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The character, causes and consequences of IS strategic misalignment in a Chinese State Owned Enterprise

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Abstract

Business-IT alignment has continued to draw the attention of researchers and practitioners in the past few decades. This thesis aims to investigate the state of business-Information Technology (IT) alignment, as well as the causes and consequences of alignment in a typical Chinese SOE (State-Owned Enterprise) group.

Chinese SOEs have experienced pressure for integration from a plan devised by the Chinese government which would potentially give SOEs a competitive edge. However, information systems implementation and integration is poorly defined in the post-merger SOE group in this empirical study. Business-IT misalignment during the integration process is one of the main reasons leading to this problem. Therefore, the issues of business-IT alignment in a post-merger Chinese SOE group are the main focus of this research.

In order to determine the current state of business-IT alignment in the Chinese SOE group, a conceptual understanding of business-IT alignment was developed based on a literature review. In this model, business-IT alignment consists of three levels; namely: the strategic level, structural level and operational level. Four types of alignment should be fulfilled according to these three levels:
1) Strategic level alignment; this means at the corporate level, the objectives and plans for Information Systems (IS) and IT implementation or development should align with the goals of the organisation.
2) Structural level alignment means that the IT infrastructure should align with the organizational and management structures.
3) Operational level alignment indicates how far IS implementations actually support the business processes.
Finally 4), IS infrastructure and business operation alignment means that the functions of IS infrastructure align with the business functions.

The business-IT alignment model that was developed is used as the basis for understanding the business-IT alignment concept. Considering the importance of the context in this study and the fact that there is no existing theory on business-IT

alignment in the Chinese SOE context, a combination of case study and grounded theoretical strategies was selected to conduct this inductive research to explore the substantive theory on business-IT alignment in the Chinese SOE group. A typical Chinese SOE group in the merger plan was selected, and where 41 semi-structured interviews were conducted. The research findings point to five categories of misalignment situations in the Chinese SOE: low importance of IS strategy; insufficient support to management in IS; ISs do not support core business units well; misalignment of systems operations and business processes; and low IS operational capabilities of staff. Furthermore, after comparing these causes and consequences with the factors identified in the existing literature, these causes, consequences and alignment are integrated into a model for the deeper analysis of the alignment process and the factors that influence it.

This research project contributes to an understanding of the IS/IT contribution to competitive advantage in business-IT alignment studies. Furthermore, the conceptual understandings of the alignment process and dynamic alignment are refined. This study also identified factors influencing business-IT alignment in Chinese SOEs which form the basis of how to improve the situation.

List of Publications

- Chen, S., Peng, G.C., Nunes, M. and Mojtahed, R. (2012). “Understanding of ERP systems in Chinese SOEs: A case study”. In: Seventh International Conference on Digital Information Management (ICDIM, 2012), Macau, China, 22-24 Aug. 2012.
- Chen, S., Nunes, M., Peng, G.C. and Mojtahed, R. (2012). “Exploring CRM adoption in Chinese SOEs: insights from a case study”. In: International Conference on Computer Science and Service System (CSSS 2012), Nanjing, China, 11-13 August 2012.
- Chen, S., Peng, G.C., Nunes, M. and Mojtahed, R. (2012). “Exploring SCM awareness in Chinese SOEs: insights from a case study”. In: Global Information and Management Symposium (GIAMS 2012), Shanghai, China, 17-20 August 2012.
- Chen, S., Osman, M., Nunes, J.M.B. and Peng, G.C. (2011). "Information systems evaluation methodologies". In: Proceedings of the IADIS International Workshop on Information Systems Research Trends, Approaches and Methodologies (ISRTAM), Rome, Italy, 20 July 2011.

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Chapter 1: Introduction

1.1 Research theoretical background

The utilisation of information technology (IT) has altered the basic nature of industry (Luftman *et al.*, 1993). Information technology also changed its traditional role from back office to a strategic role (Henderson and Venkatraman, 1992). The strategic use of information technology has been realized as a fundamental issue for business. The alignment of business strategy and IT strategy is required for effective and efficient utilisation of information technology (Luftman *et al.*, 1993). Furthermore, it is considered that IT investments' payoffs are actually one of the functions of strategic alignment (Tallon and Kraemer, 1999). The fundamental importance of alignment for organisational effectiveness is repeatedly highlighted in the information systems' literature (Chan, 2002). On the other hand, an absence of strategic alignment probably results in the organisation's inability to realise sufficient value from their IT investments (Henderson and Venkatraman, 1993). The misalignment or poor alignment of business-IT may result in the high potential information systems (IS) applications not being identified or not fully adopted by the executives (Chan, 2002). What is worse, the executives continue to experience disappointment due to sub-optimal performance, which results from poor alignment given the heavy investments on information systems (Chan, 2002). Business executives have paid more and more attention to the contribution of IT to business performance. The alignment of information systems strategy with business strategy has been one of the most important issues facing business executives in Europe and North America (Tallon and Kraemer, 1999). Moreover, the congruence of IS functions with the other business functions is also emphasised as one of the key issues considered by IS executives in the 21st century in some business organisations (Chan, 2002). Business-IT alignment was revealed as the top concern in a survey of over 300 Chief Information Officers (CIO) and Chief Executive Officers (CEO) (Nickels, 2004). However, companies still continue to report limited alignment (Chan, 2002).

The research so far on business-IT alignment mainly focuses on three perspectives. Firstly, some research aims to investigate how IT contributes to business performance or studies the impact of business-IT alignment on business

effectiveness. This can be considered as the fundamental issue of the research on business-IT alignment, which means that researchers are realising the importance of the alignment. For example, Tallon and Kraemer (1999) argued that the IT business value is the consequence of strategic alignment. In 2003, Tallon and Kraemer stated further that the congruence of the goals of business and IT is a key determinant of executives' perception of IT payoffs.

Secondly, the research emphasises the concept of business-IT alignment, which is presented in a series of strategic alignment models. The most widely-used strategic alignment model was developed by Henderson and Venkatraman in 1990. In this model, four dimensions were identified in business-IT alignment, including business and IT strategy, and business and IT infrastructure, to fulfil the two perspectives of strategic alignment and functional alignment. Maes *et al.* (2000) developed a unified framework, which added structure, operation, information and communication as three variables to the concept of business-IT alignment. He argued that this framework provided a foundation for further research on the use of the concept of alignment as a practical tool for management. However, from a review of the following literature, it was found that this framework was not widely used to explain the concept of business-IT alignment, or used as a practical tool for management in the research that followed. It is believed this is because the structural and operational levels of alignment are not explained very clearly in the framework and because some of the statements are similar to the explanation by Luftman (2003) of the strategic alignment model (Henderson and Venkatraman, 1990).

The third type of focus in business-IT alignment research is on how to achieve business-IT alignment. In the information systems planning stage, in terms of achieving business-IT alignment, the strategic information systems planning is a popular topic in the research. For instance, Grover *et al.,* (1998) investigated the construct and measurement of the success of strategic information systems planning. It was realised that the research on attaining business-IT alignment mostly focused on the strategic level alignment, but ignored the lower levels such as the infrastructure level. For instance, Reich and Benbasat (1996) clarified the construct of linkage between business and information technology objectives and measured the social dimensions of linkage. Teo and Ang (1999) identified the critical success

factors in business and IS plans alignment. Although some research focused on the lower level alignment of business-IT; for example, Brown and Magill (1994), examined ways of organising the structure of IS functions in order to align with the enterprise; it was not realised by researchers that this is part of the concept of business-IT alignment. It means researchers just stated that the organisational alignment was important but this kind of discussion was not integrated into the business-IT alignment concept at that time. Therefore, this lower level alignment was not linked to strategic business-IT alignment. In some situations, researchers did consider that IT dimensions in the lower operational level should also align with the business objectives; e.g. Roepke *et al.,* (2000) explored how to develop IT human resources so as to support business needs. However, there is still the lack of a comprehensive hierarchical review that investigates all the dimensions in business-IT alignment in the literature. The main contribution to assessing business-IT alignment maturity is from Luftman, who summarised the enablers and inhibitors of business-IT alignment based on the research in western companies. Furthermore, Luftman (2003) created an assessment framework for business-IT alignment. Although it is a relatively comprehensive framework for the research to date, the criteria set out in the framework are not specific enough. This framework has not yet been widely used in practice for reviewing the literature.

From the literature review it was concluded that there are two ambiguous points in the research on business-IT alignment. Firstly, the most commonly cited concept of business-IT alignment is the strategic alignment model developed by Henderson and Venkatraman in 1990 with four dimensions. Some researchers argued that this strategic alignment model is not that practical for use as a real management tool (Maes *et al*., 2000). Moreover, many more elements that should be included in the concept of business-IT alignment as defined in this model are now appearing along with the development of organisational management and information technology. Although there have been some attempts to develop the original strategic alignment model that was set out by Henderson and Venkatraman (Sabherwal *et al*., 2001; Maes *et al*., 2000), a comprehensive analysis is still lacking. Secondly, while the process of how to achieve business-IT alignment is discussed in a lot of the research as mentioned above, it only focuses on specific perspectives, for instance the investigation on social dimensions from Reich and Benbasat (2000). The enablers

and inhibitors summarised by Luftman are based on the traditional strategic alignment model; therefore, there are some factors not considered in his summary. Furthermore, these factors are not used and validated widely in the research that followed. In summary, there is a need to develop the traditional strategic alignment model in the current context of management and technology, to identify the concept of business-IT alignment clearly and update the business-IT alignment model. In addition, research about business-IT alignment in the Chinese SOE (State-Owned Enterprise) context is limited. There is therefore the need within this special context of the Chinese SOE group to apply the strategic alignment model and carry out business-IT alignment. This will be discussed in Section 1.2 below.

1.2 Research context

Information technology has brought about tremendous changes to China and the rest of the world. The Chinese government has realised the importance of information technology to the development of the Chinese economy since the 1980s, when information technology was first identified as one of the decisive factors for social and economic improvement in China. Since then, a large number of various resources have been invested to construct an advanced information technology infrastructure in China (Tate, 1987). It was reported that the Chinese government completed the construction of nationwide networks and Internet services in 1996 (China Daily, 1996). Specifically, as a leading economic component in China, much attention has been given by the Chinese government to computerisation of state-owned enterprises. The initial stage of IT infrastructure investment in state-owned enterprises was from 1982 to 1992 (Bi, 2008). Since then, the Chinese government has continued making regular further investments in the IT infrastructure in state-owned enterprises. Furthermore, information technology development in state-owned enterprises was emphasised again during China's 17th National People's Congress in 2007. More attention by the Chinese government has since been given to IT infrastructure investment in state-owned enterprises following this congress. Since then, a large amount of IS hardware and software has continued to be introduced to, and adopted by, Chinese enterprises (He *et al*., 1998). It is thus essential to investigate the current status of information systems implementation in

Chinese state-owned enterprises. SOEs have experienced a series of reforms since they were established. From 1949 until 1978, with two unsuccessful attempts at reform in this period, Chinese SOEs were answerable to central government. A leading feature of traditional SOEs in the Chinese economy was a lack of autonomy, as with other Soviet-type economies. According to central plans, the state provided SOEs with all inputs for production and also covered all costs. SOEs delivered all revenues to the state. The state set the salary levels of SOE employees. SOEs had to seek State approval for all their activities (Lin *et al.,* 1998). Management of these enterprises was now the responsibility of central government (Ye, 2009). Chinese SOEs also had to undertake a wide range of social responsibilities during that period. The enterprises had to provide their employees access to healthcare, accommodation, education and food without receiving any payment from them (Wei and Li, 2009). This placed a heavy burden on the enterprises' finances. Since 1978, the Chinese government started reforming state-owned enterprises together with wider Chinese economic reforms. General management issues were emphasised in the early stages of the reforms from 1978 to 1992. During this period, the management of enterprises was separated from governmental management. SOEs had to pay tax to the government rather than turning over their profits as had previously been the case (Ye, 2009). Along with this change, SOE operations and production had to be planned and conducted according to market conditions to some extent. The main purpose of production was thus no longer to fulfil requirements from the governmental plan, but rather to make a profit (Wei and Li, 2009). From 1992, the focus shifted to building a market-oriented modern enterprise system (Peng, 2009). The "market-oriented" approach has been further emphasised since then, and SOEs now need to face an even more complicated and competitive situation. However, until 1997, Chinese SOEs faced many problems. For example, in industry areas which were best-suited to carrying out large-scale production, Chinese SOEs were only organised on a small scale in scattered locations. For example, in steel production, the minimum output necessary to produce a profit was 4 million tonnes per year. Out of a total of 779 steel producing enterprises, only five enterprises reached this level of output. Industrial structures are similar in different provinces in China. Still using the example of the steel industry, there were different steel-producing enterprises in more than 20 provinces (Chen, 1999). Therefore, the Chinese government proposed a merger plan for SOEs at the 15th National Congress in 1997. After merger and

acquisition over the next few years, the number of SOEs subordinate to the central government was reduced from 196 to 123 during the period 2003 to 2010. There are now 30 Chinese SOEs included in the top 500 enterprises of the world following the mergers in 2010 (Saidi consultant, 2010). The number of Chinese SOEs, and those that are listed in the top 500 enterprises of the world, are summarised in tables 1.1 and 1.2 (Ye, 2009). It is clear that, following the mergers and acquisitions, the capacities for global competition by Chinese SOEs have increased. The corporation used for case study in this research is one of the important examples in the merger plan.

