literature regarding the benefits of business strategy and IT alignment (Avison et al., 2004).

In interpreting the values and explaining the role of IT/IS manager, Henderson and Venkatraman (1993) clearly identified key roles of IT/IS manager and top management within each perspective. In the Technology Transformation perspective, the IT/IS manager should be involved in designing and implementing the required I/S infrastructure that is consistent with the IT vision. In the case of company B, participants play a vital role in planning, designing and implementing the business strategic plan. In company A, the role of the IT manager included a direct communication with the CEO. In the Competitive Potential perspective, the role of top management is to be a business visionary and the role of the IT/IS management is to be a catalyst in the whole transformation process. In company X, the managing director plays a significant role in making such changes in software processes as he has a strong view and belief that the adoption of agile methods could meet the business objective.

However, several other comments from the participants indicated that the speed and flexibility of agile methods allowed such rapid response to changes at the operational level that formalised
alignment processes becomes less important. Whether this responsiveness will loosen the relationships between and across the four domains of business and IS/IT strategy, and organisational and ICT infrastructure is an area that requires further study. For company X:

Whether your company aligns to agile is [based on] whether your operation management believes there [is a] need to fix the problem. In our case, we put agile as fundamental business strategy. There is no alignment of how we do that with the implication that business strategy would follow suit.

**CONCLUSION**

The purpose of this study was to explore how organisations align business strategy with IT/IS strategy where agile software development has been adopted. This research indicates that agile methods may be emerging as a core infrastructure in order to achieve the organisation’s business strategy in a rapidly changing environment. The research findings suggest that agile methods have been applied successfully within the case organisations. However, while the benefits of business and IT/IS strategy alignment were recognised by participants, the narratives suggest this alignment may be more relevant at functional than at strategic level. The use of agile methods in response to internal and external uncertainty, therefore, may change the role of ICT in the firms, and hence impact on the alignment of business strategy and IT/IS strategy. Further study, such as a longitudinal study of strategic alignment pre- and post- adoption of agile methods is required, to investigate whether the agile environment underlies this perception.

**REFERENCES**


**ADDITIONAL READING**