Year	1995	2000	2003	2004	2005	2006	2007
Number of SOEs (10,000 unit) in China	11.80	5.35	3.43	3.18	2.75	2.50	2.07

Table 1.1. The number of SOEs in China (Ye, 2009)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Number of SOEs listed in top 500	3	4	6	9	11	11	12	14	15	20	24	25

Table 1.2. The number of Chinese SOEs listed in the top 500 enterprises of the world (Ye, 2009)

After development and reform, Chinese SOEs still have their own features nowadays. Firstly, Chinese SOEs still bear social responsibilities. SOEs bear a heavy burden from redundant workers, retirement pensions and other social welfare costs (Lin *et al.,* 1998). Older SOEs carry heavier burdens from retirement pensions and social welfare costs because of more retired workers (Lin *et al.,* 1998). Moreover, SOEs are not allowed to fire the redundant workers to enable social stability (Lin *et al.,* 1998). However, although SOEs have policy burdens, they have soft budget constraints since the state is responsible for the SOE losses in practice (Lin *et al.,* 1998). Secondly, Chinese SOEs operate in a special socialist market economy environment in China. At the 14th congress in 1992, the Communist Party approved the "Socialist Market Economy" in China, which signalled that the Chinese government abandoned Marxist economic theory in favour of the Western market economy (Fan, 1998). Although Holton (1985) predicts that a market-oriented socialist system is possible conceptually, there is no clear theory or ready model to practice put into practice and provide some guidance on what is exactly meant by a Socialist Market Economy (Fan, 1998). Strategic management knowledge plays an important role and

is important to SOEs' managers in the transition to a market economy (Fan, 1998). Thirdly, China has its unique cultures. Three resources influence the modern Chinese culture, including Confucianism, communist ideology and Western values (Fan, 1998). Since the Chinese government is pursuing two contradictory directions, which are to experiment with capitalism economically and to insist on communism politically, there are inherent conflicts between communist ideology and market economy practice (Fan, 1998). Fourthly, Chinese SOEs are operating in a fast-developed economy. China has attracted the attention of executives, economists and investors worldwide with a consistently growing economy with an average annual growth rate of nearly 10% in the last three decades (Shalhoop and Sanger, 2012). After economic reforms in 1979, the number of foreign owned enterprises operating in China increased from 100 to 280,000 by 1998 (Shalhoop and Sanger, 2012). In 2001, China obtained membership of the World Trade Organisation and became the second largest economy in the world in 2010. On the other hand, China also makes large global investments, which has enabled China to gain a highly respected position in the global economy after the global financial crisis in late 2008 (Shalhoop and Sanger, 2012). Fifthly, the Chinese government considers capital-intensive industries as being strategically important (Lin *et al.,* 1998). Therefore, the SOEs have been instructed to operate in these industries (Lin *et al.,* 1998). Different industries are dependent on various production technologies, technological innovation and organisational practices (Tambe and Hitt, 2012; Oliveira and Martins, 2011). IT aims to provide benefits to all industries but little is known about how these benefits vary among different industries (Tambe and Hitt, 2012). It has been argued that IT contribution and its appropriability are different in service industries (Roach, 1991). Others have argued that computer-producing industries have captured IT values disproportionately compared to computer using industries (Gordon, 2000). Chinese SOEs operating in capital-intensive industries should be paid attention in terms of IT adoption.

In summary, there are four dimensions of the context within which the Chinese SOE is implementing information systems in the organisation. Firstly, the Chinese government paid much attention to information technology and has invested heavily on construction of the IT infrastructure. Secondly, the information systems

implementation and management changes in Chinese SOEs have been conducted according to a governmental plan rather than as the result of market competition. Thirdly, the Chinese SOEs now face a complicated international market and need to plan the operation and production for themselves. This kind of context indicates just how much the investigation of business-IT alignment in Chinese SOEs is essential to assist successful information systems implementation so as to improve the business performance of the organisation. Fourthly, Chinese SOEs are included in the government's merger plan for facing a more competitive environment. Small single enterprises are now integrated into larger corporations. Therefore the implementation and integration of information systems needs to be investigated in the merged group environment, and business-IT alignment becomes extremely important in this context.

1.3 Significance of the study

Based on the discussions in sections 1.1 and 1.2, this study is significant from a theoretical and contextual perspective. The strategic alignment model developed by Henderson and Venkatraman in 1990 is the most widely used model in business-IT alignment studies (Hiekkanen *et al.*, 2013). Although there are other researchers attempting to refine and extend this model (Avison *et al*., 2004; Sabherwal *et al*., 2001; Maes *et al.* 2000; Maes, 1999; Luftman *et al*., 1999), their studies are not popularly used and the fundamental understanding of business-IT alignment in the studies nowadays is still based on the strategic alignment model developed by Henderson and Venkatraman in 1990.

However, after more than 20 years development of technology, it is necessary to develop a conceptual understanding of business-IT alignment in the current situation. Together with management, organisation and technology development, managers and business firms are now focused on the real economic value of information and communications technology (ICT) to the business processes and efficiency (Laudon and Laudon, 2006). From a business perspective, information systems are based and supported by ICT and considered as important tools for creating value by helping managers make better decisions or improving business processes execution (Laudon

and Laudon, 2006). The focus on ICT that characterised the 80s and 90s business and academic literature is now being replaced by a focus on IS (e.g. ERP rather than Networks and DBs) as business understanding and use of technology improves. This thesis focuses on IS issues, but a significant part of the relevant literature used is still focused on IT and ICT. The early propositions on business-IT alignment are still extremely relevant but this thesis will focus on alignment between business and IS. Therefore, the differentiation of IT and IS will be emphasized in the understanding of the business and IT alignment concept (please see section 2.3.3). Therefore, although there are a large number of studies focusing on the influencing factors of business-IT alignment, these influencing factors are identified based on the traditional conceptual understanding of business-IT alignment. This theoretical background indicates that there is a need for further studies to investigate the business-IT alignment concept and its influencing factors.

Furthermore, this study explores the business-IT alignment from a Chinese SOE context. Chinese SOEs have unique qualities. As has been discussed in section 1.2., Chinese SOEs are operating in a special Chinese context. Firstly, Chinese SOEs are operating in a special socialist market economic environment. There is no clear theory or model that can be used in the real world with regard to what is exactly meant by a socialist market economy (Fan, 1998). This situation increases the complexity of the market in which Chinese SOEs operate. Secondly, three resources influence the modern Chinese culture, including Confucianism, communist ideology and Western values (Fan, 1998). With a long history, special political stance and the recent open environment, Chinese SOEs are facing a diversified cultural environment. Thirdly, with a consistent annual economic growth rate averaging nearly 10% in the last three decades (Shalhoop and Sanger, 2012), China is now a fast-developing economy compared to western developed countries. In addition to the environment the Chinese SOEs are operating in, Chinese SOEs also have their own special features. Firstly, Chinese SOEs still bear social responsibilities. SOEs bear a heavy burden from redundant workers, retirement pensions and other social welfare costs (Lin *et al.,* 1998). Secondly, the information systems implementation and management changes in Chinese SOEs have been conducted according to a governmental plan rather than as a result of market competition. Thirdly, Chinese SOEs have experienced a series of reforms. On the one hand, they are becoming

larger and more competitive after the merger plan proposed by the government. On the other hand, they are facing a more and more competitive environment under the market-oriented enterprise system. All these unique qualities of Chinese SOEs indicate the significance of the study. To summarise, this study is very important and meaningful considering the theoretical background and Chinese SOE context.

1.4 Research question and objectives of the research

From the discussion above, it is clearly necessary to explore the current status of business-IT alignment from a Chinese SOE context. Moreover, this study is based on the findings of the researcher's previous MSc research project that revealed the problems SOEs in China are facing with their information systems, the way these were implemented and how, despite being heavily invested in according to the governmental plan, the real implementation and operation of the systems is not satisfactory. The information systems are not contributing to business performance, and have sometimes even become a burden because of the large investment made. There is thus a need to align business and IT so as to improve the potential ROI derived from IT investments in Chinese SOEs. This research will undertake an in-depth investigation of the current situation of business-IT alignment with a typical Chinese SOE group as a case study, and further explore the causes and consequences of the current alignment situation. The results from this study will help the researcher identify the problems related to alignment.

This research will be guided by the following research questions:

- What is the current state of business-IT alignment in Chinese SOE groups?

This question will be expanded and investigated in detail by the following sub-questions:

- What are the causes of the current situation of business-IT alignment in the Chinese SOE groups?
- What are the consequences of the current situation of business-IT alignment

in the Chinese SOE groups?

- How can this situation be improved in light of the findings of this research as well as experiences with similar situations reported in the literature?

To answer these research questions, the following research objectives were set:

- To review the literature on the concept of business-IT alignment and the business-IT alignment model;
- To develop business-IT alignment conceptual understanding based on the review of research in order to inform the data collection process;
- To use the established conceptual understanding to investigate the current situation of business-IT alignment in a Chinese SOE group;
- To identify the causes and consequences of the business-IT alignment situation in the Chinese SOE groups through the use of a case-study;
- To identify and propose ways in which business-IT alignment in Chinese SOEs can be improved by discussing the findings of the research against existing good practice in the literature.

1.5 Research methodology

For an investigation of the state of business-IT alignment, the focus and results are probably different based on various conceptual understandings of the business-IT alignment. In addition, the studies on the influencing factors on the business-IT alignment such as antecedents, enablers, and inhibitors were focusing on some specific perspective, so lacking a holistic picture. Even for the investigation of the influencing factors on business-IT alignment from a similar perspective, the findings may vary from one to another considering the different conceptual understandings and different contexts. Due to the very specific characteristics of the Chinese SOE, it was difficult to use an established theory for the problem. This showed that a deductive approach is not appropriate for this research.

This study thus adopted an inductive approach. Specifically, grounded theory was used in this study. It is widely accepted that grounded theory is particularly useful to

generate a theory (Strauss and Corbin, 1998). Furthermore, the nature of the research indicates the significance of context in the research. A case study was selected to be used combined with grounded theory. It is argued that a combination of different methods may reduce the effects of the methods' weaknesses so as to lead to better conclusions (Saunders, 2003). Moreover, considering that the total number of SOEs in China is not small, it would be virtually impossible to formulate a theory encompassing all of the SOEs.

In this project, a single case study was selected. The Aluminium Corporation of China was chosen in this research for two reasons. Firstly, it is a typical Chinese SOE in the manufacturing sector directly subordinated to central government. As was presented, this Chinese SOE is a typical example in the merger plan from the Chinese government. Secondly, the researcher obtained guaranteed access to the informants. To summarise, this research adopted a combination of grounded theory and case study methods. Particularly, the grounded theory approach from Strauss and Corbin (1998) was employed.

Since grounded theory was adopted, a literature review was undertaken for the purpose of attaining theoretical sensitivity in this research project. With the conceptual understanding gained through a literature review, data collection and data analysis were conducted following the grounded theory approach. Overall, 41 informants were interviewed following the theoretical sampling process. The emerging theory saturated on five main categories for the business-IT alignment situation, and six and five main categories respectively for the causes and consequences of the business-IT alignment. These main categories are discussed in detail later in the thesis.

1.6 Structure of the thesis

The thesis is organized according to the following structure. This chapter (Chapter 1) introduces the background of the research project and defines the research questions and research objectives.

Chapter 2 reviews the existing literature on business-IT alignment. To be specific, the chapter reviews the organizational theory, systems theory and business-IT alignment. It should be noted that these reviews are aimed at discovering the main themes and obtaining theoretical sensitivity.

Chapters 3 and 4 discuss the research methodology and research design respectively. The research methodology chapter explains the selection of the research methods for this project in detail. The research design chapter explains fully the case study approach, research stages, data collection and data analysis.

Chapter 5 presents the findings of the research. To be specific, the chapter discusses the five main categories identified in the IS strategic alignment situation in Chinese SOEs, and the causes and consequences related to them.

Chapter 6 provides the discussion and conclusions of the findings. In this chapter, research findings that emerged from the data analysis are summarised and compared to the existing literature. The new aspects brought to light by this research are identified and further discussed after comparison. Based on this, the contributions and implications of the findings are further explored. In addition, limitations and future work are discussed.

Chapter 2: Literature review

2.1 Introduction

This research's literature review focused on three areas, namely: organizational theory, information systems (IS) theory and business-IT alignment. This literature review was not conducted in-depth as the grounded theory approach was chosen. "There is no need to review all the literature in the field beforehand, as is frequently done by analysts using other research approaches" (Strauss and Corbin, 1998: 49). Furthermore, it can be argued that the researcher can be constrained and even stifled by steeping themselves in the literature (Strauss and Corbin, 1998). The literature review in this research aims at discovering the main themes in the area and obtaining theoretical sensitisation.

To be specific, the organisation's operation and management, the information systems used in the organisation, as well as the business IT alignment are discussed in this chapter. Firstly, the main dimensions of an organisation, including its structure, business functions and operational processes, management and leadership are discussed. As information technology is used in the organisation to facilitate its management and operations, the main types of organisational information systems and impacts of information systems implementation on the organisation are summarised next. Finally, the chapter discusses the business-IT alignment. The concept of business-IT alignment and the research on strategic alignment models are reviewed, and current research on how to assess business-IT alignment is discussed.

2.2 Organisational theory

Raymond (1994) defined the concept as follows: an organisation is a group of resources built for a particular purpose. He explained further the particular purpose could be the need for products or services from a person or a group of persons. An organisation is defined as "a consciously coordinated social unit, composed of two or more people that functions on a relatively continuous basis to achieve a common goal or set of goals"; from Robbins (1996: 5). Mullins (2002: 96) stated that organisations are "social constructs created by groups in society to achieve specific

purposes by means of planned and co-ordinated activities. These activities involve using human resources to act in association with other inanimate resources in order to achieve the aims of the organisation". Based on these definitions of organisation, "a particular purpose" or "a common goal or set of goals" is one of the important factors in an organisation. Furthermore, in order to achieve the goal, people and other resources need to be organised and co-ordinated in some form of structure. Therefore, operation is important in the organisation. In addition, as Mullins (2002) summarised, people, structure and management are also important factors in the processes of achieving the objectives in an organisation.

It should be noted that within the formally structured organisation, an informal organisation will also exist (Mullins, 2002). Mullins (2002) distinguished informal organisations from formal organisations. From the interaction of people working within the formal structure, the informal organisation is formed based on the psychological and social needs of the people. These informal organisations usually have flexible and loose structures, with undefined relationships of members and different degrees of involvement (Mullins, 2002). To distinguish them, he emphasised that "a formal organisation is the planned co-ordination of the activities of a number of people for the achievement of some common, explicit purpose or goal, through division of labour and function, and through a hierarchy of authority and responsibility" (Mullins, 2002: 98).

Broadly, an organisation is comprised of an operating component and an administrative component (Mullins, 2002). In the operating part of an organisation, people undertake the actual work of providing products or services. In the administrative part of an organisation, people are in charge of supervision and co-ordination and usually managers and analysts comprise the administrative component (Mullins, 2002). Mullins (2002) also identified five basic components of an organisation.

- Operational core: the actual task activities in technical or productive operations of the organisation.
- Operational support: the management and resources controlling the actual

flow of operational work.

- Organisational support: the provision of services for the whole organisation but usually with the exception of the actual flow of operational work.
- Top management: the activities and decision making related to the organisational objectives and policy, strategy or the work of the organisation and its interactions with the environment.
- Middle management: provides the link to the previous four basic components. To be specific, links the operational support and organisational support staff, as well as the operational core and upper management. Furthermore, it ensures the co-ordination and integration of activities within the organisation.

Organisational theory studies the way that organisations function and how they interact with the environment that they operate in (Jones, 2013). Although researchers focus on different components of organisational theory based on their research objectives, the main perspectives include the goals, structure, management, operations, culture and human relations in organisational theory (Jones, 2013; Daft, 2012; Hatch and Cunliffe, 2012). Organisational goals are closely related to organisational strategies (Daft, 1998), which will be discussed in section 2.3. People in the organisation interact with all these factors including goals, structure, management, operations and culture. Therefore, in section 2.2, organisational structure, operations, management and culture will be discussed.

2.2.1 Organisational structure

Structure is the pattern of relationships among positions and members in the organisation and reflects the way in which organisational activities are planned, categorized, organized and coordinated (Balochian *et al*., 2012; Mullins, 2002). Furthermore, organisational structure shows how the organisation aligns and uses effort from its members and how communication is arranged (Birkinshaw *et al.,* 2008; Hamel, 2007). There are three main tasks for the structure. Firstly, structure shows the concentration of the power (Balochian *et al*., 2012; Hall, 1987). Secondly, structure assists the organisation to produce its output and achieve the organisational goals and organisational effectiveness when the managers match the structures and

organisational purposes well (Balochian *et al*., 2012; Gibson, 2000; Hall, 1987). Thirdly, organisational activities acquired patterned regularity from the structure, which controls and minimizes the influence of various individuals on the organisation. These regularly occurring organisational activities indicate that work for people in the organisation is predictable, which ensures it can be completed (Balochian *et al*., 2012; Gibson, 2000; Hall, 1987).

Researchers usually agree that there are three dimensions used to describe structures, including formalisation, centralisation, and complexity (Balochian *et al*., 2012). Formalisation concerns the "extent to which an organisation relies on written rules and procedures to predetermine actions of employees" (Gibson, 2000: 342). High specialisation of labour, high delegation of authority, the use of functional departments, and wide spans of control lead to highly formalised organisations (Gibson, 2000). Formalization reflects the level of standardisation of organisational activities (Balochian *et al*., 2012). Although high level of formalisation indicates clear and precise specifications for each job and predictability of communication channels, it implies lack of flexibility in the organisation (Balochian *et al*., 2012). Centralisation refers to the "degree to which upper management delegates authority to make decisions" (Gibson, 2000: 343). When managers at the top of the hierarchy have the authority to make important decisions, authority is highly centralized while when managers at all levels in the hierarchy have the authority to make important decisions and to initiate new projects authority is said to be highly decentralized (Jones, 2013). Normally, the higher the specialisation of labour, the less the delegation of authority, the greater the use of functional departments and the wider the span of control, contribute to centralisation (Gibson, 2000). Centralisation is a very important dimension of structure. Both centralisation and decentralization have their advantages respectively. Centralisation makes the common policy and strategy consistent and easier to implement and also the sub-units do not become too independent; therefore co-ordination and management control are easier in a centralised organisation (Jones, 2013; Mullins, 2002). Furthermore, a centralised organisation has larger economies of scale and lower overhead costs, while decision making will be quicker since diffused authority is avoided (Caker and Siverbo, 2014; Mehta and Hirschheim, 2007; Mohdzain and Ward, 2007; Mullin, 2002). In a decentralised organisation, flexibility and responsiveness are promoted by allowing

lower-level managers to make important decisions (Caker and Siverbo, 2014; Jones, 2013; Mehta and Hirschheim, 2007). Furthermore, the responses from the organisation to the environment are increased (Mullin, 2002). The development in each functional department is easier to make consistent in a flatter and more flexible organisation (Mullins, 2002). Support services and customer services can be more effective since the organisation is flatter and they are closer to the operational level of work and the activities they intend to serve (Mullins, 2002). Since both centralised and decentralised organisations have their positive characteristics, Mullins (2002) proposes some factors that need to be considered to determine the level of decentralisation, including the nature of the products or services, the daily management of the organisation, the requirement for the standardisation of procedures, organisational policies, or the terms of employment. Complexity refers to the differentiation of jobs and units in the organisation, including horizontal differentiation and vertical differentiation (Gibson, 2000). Horizontal differentiation refers to the "number of different units at the same level", while vertical differentiation refers to "the number of levels" in the organisation (Gibson, 2000: 344). The greater the specialisation of labour, the greater the delegation of authority, the greater the use of functional departments and the narrower the span of control, lead to higher complexity (Gibson, 2000).

Managers decide on the organisational structure from four perspectives, including division of labour, departmentalisation, span of control and authority (Gibson, 2000). Division of labour refers to "the extent to which jobs are specialised" (Gibson, 2000: 328). It means the total tasks are divided into different specific jobs with specified activities. Together with the increase of these specified jobs, there is a need to delegate them to a small group, which indicates departmentalisation. Usually, these specific jobs are combined according to the functions of the organisation and thus the job designated 'manager of group' is created. Therefore, different types of organisation may have different kinds of departmentalisation. Furthermore, the number of jobs or individuals under one group manager needs to be determined properly. This is the issue known as 'span of control'. Finally, the authority for each job is decided which is mentioned as 'delegation of authority' above. Managers need to balance the degree and alternatives of authority in this issue (Gibson, 2000).

Furthermore, there are two most important design choices to decide the

organisational structure based on the four perspectives discussed above, including vertical differentiation and horizontal differentiation (Jones, 2013; Gibson, 2000). Vertical differentiation refers to the hierarchy of the organisation (Jones, 2013). An organisation that has many levels in its hierarchy is called a tall organisation while an organisation in which the hierarchy has few levels is a flat organisation (Jones, 2013). Hierarchy emerges when managers find division of labour and specialization increase which makes coordinating and motivating employees more difficult (Jones, 2013). The number of managers and the number of levels in its managerial hierarchy are increased to improve the ability of control so that an organisation becomes taller (Jones, 2013). Horizontal differentiation contributes to departmentalisation, including functions or divisions (Jones, 2013; Gibson, 2000). Researchers have different focuses on the functions in an organisation (Jones, 2013; Slack, 2010; Laudon and Laudon, 2006). There are five main functions in common, including sales and marketing, manufacturing and production, purchasing, finance and accounting, and human resources functions (Jones, 2013; Slack, 2010; Laudon and Laudon, 2006). The sales and marketing function in the organisation refers to the activities of linking the organisation's products and services with the markets as well as generating customer requests for products or services; the manufacturing and production function refers to the activities of creating new or modified products and services; the purchasing function refers to the activities of managing the resources and controlling the operational or management activities with suppliers; the accounting and finance function refers to the activities of managing the information and financial resources for assisting economic decision-making; the human resources function refers to the activities of recruiting, developing or training the staff in the organisation (Jones, 2013; Slack, 2010; Laudon and Laudon, 2006). The original structure types identified by Mintzberg in 1983 include Simple Structure, Adhocracy, Machine Bureaucracy, Professional Bureaucracy, and Divisional Form (Mintzberg, 1983). As a result of changing times, industry has changed along with the shifted environment and Mintzberg's classifications are adapted to better represent today's organisations, including functional structure, bureaucratic structure, divisional structure and matrix structure (Steiger *et al*., 2014; Jones, 2013; Mullins, 2002; Daft, 1998; Hicks, 1993).

Functional structure is a design where people are grouped into functions or

departments according to the common skills and expertise they share and the same resources they make use of (Jones, 2013). An organisation is structured based on the managerial functions in the functional organisational form, as can be seen in figure 2.1. The professional skills are emphasized within a functional structure (Steiger *et al.,* 2014). Functional structure provides people with opportunities to learn the most efficient techniques from one another for performing a task and become more skilled, specialized and productive (Jones, 2013). Moreover, people who are grouped by common skills can monitor and supervise one another and control activities (Jones, 2013). People are committed to organisational activities as team members and it facilitates the development of a core competence for an organisation (Jones, 2013). However, a functional structure creates problems when an organisation continues to develop and differentiate (Jones, 2013). Specifically, a functional structure creates communication barriers as more organisational functions develop. Furthermore, when an organisation develops in various geographic regions, control problems are created with functional structure (Jones, 2013). The functional structure type is attractive to a complex, yet stable environment based on its democratic nature (Steiger *et al*., 2014).

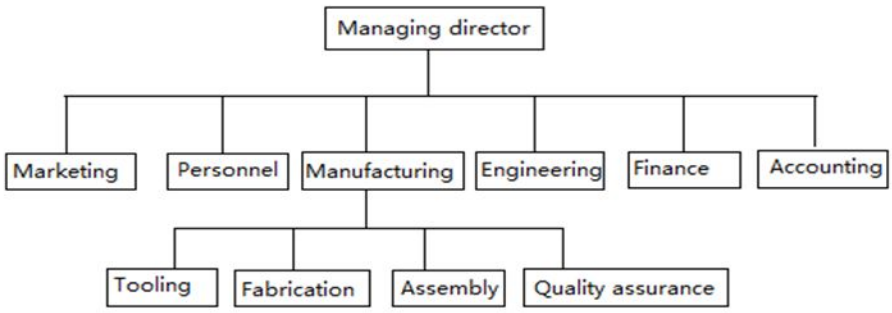

Figure 2.1 Functional form of organisation (adapted from Hicks, 1993: 81)

The bureaucratic organisational structure, as shown in figure 2.2, was described by Max Weber in the early 1900s and his work has been very influential in organisational design (Jones, 2013; Hicks, 1993). Weber was interested in designing an organisational structure that could improve organisational operation by allocating decision-making authority and controlling resources effectively. Bureaucracy is a type of organisational structure in which people are held

accountable for their actions through being required to act under predefined specific rules and standard operating procedures (Jones, 2013). In a bureaucratic structure, higher office in the hierarchy controls and supervises lower offices in accordance with standard procedure and rules (Jones, 2013; Hicks, 1993). There are some disadvantages of the bureaucratic organisational structure. Managers may fail to control the organisational hierarchy development properly over time so that these organisations tend to become very tall, centralized and inflexible (Jones, 2013). Furthermore, managers come to be too dependent on the rules and standard procedures to make decisions; therefore they become unresponsive to the demands of customers and the changing environment (Jones, 2013). However, since the bureaucratic structure lays out rules and standard procedures for designing hierarchy and identifies clear specification of vertical authority and relationships among horizontal tasks, almost every organisation is provided with some features of bureaucratic structure (Jones, 2013).

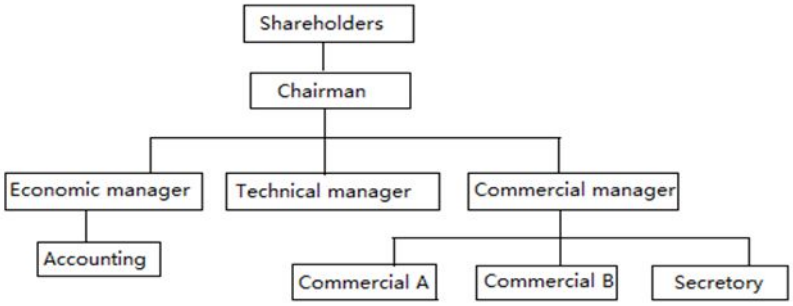

Figure 2.2 Example of bureaucratic organisational structure (adapted from Hicks, 1993: 83)

Together with the growth of an organisation, more different kinds of products in more different locations for many different types of customers are produced (Jones, 2013). Divisional structure is adopted to solve the control problems by creating smaller, more manageable sub-units (Steiger *et al.,* 2014; Jones, 2013). A divisional structure is a form of structure in which an organisation groups functions based on the specific demands of products, markets, or customers (Jones, 2013). When the control problems result from the number and complexity of products, the organisation groups its activities according to output such as products, services, businesses or profit centres and uses a product structure, as shown in figure 2.3

(Jones, 2013; Mullins, 2002; Daft, 1998; Hicks, 1993). When the control problems result from the number of locations where the organisation produces and sells its products, organisation is structured based on regions in the geographical structure (Jones, 2013; Mullins, 2002; Daft, 1998). All the functions that provide support to products or services are included in each geographical location, as shown in figure 2.4 (Mullins, 2002; Daft, 1998). One advantage of the divisional structure type is risk diversification, which is also called strategic invulnerability (Steiger *et al.,* 2014). Control in a divisional structure is determined within the separate divisions and operational functions are duplicated between divisions; therefore, the organisation is shielded from the unique risks which individual divisions may face (Steiger *et al.,* 2014). In addition, allocation of capital is efficient and strategic responsiveness is increased in a divisional organisational structure (Steiger *et al.,* 2014). However, the potential for fragmentation of knowledge management practices is a primary challenge presented with the divisional structure type (Steiger *et al.,* 2014).

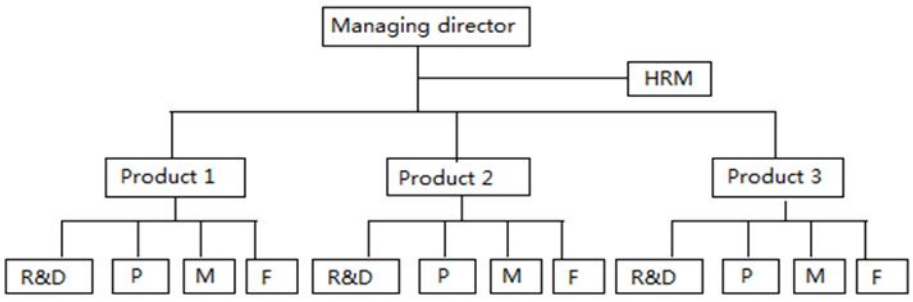

Figure 2.3 Product organizational structure (adapted from Mullins, 2002: 539)

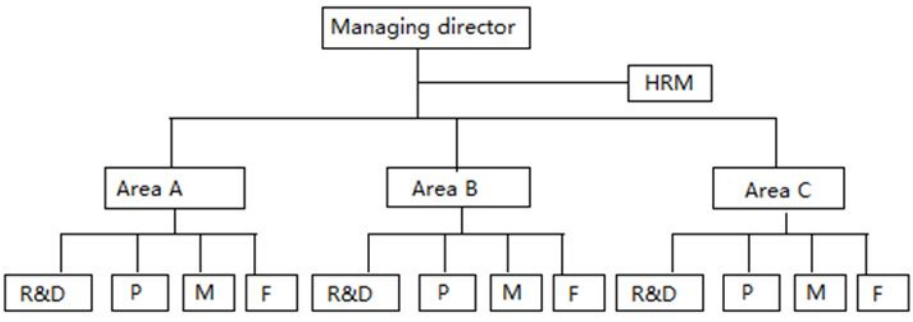

Figure 2.4 Geographical organisational structure (adapted from Mullins, 2002: 539)

In the real world, an organisation's structure may not exist in a pure functional,

product or geographical form. Product and functions, or product and geography may need to be focused on at the same time in the organisation in practice, so organisations may adopt a hybrid structure to combine the characteristics of both (Steiger *et al.,* 2014; Daft, 1998). A matrix structure is a structure type in which the organisation groups its people and resources by function and by project or product simultaneously (Jones, 2013). The organisation in a matrix organisational form is structured in a combination of functional form and product form (Hicks, 1993). In the vertical flow, the organisation is subdivided into functional departments while in the horizontal flow, the authority and responsibility are assigned to different project managers in various programme departments (Mullins, 2002; Hicks, 1993). There are some advantages of matrix structure. Matrix structure reduces functional barriers and promotes interactions among functional specialist (Jones, 2013). Furthermore, it enables an organisation to use the skills of its specialized employees, and create and manage the knowledge effectively since the employees can move to wherever they are most needed in the matrix (Steiger *et al,.* 2014; Jones, 2013). An organisation can be responsive in a dynamic and complex environment with a matrix structure (Steiger *et al.,* 2014). However, the matrix structure should be managed carefully to retain the flexibility (Jones, 2013). With few rules and standard procedures, the matrix structure lacks a control structure and can produce role ambiguity and role conflicts (Jones, 2013). A matrix structure is not used in everyday organisational situations and is appropriate when an organisation needs a high level of coordination between functional experts so as to respond to a changing environment quickly (Jones, 2013).

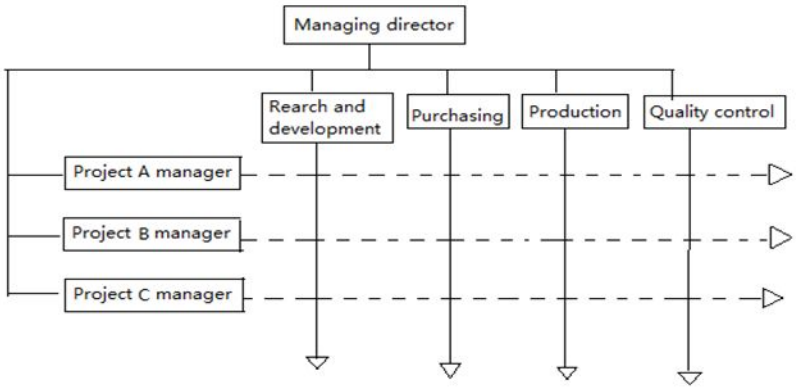

Figure 2.5 Matrix organisational structure (adapted from Mullins, 2002: 551)

Organisational structure should be determined based on the characteristics of the organisation and the context it is located in (Daft, 1998). When the need for horizontal co-ordination is low in an organisation, this indicates that the organisation is positioned in a relatively stable environment. It can thus adopt routine and low interdependent technology and aim to achieve operative goals in each functional department; this means that a functional structure can be adopted (Daft, 1998). On the contrary, if the environment is not stable, the technology is interdependent across all the business units. In this situation, a product structure is suitable for the organisation, which will facilitate co-ordination across the functional departments (Daft, 1998). An organisation adopts a geographical structure to facilitate manufacture and delivery of its product or service to customers in different regions and to make its managers and employees focus on the requirements of customers or sales targets in a specific geographical area (Daft, 1998). As mentioned before, if the organisation multi-focuses on the functional, product or the geographical aspects in the organisation, a hybrid structure is suitable for the organisation. Furthermore, if the functional, product, geographical or hybrid structures are not able to meet the requirements of horizontal linkage from the organisation, the matrix structure can be selected (Daft, 1998). The managers in either the horizontal or vertical line have equal authority in a matrix structure, while in the hybrid structure of the organisation is divided into different parts vertically (Daft, 1998; Hicks, 1993).

Structure influences not only the behaviour of the individual but also the behaviour and functioning of groups in organisations (Gibson, 2000). A good structure helps to improve the relationships among the group members, encourage the members' participation, increase the job satisfaction of the workforce, and therefore to facilitate the effective organisational performance (Mullins, 2002; Gibson, 2000). Organisational structure plays a significant role in the performance of an organisation (Wilden *et al*., 2013; Pelham and Wilson, 1996; Drucker, 1989). Furthermore, all of the environment, strategy, technology and size of organisation factors influence the organisational structural design, among which the connection between strategy and organisational structure is particularly interesting. To be specific, the structural design reflects the competitive strategy while the change of strategy usually results in structural change in the organisation (Daft, 1998).

2.2.2 Operations and business processes in the organisation

A broad definition of operations includes all the activities that are necessary to fulfil the customers' requests as well as activities that manage the relationships among the organisational functions (Slack, 2007). Furthermore, the nature of the operations is a series of processes that transfer a set of input resources to outputs of products and services (Slack, 2007). The inputs are usually a mix of materials, information and customers (Slack, 2007). The operations with transformation processes usually transform the physical properties (e.g. a manufacturing company), or locations (e.g. a delivery company), or possession of the inputs (e.g. a retail company), as well as storing the inputs (e.g. warehouses, hotels). The outputs from the operational processes are tangible products or intangible services. Usually, the operational processes produce both products and services (Slack, 2007). To emphasize the point, when operation is understood as an activity, it means managing the processes within all the organisation's functions (Slack, 2007). Furthermore, a process that contains all the necessary elements of production for fulfilment of the entire customers' needs is called an end-to-end business process. Normally, these processes cover the whole organisation's functions (Slack, 2007). Champy and Hammer (1994) define a business process as a collection of activities that create an output that is of value to the customers from taking one or more kinds of input. The definition of business process from Champy and Hammer (1994) focuses on the input and output behaviours of a business process. However, it is argued that an ordering of the activities or the execution constraints should be emphasized in the concept of a business process (Weske, 2012). Davenport and Short (2003) define a business process as a set of logically related tasks that are performed in order to achieve a defined business outcome for a particular market or customer. Furthermore, he points out the business process should be a specific ordering of work activities. The terms 'logically related' and 'a specific ordering' put together focuses on the process activities and their designs.

Process design, which refers to the activities taken to make the performance of the process appropriate for its purposes, is very important in operational management (Slack, 2007). There are eight different types of processes in the organisation based on different types of production (Slack, 2007). In terms of the manufacturing

processes, there are five different types (Slack, 2007). Project processes are used for the activities that produce discrete, usually highly customised products. Jobbing processes (also known as "one-offs") also transform high variety and low volume products. Slightly different from the project processes with more or less exclusive input resources, resources input to jobbing processes are shared with many others. Batch processes are similar to jobbing processes but with less variety of products. Batch processes produce more than one product for each time. Mass processes transform the products with high volume and relatively narrow variety. Continuous processes produce even higher volume and lower variety products compared to mass processes (Slack, 2007). In addition, there are three different types of service processes (Slack, 2007). Professional services are people-based processes providing high levels of customisation services, such as consultants, lawyers, or architects. Service shops position themselves between professional services and mass services providing medium levels of volume and customisation. For example, banks, car rental companies, or hotels use types of service shop processes. Mass services transform services with limited contact time and little customisation. For instance, supermarkets, airports or libraries are included in the mass services type (Slack, 2007). Moreover, these processes are positioned relative to each other and the various tasks with the processes are allocated in a specific way, which is called 'layout'. Layout is related to process type. Slack (2007) identifies four different kinds of basic layout types. Fixed position layout indicates that transformed resources remain stationary in operational processes. In a functional layout, the transforming resources are located based on the needs and convenience of the functions in the process. To be specific, similar resources or processes are organised together. In a cell layout, the resources entering the operation are pre-selected to meet an immediate processing need, and after transforming, the transformed resources may go to another cell in the operational processes. In a product layout, the transforming resources are located for the convenience of the transformed resources entirely. As a so-called mixed layout, the design of this type of layout combines some or all of the elements from the other basic layout types or, in some other way, using a particular basic layout type in some different parts of the operational processes (Slack, 2007). Different process types influence different layout types. Usually, the processes for producing higher volume and lower variety products or services are more concerned with the location of the transformed resources. In

addition, for the operational objectives, the more important the cost is, the more likely the higher volume and lower variety processes are used (Slack, 2007).

Business process management aims to improve the way business people think about and manage their business processes (Hammer, 2010; Harmon, 2015). There are three traditions to carry out business process management (Harmon, 2015). One tradition is quality control, which focuses on output standards and statistical measures of quality, such as Total Quality Management (TQM), Lean and Six Sigma (Harmon, 2015). Management tradition emphasizes changes of business nature radically through innovation in order to give the business a competitive advantage, furthermore, to align strategy with the means of realizing the strategy (Harmon, 2015). Important tools used in management tradition include value chain analysis, and balanced scorecard (Harmon, 2015). The third tradition is the information technology tradition, which refers to the use of software applications and computers to automate work processes (Harmon, 2015). With business process reengineering, enterprise resource planning applications are typical tools used to manage business process in the information technology tradition (Harmon, 2015). Moreover, organisations work on all levels simultaneously to manage their processes (Harmon, 2015). At the enterprise level, organisations align processes with strategies and organize the processes within the entire enterprise. At the process level, organisations seek to explore new approaches for process analysis and redesign. At the implementation level, new technologies are adopted to support process work (Harmon, 2015). Business process management facilitates an organisation to create high-performance processes with faster speeds, greater accuracy, reduced assets, lower costs and enhanced flexibility (Hammer, 2010). End-to-end processes across organisational boundaries drive out the non value-added activities collected at these boundaries (Hammer, 2010). Furthermore, organisations should be able to adapt their current business processes according to newly arising opportunities and needs quickly (Minor *et al*., 2011). An organisation can replace a process which no longer meets its needs or its customers' needs through process management (Hammer, 2010). Therefore, business process management enables organisations to respond to periods of rapid change better (Hammer, 2010).

Supply chain management and enterprises resources planning are typical planning

and control business processes in organisations (Fawcett *et al.,* 2014; Jenatabadi *et al.,* 2013; Su and Yang, 2010). Enterprises resources planning is developed together with the technology development and investigated from the information technology tradition based on the discussions above (Harmon, 2015; Jenatabadi *et al.,* 2013); therefore, it is discussed in section 2.3.3 in this thesis. Supply chain management is discussed from the management tradition in various literatures and information technology is considered as essential technology involved (Fawcett *et al.,* 2014; Jenatabadi *et al.,* 2013; Coyle *et al.,* 2012). Supply chain management is becoming more and more popular together with the corporate expansion and a developing global culture (McAdam and McCormack, 2001). A supply chain is defined as a collection of entities that are involved in the upstream and downstream flows of finances, products, services and information directly from a source to a customer (Christopher, 2005; Mentzer *et al.,* 2001). Supply chain management aims to satisfy the end customers through providing appropriate products and services at a competitive cost when they are required and further to improve the competitive success and financial viability of organisations (Coyle *et al.,* 2012). To be specific, supply chain management aims to synchronize all supply chain activities for creating customer value (Langley and Holcomb, 1992). The main activities of supply chain management include purchasing and supplier management, supplier selection, global sourcing, and physical distribution management (Slack, 2007). To be specific, purchasing and supplier management deal with the links between the operations and their suppliers. The requirements of all the operational processes, the potential suppliers and also the capabilities of the suppliers are controlled and managed. Supplier selection refers to the choosing of appropriate suppliers through some assessment procedure. Global sourcing is one of the major developments of supply chain management in recent years, which means businesses source from outside the home country. Physical distribution management, also known as logistics, refers to the physical transportation of products and services to the customers (Slack, 2007). Furthermore, research has suggested organisations should establish management practices to allow them to carry out supply chain management activities, including integrated behaviour, mutually sharing information, mutually sharing risks and rewards, cooperation, and integration of processes (Mentzer *et al.,* 2001; Tyndall *et al.,* 1998; Cooper *et al.,* 1997; Bowersox *et al.,* 1996;).

To summarise, operations refers to activities of managing a series of business processes while business process is a set of logically related work activities in a specific order to achieve a business outcome. From a broader perspective, these business processes can be organized in different designs based on the various layouts according to the production. Business process management provides different ways to think about and manage the business processes from quality, management and information technology traditions. The business process management tends to align with strategy and supports cross-functional collaboration in the organisation (Rotaru *et al*., 2014).

2.2.3 Management and leadership in organisations

A well-known definition of management from Brech (1975: 19) is "a social process entailing responsibility for the effective and economic planning and regulation of the operations of an enterprise, in fulfilment of given purposes or tasks; such responsibility involves:

a) Judgement and decisions in determining plans and in using data to control performance and progress against plans;
b) The guidance, integration, motivation and supervision of the personnel composing the enterprise and carrying out its operations."

Naylor (1999: 6) recently offered a further definition: "Management is the process of achieving organisational objectives, within a changing environment, by balancing efficiency, effectiveness and equity, obtaining the most from limited resources, and working with and through other people". In summary, for achieving the given purposes or organisational objectives, management activities include (Mullins, 2002):

- Plans: deciding what needs to be achieved and the standards of the performance; developing a plan of action;
- Organising: managing the materials and human resources and constructing the structure of the organisation;
- Control: checking that actual activities are carried out according to the plans and the performances are satisfactory according to the standards;
- Co-ordination: ensuring the unification and harmony of all the activities and

efforts of the organisation;

- Motivation or command: inspiring the employees to work effectively, to be loyal to the tasks or group, getting optimum returns from all the members in the organisation.

Managers' activities are influenced significantly by the nature of both the internal and external environment they are working in (Mullins, 2002). The internal environment refers to the culture and climate of the organisation; the external environment refers to the changing opportunities and challenges, risks and limitations outside the organisation that organisations have to face. Moreover, these external environmental factors are also outside the control of management (Mullins, 2002).

Mullins (2002) identified ten managerial roles which can be classified into three groups: interpersonal roles, informational roles and decisional roles. The interpersonal roles are related to the influence of the manager's status and authority over other people, comprising of the figurehead role, leader role and liaison role.

- The figurehead role indicates that the manager is the symbol of the organisation and formally represents the organisation.
- The leader role concerns the responsibility, together with the other managers, for staff, such as motivation and guidance.
- The liaison role is concerned with the horizontal relationships between managers and the individuals or groups outside the units or organisation.

From the manager's interpersonal roles, the information roles arise in terms of sources and communication of information, including the monitor role, disseminator role and spokesperson role (Mullins, 2002).

- The monitor role refers to managers seeking and receiving formal or informal information from internal or external sources for developing an understanding of the organisational work and environment.
- The disseminator role indicates that managers transmit factual or valuable judgemental information from outside or within the organisation.
- The spokesperson role represents managers having formal authority to

transmit information to people outside the unit or organisation.

Based on the interpersonal and informational roles, managers make strategic organisational decisions as part of decisional roles, including the entrepreneurial role, disturbance handler role, resource allocator role and negotiator role (Mullins, 2002).

- The entrepreneurial role refers to managers initiating and controlling the plans for seeking improvement or solving problems in the organisation.
- The disturbance handler role is concerned with the reactions of managers to unexpected disturbance and unpredictable events.
- The resources allocator role involves managers making decisions on resources allocation to control the programming of work.
- The negotiator role refers to managers participating in negotiation activities with other individuals, groups or organisations.

In addition, all the specific management activities fit into different management hierarchical levels (Daft, 2000). Although managerial roles take different forms based on various types of organisational structures, they consistently exists at executive or top management level, middle management level, operational management level and non-managerial level (Steiger *et al*., 2014; Daft, 2000). At the top of the hierarchy are the top managers who take on the responsibilities to set organisational purposes, define the strategies, make decisions related to the whole organisation and analyse the external environment (Daft, 2000). Social intelligence and relationship management are important in the top management level (Yeo, 2007). Middle managers, positioned in the middle level of management, are in charge of business units and major departments and take on responsibilities to implement the strategies defined by the top managers (Daft, 2000). Middle managers play a critical role in connecting with other levels and they balance strategic focus with operational activities (Van Marrewijk *et al*., 2010). First-line managers take on the responsibilities directly related to the products or services being produced (Daft, 2000). The non-managerial level consists of the largest number of employees (Steiger *et al*., 2014). They take responsibility to carry out daily operational activities following implemented strategies decided by upper level managers (Steiger *et al*., 2014). On the other hand, from the horizontal perspective, functional managers are

responsible for different functional departments such as manufacturing, finance or human resources as discussed previously.

Management power is derived from the organisational structure, which aims to promote stability, order, and problem solving; while leadership, which is not necessarily related to the hierarchical structure of the organisation, focuses on the interpersonal behaviour in a broader context (Mullins, 2002). Leadership, which is a crucial part of the management process, is defined as "an interaction between members of a group. Leaders are agents of change; persons whose acts affect other people more than other people's acts affect them. Leadership occurs when one group member modifies the motivation or competencies of others in the group" (Gibson, 2000: 272). In brief, leadership presents the ability of an individual to motivate, influence and enable other people to contribute to the success and effectiveness of the organisation (Dickson *et al.,* 2012). Leadership supports clarification of mission, vision and values, identification of strategies, structure and policies, as well as generation of efficient learning processes (Ajmal *et al.,* 2012). Furthermore, leadership facilitates subordinates to develop their thinking systematically (Ajmal *et al.,* 2012). The styles of managerial leadership are classified as three types including the autocratic style, democratic style and *laissez faire* style in a broad way (Mullins, 2002). With the autocratic style, the focus of power is on the manager alone and the interactions in the group are all towards the manager. In the democratic style, greater interaction exists within the group. The focus of power is with the group and the functions of leadership are shared within the group. In the *laissez faire* style, managers just observe the members of the group without interfering and leave the rights of decision making to the members themselves (Mullins, 2002). However, these managerial leadership styles mainly focus on how leaders influence subordinates in the group when these different leadership styles perform as different behaviours. These leadership behaviours include task-oriented behaviours, such as clarifying, planning, and monitoring operations; and problem solving and relations-oriented behaviours, such as supporting, developing, recognizing and empowering (Yukl, 2012). As Yukl (2012) points out, early research on leadership behaviour emphasizes how a leader impacts on subordinates and internal activities in the work unit while few studies on leadership examine external leadership behaviours (Yukl, 2012). Yukl (2012) argues external leadership behaviours aim to acquire necessary

information and resources so as to increase collective learning, innovation and adaptation to the external environment. External leadership behaviours include change-oriented behaviours, such as advocating change, envisioning change, encouraging innovation, facilitating collective learning; and external behaviours, such as networking, external monitoring and representing (Yukl, 2012).

Leadership has been shown to influence organisations from different perspectives. Some researchers found that leadership impacts organisational performance and choice (Haleblian and Finkelstein, 1993). Various studies have considered that leadership can influence change and innovation within the organisation (Elenkov *et al.,* 2005). In particular, some researchers have investigated the impact of leadership on management innovation (Vaccaro*,* 2010; Birkinshaw *et al.,* 2008). It is also suggested that since leaders in larger organisations may face more difficulties due to the complex organisational context, the impact of leadership decreases when the organisation becomes bigger (Koene *et al.,* 2002). Dickson *et al.,* (2012) explored the relationships between leadership and culture in organisations. They argue that some leadership behaviours may be more universally accepted in some types of cultures than others. Culture is discussed in the next section.

2.2.4 Culture in organization

There are two types of culture that can influence an organisation. These are the national culture and the organisational culture. Jaeger (1986) summarised an ideational view of culture from most management researchers as "a set of ideas shared by members of a group". Furthermore, from the definition of Keesing (1974), who defined culture as "an individual's theory of what his fellows know, believe and mean, his theory of the code being followed, the game being played", Jaeger (1986) emphasised the cultural concerns by using a set of common theories of behaviour or mental thinking shared through a group of individuals, rather than seeing it as an individual characteristic. Newman and Nollen (1996) described how "national culture is defined as the values, beliefs and assumptions learned in early childhood that distinguish one group of people from another", which is consistent with the previous definitions. In a broader context, there are three levels of culture containing

basic assumptions and premises, values and ideology, as well as artefacts and creations (Schein, 1992).

Hofstede's (1980, 1991) five national dimensions are used to differentiate the national culture group, including power distance, uncertainty avoidance, individualism (collectivism), masculinity (femininity) and long-term (short-term) orientation (Newman and Nollen, 1996; Jaeger, 1986). His work is well known as a framework for classifying countries according to work-related values (Dickson *et al.,* 2012). Hofstede proposed the framework based on a study carried out with IBM managers who were geographically dispersed in more than 40 countries (Hofstede, 1980). Four culture dimensions were originally identified in his work in 1980 while the fifth one, long term (short-term orientation), was added subsequently in 2001 (Hofstede, 2001). Power distance describes the extent to which members in society accept unequal distribution of power in organisations and institutions (Dickson *et al*., 2012; Hofstede, 2001; Newman and Nollen, 1996). Power distance has impact on the importance and expectation given to power statuses. Leaders are expected to take directions while subordinates are expected to obey and not to take initiatives; for example, China or Russia has a higher power distance index than Scandinavian countries (Vanhee *et al.,* 2014). Uncertainty avoidance describes the extent to which a society avoids uncertain situations and ambiguity (Hofstede, 1980). Societies with a high uncertainty avoidance score tend to provide career stability, establish more formal rules and believe in absolute truths and expertise attainment (Newman and Nollen, 1996). Individuals in high level uncertainty avoidance cultures resist risk and unexpected events by focusing on rules and norms (Dickson *et al.,* 2012). Conversely, individuals from a low level uncertainty avoidance culture tend to accept situations with unspecified behaviour and unclear outcome without presence of rules. For example, Greece and Japan have higher level uncertainty avoidance than Sweden and China (Vanhee *et al.,* 2014). Individualism and collectivism describe cultural differences according to independence versus interdependence (Dickson *et al.,* 2012; Hofstede, 2001). In individualistic societies people are supposed to take care of themselves, their immediate families and their own interests; while in collectivist societies, people distinguish between in-groups and out-groups and are expected to put the interest of the collective ahead of their personal interests (Dickson *et al.,* 2012; Hofstede, 2001; Newman and Nollen, 1996). In a lower individualistic society,

an individual's identity tends to link to his or her social context. Thus, individual goals tend to link to his or her context while in high individualism cultures, individuals are expected to be independent of any context. For example, the USA and Great Britain have a higher individualism culture than China or South American countries (Vanhee *et al.,* 2014). Masculinity and femininity describe the extent to which the dominant values in society are masculine such as strength, competitiveness or material achievement; or where the dominant values are feminine pursuits such as concern for others, quality of life or quality of relationships (Dickson *et al.,* 2012; Hofstede, 2001; Newman and Nollen, 1996). In high level masculine societies, good performance is recognized and rewarded further leading to competition while in low masculine cultures, interactions emphasize the building of cooperation and establishing consensus; for example, Japan and Italy are higher masculine cultures than the Scandinavian countries (Vanhee *et al.,* 2014). Long term and short term orientation describes the extent to which people respect tradition, protect each other's face, have a sense of obedience and fulfil social obligations (Dickson *et al.,* 2012; Hofstede, 2001). Long term and short term orientations influence the span of time used to take decisions. Furthermore, in long term orientations, relationships are built on long lasting trust; while in short term orientation cultures, immediate success and avoiding failure are emphasized and decision making is dependent on dogmatic rules. For example, extreme-Asian countries are in long term orientation versus Great Britain and Canada (Vanhee *et al.,* 2014).

One of the more recent refinements and developments of culture dimensions is Project GLOBE (Dickson, 2012; House *et al.,* 2002). Project GLOBE (House *et al.,* 2004) describes 64 cultures with nine dimensions, including performance orientation, future orientation, assertiveness, power distance, human orientation, institutional collectivism, uncertainty avoidance and gender egalitarianism (Dickson, 2012). However, some of these dimensions still have their origins in Hofstede's work conceptually (Dickson, 2012). Hofstede's dimension on national culture is popularly used in these studies. Taras *et al.,* (2012) have explored how to use the analysis of Hofstede's dimensions to improve national cultural indices. Some researchers investigate national culture in a particular dimension of Hofstede's work (Minkov and Hofstede, 2014) while other researchers focus on the relations of Hofstede's

culture dimensions with personality factors (Migliore, 2011). Considering its popular application, there are even conflicts among different studies. Yoo *et al.,* (2011) developed 26-item five dimensional scales to assess Hofstede's cultural dimensions at individual level. However, after investigating how the Hofstede and GLOBE national culture dimensions are used in analysis (Venaik and Brewer, 2013; Brewer and Venaik, 2012; de Mooij, 2013), they argue that Hofstede and GLOBE national culture can be applied to groups of individuals rather than an individual (Venaik and Brewer, 2013; Brewer and Venaik, 2012; de Mooij, 2013).

National culture has a significant impact on organisational behaviour (Mullins, 2002). Especially in today's environment of globalisation, the importance of understanding how to manage differences between national cultures is emphasised especially in the organisation (Mullins, 2002). National culture influences organisations in many ways. For example, Newman and Nollen (1996) discovered that when management practices in the organisation were aligned with the national culture, the organisational financial performance was higher. Jaeger (1986) identified that there was a link between organisational development interventions and a given national culture configuration. Vanhee *et al.,* (2014) investigate the relationship between national culture and organisations in detail. They link each of Hofstede's dimensions with each aspect of organisations. Shao *et al.,* (2013) have explored how national culture influences corporate investment. Therefore, to investigate the business-IT alignment in the Chinese SOE context, the importance of national culture should be emphasised.

The organisational culture concept originated in cultural anthropology and is popular in management, marketing and organisational behaviour studies (Hogan and Coote, 2013). Organisational culture is "what the employees perceive and how this perception creates a pattern of beliefs, values, and expectations" (Gibson, 2000: 30). It can be understood as the broadly defined culture in an organisational group. Mullins (2002: 802) presented a detailed definition of organisational culture as "the collection of traditions, values, policies, beliefs, and attitude that constitute a pervasive context for everything we do and think in the organisation". The essence of organisational culture is that members in an organisation can find solutions with internal integration and adaptation to environment when there is a problem, as well

as coordinate through shared cultural values (Uzkurt *et al.,* 2013; Blackwell, 2006). The origin of organisational culture from a view of national culture is based on the work of Deal and Kennedy (1982) (Manetje, 2009). Organisational culture is considered to be central to organisational success according to this point of view; therefore, organisational culture is more emphasized than national culture (Manetje, 2009). Deal and Kennedy identified four generic types of organisational cultures, based on the risk degree of the organisation's activities and the speed of receiving feedback on the decisions or strategies forming two determining factors, as shown in table 2.1.

Risk degree / Speed of feedback	High	Low
Quick	Tough-guy, macho culture	Work hard/play hard culture
Slow	Bet your company culture	Process culture

Table 2.1 Four types of organisational culture (Mullins, 2002: 803)

Several studies have classified organisational culture into categories; however, most prior studies consider organisational culture is constructed in a single level (Uzkurt *et al.,* 2013; Hogan and Coote, 2013). Schein (1992), however, analysed it and distinguished between three layers. In the artefacts and creations level, cultural things are visible but not interpretable; for example, the organisational annual report, wall dividers between workers or furnishings fall into the artefacts and creations level (Gibson, 2000; Schein, 1992). In layer two, values are found, which refers to the conscious, affective desires or wants, the things that are important to people (Gibson, 2000; Schein, 1992). The assumptions and premises layer includes basic assumptions people make to guide their behaviours. Furthermore, these assumptions tell people how to "perceive, think about and feel about work, performance goals, human relationships, and the performance of colleagues" (Gibson, 2000: 30). Chinese SOEs have their own special organisational culture, which will be emphasised and analysed in this study.

A culture web is another kind of tool used to describe the culture of an organisation.

Different aspects are brought together for analysing organisational culture as follows (Johnson *et al.,* 2008; Mullins, 2002):

- Routines indicate the way in which things are done or how things should happen on a day-to-day basis in the organisation.
- Rituals mean the special activities or events which are highlighted, emphasised or reinforced as being of special importance in the culture such as training programmes, promotion and assessment procedures.
- Stories are a way of distributing what is important in an organisation, which are told by members through embedding the present in the organisational history and flagging up important events and personalities.
- Symbols are objects, events and acts which represent the nature of the organisation through conveying meanings above their functional purpose such as logos, offices, type of language and so on.
- Power structures are the most powerful individuals or groups within an organisation.
- Control systems are measurement and reward systems that reinforce what it is important to focus attention on in the organisation.
- Organisation structure reflects power and shows important roles, relationships and activities within the organisation.

A number of previous studies have investigated organisational culture and its performance. Baird *et al.,* (2011) found that the organisational cultural dimension orientation is positively related to the extent of use of business management practice. Acar and Acar (2014) explored different organisational cultures and their various effects on organisational performance. Hogan and Coote (2013) argued the impact of organisational culture on performance from a management innovation perspective. Organisational culture plays a crucial role in organisational effectiveness and performance.

2.3 Systems theory

An organisation can be seen as a system that transforms the inputs including

materials, information and customers, to outputs such as products or services through a set of operational activities (Slack, 2007). Many other scholars also present the idea of viewing the organisation or business process as a system of flows (Mullins, 2008; Chaffey and Wood, 2005; Alter, 1996; Mintzberg, 1979). This section aims to provide a comprehensive review of the concepts of systems and information systems.

2.3.1 Concepts of systems and information systems

Many scholars have contributed to the definition of 'system'. Ackoff (1971) defined it as follows: "A system is a set of interrelated elements. Thus a system is an entity which is composed of at least two elements and a relation that holds between each of its elements and at least one other element in the set". According to Maddison and Darnton (1996), a system is considered as a set of components connected together in an organised way. From Chaffey and Wood (2005: 26), a system was defined as "a collection of interrelated components that work together towards a collective goal". To sum up, as a system, two aspects are emphasised in the definitions: one is the elements or components of a system; while the other is the relationship between or among these components. Furthermore, in the system, these components are organised for a particular purpose and therefore can perform some functions. The behaviours of the systems are also influenced by adding or removing components (Maddison and Darnton, 1996).

Particularly, Chaffey and Wood (2005: 26) explained the concept of system in an organisational context as "the system in [an] organisation is made up of all the processes within the organisation that work towards achieving its goal". As mentioned before, the organisation can be considered as a system that produces outcomes such as products or services from inputs such as resources through transformational processes (Slack 2007; Chaffey and Wood, 2005). In an organisational system, the element environment should be emphasised considering the interaction between them. In addition, two other elements, feedback and control, are required in an organisational system to manage the performance of the system for an organisation to achieve its goal (Chaffey and Wood, 2005). The features of an organisational system are shown in figure 2.6.

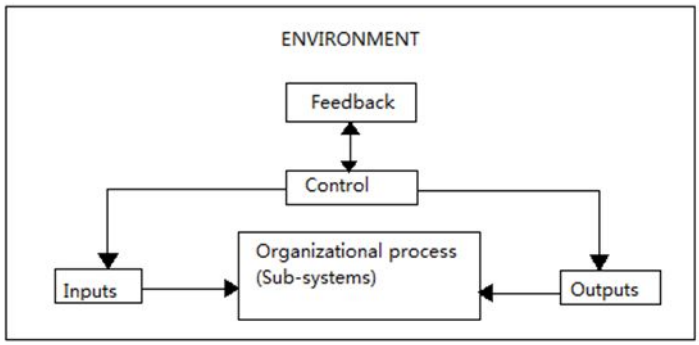

Figure 2.6 The organisational system (adapted from Chaffey and Wood, 2005: 27)

It should be noted that there are two different aspects of organisational environment, micro-environment and macro-environment (Chaffey and Wood, 2005). The micro-environment refers to the forces coming from the stakeholders of the organisation. For example, the demands of customers and the services provided to them, together with the competitors and suppliers, shape the marketplace of the organisation. This is the typical type of micro-environment. On the other hand, the macro-environment has broader influences on organisational systems. For instance, economic factors, government regulations, legal factors, as well as technology and some social constraints are all considered as macro-environment elements (Chaffey and Wood, 2005). Environmental influences are very important to the organisational systems, so it is necessary to consider the environment when analysing organisational systems.

Kroenke and Hatch (1993) stated that the term 'information' is very difficult to define and is usually defined in different ways. To understand the concept of information, it is important to distinguish information from data (Chaffey and Wood, 2005; Kroenke and Hatch, 1993). Data is defined as "recorded facts or figures" (Kroenke and Hatch, 1993: 11), or "discrete, objective facts about events" (Chaffey and Wood, 2005: 21); while "information is knowledge derived from data" (Kroenke and Hatch, 1993: 11). To be specific, information is "organised data, meaningful and contextually relevant" (Chaffey and Wood, 2005: 21). Some scholars may include 'uncertainty reduction' in the concept of information. To help understand the concept of information, the statement from Gregory Bateson is useful; he explained information as "a difference that makes a difference" which reflects how people usually think of information (Kroenke and Hatch, 1993: 12). Information contributes

a lot to improve the performance of organisations and their employees. On one hand, information resources can help organisations to deliver products and services with better quality and also acquire more profits. On the other hand, more useful and timely information is helpful to the individual's performance through supporting their decision-making (Chaffey and Wood, 2005).

An information system is "a means of catering for the following and storage of knowledge and information to satisfy the needs of all users", and also a system that "accepts data presenting knowledge and information, stores it, processes it and outputs information for people to use" (Maddison and Darnton, 1996). Chaffey and Wood (2005: 43) summarised information systems as "the means by which organizations and people, using information technologies, gather, process, store, use and disseminate information". Briefly, an information system is a system that uses information technology to manage information (Chaffey and Wood, 2005; Alter, 1996). Specifically, information systems are not necessarily computer-based; any system that provides information to organisations can be called an 'information system' (Maddison and Darnton, 1996; Hicks, 1993). For instance, manual information systems are also a kind of information system; however, they are becoming less significant nowadays (Hicks, 1993).

Furthermore, for an information system in organisations, "an information system can be defined technically as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organisation" (Laudon and Laudon, 2006: 14). Apart from supporting decision-making and control, information systems are also helpful with problem analysis, production of new products, and so on. As a kind of system in the organisation, Landon and Laudon (2006) also explained the mechanism of how an information system achieves its functions such as decision-making and operational control in an organisation. Three activities are included in this mechanism. Firstly, raw data from inside or outside the organisation are collected through the activity 'input'. After that, this input is transferred into a useful form by the activity 'processing'. Finally, the activity 'output' makes people acquire the processed information or transfers the information to the activities that need it. In addition, feedback is also required by information systems to help the users with improving the input stage. Furthermore,

Laudon and Laudon (2006: 15) emphasised that "an information system contains information about an organisation and its surrounding environment."

To sum up, organisations can be considered as a system that creates products or services as output. Information systems are a kind of system that manages information transferred through operational activities usually via information technology in the organisation. To acquire further understanding, information technology is discussed in the next section.

2.3.2 Information technology in the organisation

Information technology refers to any artefact with a technological base which consists of computer hardware and software to collect, manipulate, store or distribute information (Slack, 2007; Cooper and Zmud, 1990). From an organisational perspective, information technology consists of "all the hardware and software that a firm needs to use in order to achieve its business objectives" (Laudon and Laudon, 2006: 13).

Kroenke and Hatch (1993) stated that hardware usually means computer equipment, but in a manual system the hardware may include things such as pencils or paper. Furthermore, he pointed out that nowadays, in most information systems, hardware means computer hardware. Raymond (1994) defined hardware as "all of the equipment that comprises a computer system". Furthermore, Kroenke and Hatch (1993) summarised the main components of hardware in an information system as input devices, output devices, storage devices, main memory and central processing unit (CPU).

Chaffey and Wood (2005: 58) summarised that software is defined as "instructions or programs used to control a computer system through interaction with hardware". There are two types of software: applications software and systems software (Chaffey and Wood, 2005; Hicks, 1993). Application software refers to "software programs used by business users to support their work"; while the systems software "controls the resources of the computer system as it performs tasks for the end user

through acting as a bridge between the hardware and applications software" (Chaffey and Wood, 2005: 59-60). The main categories of applications software include enterprise software, departmental applications, and personal productivity and group working applications (Chaffey and Wood, 2005). Enterprise systems support key processes for events and transactions as well as record or document management across the organisation. Departmental applications provide support for specialist applications within the organisation. Personal productivity and group working applications support individuals for their tasks in the organisation (Chaffey and Wood, 2005). On the other hand, Chaffey and Wood (2005) summarised that there are three types of systems software: operating systems, development software and database systems. Operating systems are used to link the hardware and applications software. Development software is a type of systems software that is used to program, such as VB and Java. Database system is another important category of systems software used to manage data (Chaffey and Wood, 2005).

Previously, the most economical way of using processing devices for management purposes was to use large centralised computers. Together with the development of the technology, smaller distributed computers were used for different parts of the operation, which became economically feasible (Slack, 2007). Local area networks (LANs) are used to link these distributed computers together so that they can communicate with each other. A LAN is "a communications network that operates, usually over a limited distance, to connect devices such as PCs, servers and so on" (Slack, 2007: 228). The basic components of a LAN consist of "a client computer and a dedicated server computer, network interfaces, a connection medium, network operating system software, and either a hub or a switch" (Laudon and Laudon, 2006: 270). LANs can link to wide area networks for long distance communication. Wide area networks (WANs) connect broader geographical distances such as entire regions or even the entire globe (Laudon and Laudon, 2006). The Internet is the most universal WAN. The services provided by the Internet platform include email, Usenet newsgroups, chatting and instant messaging, telnet, file transfer protocol (FTP) and the World Wide Web (Laudon and Laudon, 2006).

To sum up, information technology is becoming significantly more important nowadays for information transfer across the organisation or between the company

and other organisations. Information systems are more complex since they have to be considered from both the technology and business perspectives.

2.3.3 Differentiating information systems and information technology

Sections 2.3.1 and 2.3.2 have discussed the concepts of information systems and information technology. From a conceptual understanding, information systems do not necessarily use technology; any system that provides information to organisations can be called an 'information system' (Maddison and Darnton, 1996; Hicks, 1993). However, manual information systems are becoming less important nowadays. Information systems discussed in this thesis are information systems using technology. On the other hand, as has been discussed in section 2.3.2, information technology includes computer hardware, software and networking and telecommunications technology. Among all the components of information technology, application software is closely related to the fundamental use of information systems. However, information systems are much more complex than application software. For a broader understanding of information systems, it requires an understanding of organisation, management and information technology, as shown in figure 2.7 (Laudon and Laudon, 2006).

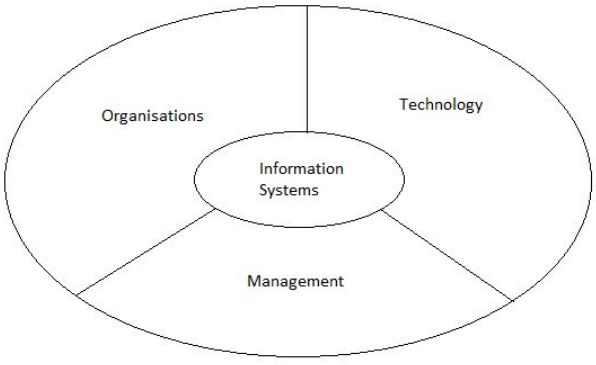

Figure 2.7 Information systems and information technology (adapted from Laudon and Laudon, 2006:16)

Information systems emphasize the organisational and management perspectives. From a business view, an information system provides management and organisations solutions to the challenges and problems created by the environment,

based on information technology (Laudon and Laudon, 2006). Furthermore, an information system is used as important tool to create value for the organisations (Laudon and Laudon, 2006). From a literacy view, information systems literacy holds both a behavioural and a technical approach to information systems studies. In contrast, computer literacy mainly focuses on information technology knowledge (Laudon and Laudon, 2006).

Researchers may not distinguish information technology and information systems very explicitly when it is not necessary based on the studies. For example, Rivad and Lapointe (2012) and Venkatesh *et al*. (2003) have investigated the user acceptance of information technology. They use the term 'information technology' as the topic and use 'information technology' and 'information systems' interchangeably in the discussion although they are investigating if users have adapted to information systems implementations when new information technology is involved. Moreover, information systems are emphasized when researchers explore functions of systems or carry out information systems studies from business perspectives (Romney *et al.,* 2012; Hall, 2012; Petter *et al*., 2013). This study aims to investigate the IS strategic alignment. There is a conceptual development about business IT/IS alignment, which is discussed in section 2.4.3.2 in detail.

2.3.4 Types of information systems in the organisation

Information technology influences organisational business processes in many different ways (Brien, 2002). Information systems are one of the important ways of supporting and enabling business processes. According to the business processes they support, information systems can be categorised from a functional perspective, as sales and marketing systems, purchasing systems, manufacturing systems, finance and accounting systems, as well as human resources systems (Laudon and Laudon 2006). Sales and marketing systems support the processes of sales, marketing, advertising or promoting the products or services created by the organisations. Purchasing systems help to control the operational or management activities with suppliers. Manufacturing and production systems control the processes of planning and producing goods or services as well as helping to deal with the development and

maintenance of the production facilities. Finance and accounting systems support the management and maintenance of the organisation's financial records, as well as helping manage the financial assets and investments to maximise the return on them. Human resources systems help to manage and maintain employees' records as well as supporting the activities of attracting and maintaining employees and developing their talents and skills (Laudon and Laudon, 2006).

On the other hand, all these functional information systems support the organisation from different management and decision-support levels, including transaction processing systems (TPS), decision support systems (DSS), management information systems (MIS), and executive information systems (EIS) (Laudon and Laudon, 2006; Gupta, 1996; Hicks, 1993; Kroenke and Hatch, 1993; Awad, 1988). TPS are basic computerised systems developed from the 1950s to 1960s, which are aimed at keeping a record of the daily transactions in organisations (Laudon and Laudon, 2006; Kroenke and Hatch, 1993). The outputs of TPS are operational results or reports constructed from transaction data or updated master data (Kroenke and Hatch, 1993). MIS aim to monitor and control the performance of organisations by providing reports with vital information to middle managers for assisting them with tactical decision making (Gupta, 1996). TPS, as mentioned above, provide the operations information for MIS to summarise and report (Laudon and Laudon, 2006). Usually, summary reports accumulate from the transaction information, or exception reports describe unexpected performance; both are outputs of MIS (Gupta, 1996). DSS are interactive systems that facilitate and support the solutions and decisions for unstructured or semi-structured problems through providing data, tools or models to managers (Gupta, 1996; Kroenke and Hatch, 1993). Decision support systems emphasise the need to make decisions on the unique and rapidly changing problems facing the company, using information provided by both internal resources, such as MIS or TPS, and external resources (Laudon and Laudon, 2006). EIS help senior managers make decisions on strategic and long-term issues based on the information from both inside the organisation and from the external environment by producing standard format reports (Laudon and Laudon, 2006; Gupta, 1996; Hicks, 1993). In addition, EIS are user-friendly systems usually using a portal that applies a web interface to show the most significant data to the managers (Laudon and Laudon, 2006; Gupta, 1996).

In summary, information systems support the operation and management in the organisation from both the horizontal level, as in different functional areas, and the vertical level, in order to facilitate different levels of management, as shown in figure 2.8.

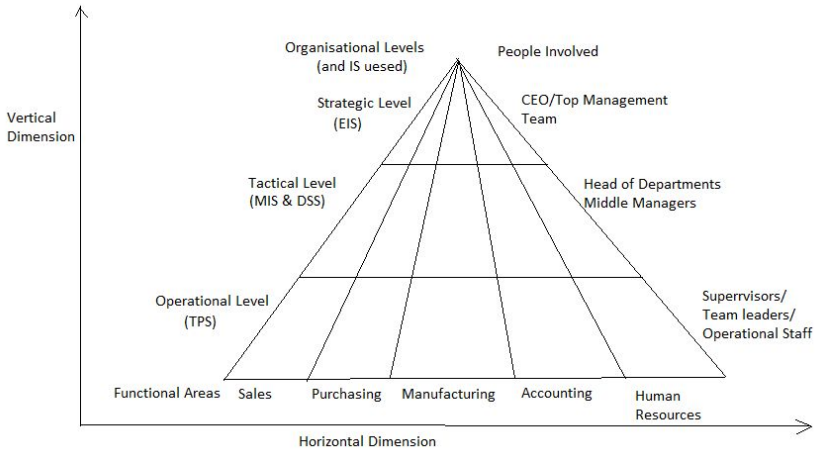

Figure 2.8 Division of organisational levels and functional areas (Chen *et al*., 2012, modified from figure 2.11 in Laudon and Laudon, 2006: 60)

In large organisations, it is important to get all these different types of information systems across different functional areas and management levels in order to share information and work together, which is a major challenge. To implement enterprise applications is one of the solutions (Laudon and Laudon, 2006). There are mainly four types of enterprise applications: enterprise resource planning (ERP) systems, supply chain management (SCM) systems, customer relationship management (CRM) systems and knowledge management systems (KMS) (Laudon and Laudon, 2006). ERP is "the integration of all significant resource planning systems in an organisation" (Slack, 2007: 452). To be specific, EPR systems collect data from "various key business processes in manufacturing and production, finance and accounting, sales and marketing, and human resources and store the data in a single central data repository", thereby integrating planning and control of all the functions in the business process (Slack, 2007; Laudon and Laudon, 2006: 61). Since ERP systems collect information from different business processes throughout the whole enterprise, it facilitates the data sharing and work connection. Furthermore, the time spent on communication among the business units in enterprise operations is reduced, and the flexibility for the company to respond to customers is increased (Slack, 2007;

Laudon and Laudon, 2006). Supply chain management systems "provide information to help suppliers, purchasing firms, distributors, and logistics companies share information about orders, production, inventory levels, and delivery of products and services so that they can source, produce, and deliver goods and services efficiently" (Laudon and Laudon, 2006: 62). SCM systems promote the relationships between enterprises and their suppliers. It reduces the costs of delivery and improves the processes of sourcing, producing and distributing (Laudon and Laudon, 2006). CRM systems "provide information to coordinate all of the business processes that deal with customers in sales, marketing, and services in order to optimise revenue, customer satisfaction, and customer retention" (Laudon and Laudon, 2006: 64). CRM systems integrate customer information from various sources. Therefore, enterprises can acquire knowledge of customers such as their preferences in more detail. This increases the effectiveness of the company in improving customer support and services (Laudon and Laudon, 2006). KMS "support processes for acquiring, storing, distributing, and applying knowledge, as well as processes for creating new knowledge and integrating it into the organisation" (Laudon and Laudon, 2006: 65). KMS increase the enterprise's ability to capture and apply knowledge and expertise. This is more and more important with the increasing concerns on the intangible assets nowadays. Knowledge management systems make all of the relative knowledge inside and outside the enterprise available at any time in order to support the business processes (Laudon and Laudon, 2006).

To sum up, all these different types of information systems support the operations and management in the organisation around various functional processes and organisational levels and help organisations solve different problems at different levels; consequently, this improves the competitive advantage of organisations. As important tools to support operations and management in the organisation, information systems influence organisations and business processes in many different ways. Firstly, information systems influence organisational structure (Laudon and Laudon 2006; Hick 1993). The hierarchies of the organisation are flattened following information systems implementation since the distribution of information is broadened to improve the management efficiency (Laudon and Laudon, 2006). Secondly, information technology and information systems change the relative costs of capital and information through substituting for traditional

capital and labour (Laudon and Laudon, 2006). Thirdly, information systems contribute to improving the competitive advantage of the organisation (Laudon and Laudon, 2006; Hicks, 1993). To be specific, information systems help organisations decrease product cycles, improve productivity, product differentiation as well as the quality of products or services. Furthermore, more and better information can be acquired and some decisions in the organisation can be made automatically through the implementation of information systems to facilitate the growth of business in the organisation.

2.4 Strategic thinking in the organisation

This section discusses the concept and development of the business strategy and the IS strategy. In addition, the concept of business-IT alignment and the studies on strategic alignment models are reviewed, and research on how to assess business-IT alignment is discussed. A new IS strategic alignment model is developed based on the literature.

2.4.1 Business strategy

To define the term 'strategy' is quite complicated, as it has always been interpreted from different perspectives. Many studies have been undertaken on the concept of strategy; however, there is no common agreement for this (Lynch, 2006). Although a single definition has only been partly agreed by scholars, Campbell *et al.,* (1999: 9) cite a widely quoted definition of strategy from Chandler from the Harvard Business School in 1962:

"Strategy is the determination of the basic long-term goals and objectives of an enterprise and the adoption of courses of actions and the allocation of resources necessary for carrying out these goals".

Three main components include: determination of the basic long term goals; adoption of courses of action; and allocation of resources are identified in the concept of strategy (Campbell *et al.,* 1999). However, one main topic 'environment'

is not included in this concept (Lynch, 2009). A recent development of understanding the strategy concept is to relate the organisation's strategy to the environment where it operates. Johnson *et al.,* (2008: 7) stated that "strategy is the direction and scope of an organisation over the long term, which achieves advantage in a changing environment through its configuration of resources and competences with the aim of fulfilling stakeholder expectations." Obviously, the basic components "long term goals" and "allocation of resources" are still included in the new definition. Furthermore, "a changing environment" is emphasised in the new definition. This is very important for this study since the Chinese SOEs are facing a more complicated and competitive environment following the reforms. To sum up, strategy is the determination of the purpose of the organisation over the long term and the actions and resources allocation in order to achieve the purpose in a changing environment (Lynch, 2009; Johnson *et al.,* 2008; Campbell *et al.,* 1999).

Based on the conceptual understanding of the strategy, scholars have investigated the strategy in three core areas (Parnell, 2014; Lynch, 2009; Johnson *et al.,* 2008; Barney and Hesterly, 2008; Ward and Peppard, 2005; Wit and Meyer, 2004). Strategic analysis identifies the mission and objectives of the organisation. Strategic environment, resources and capabilities are explored in the strategic analysis area to determine the mission and objectives of the organisation in terms of its strategic direction. Strategy development developed and selected the strategic options. Although there are concerns about network-level strategy or international strategy together with the organisational development (Johnson *et al.,* 2008; Wit and Meyer, 2004), the main focuses in the strategy development area are the business-level and corporate-level strategy options. The strategy implementation area is concerned with implementing the selected options (Lynch, 2009; Johnson *et al.,* 2008).

To be specific, general environment and industry environment are mainly considered in environment analysis (Lynch, 2009; Johnson *et al.,* 2008). For general environmental analysis, PESTEL analysis is widely used. PESTEL analysis is a comprehensive six-point checklist including political, economic, social-cultural, technological, environmental and legal aspects for guiding a particular organisation through a macro-environmental analysis (Lynch, 2009; Johnson *et al.,* 2008). Furthermore, since the environment is becoming uncertain, a scenario-based model

is used for possible future environmental analysis (Lynch, 2009; Johnson *et al.,* 2008). Specifically, Porter's five forces model is developed for competitive industry-environment analysis (Lynch, 2009; Johnson *et al.,* 2008). Porter identified the bargaining power of suppliers and buyers, the threat of potential new entrants and substitutes, as well as the extent of competitive rivalry, as the five forces impacting organisations (Lynch, 2009; Johnson *et al.,* 2008).

Analysis of resources and capabilities of organisations aims to identify where value is added and further explore and improve the competitive advantages of the organisation (Lynch, 2009). Resources and capabilities are identified as the assets that contribute to generate value added (Lynch, 2009). Resources are usually classified as tangible resources, which are the physical assets of an organisation that contribute to value added, such as raw materials; and intangible resources, which are non-physical assets but bring real benefit to the organisation, such as reputation (Lynch, 2009; Johnson *et al.,* 2008; Grant, 1991). Especially, Grant (1991) emphasised personnel-based resources which are actually part of intangible resources, including technical knowledge and other knowledge assets such as organisational culture and employee training. Personnel-based resources are important in analysing IT/IS resources (Bharadwaj, 2000), which are discussed in the next section. The strategic capability of an organisation is defined as the resources and competences needed in the organisation to survive and prosper, such as skills, routines, management or leadership (Lynch, 2009; Johnson *et al.,* 2008). There is some confusion when defining the three important concepts: resources, competences and capability. For example, some researchers consider that capability is actually part of intangible resources in strict definitional terms (Lynch, 2009; Johnson *et al.,* 2008). Lynch (2009) explained capability as the ability of an organisation to deploy and share the tangible and intangible resources so as to connect different parts and various activities effectively across the organisation. This is very similar to Johnson *et al*.'s (2008) definition of competences. Peppard and Ward (2004) distinguish these three concepts: resources, competencies and capability. Resources are available factors owned or controlled by the organisation (Peppard and Ward, 2004; Amit and Schoemaker, 1993). Competence refers to the ability including a bundle of skills and technologies to deploy a combination of resources to complete a given task (Peppard and Ward, 2004; Teece *et al.,* 1997; Prahalad and Hamel, 1994; Amit and

Schoemaker, 1993). Organisational capability refers to strategically using and deploying competence in order to achieve organisational goals (Peppard and Ward, 2004; Kangas, 1999; Teece *et al.,* 1997). Furthermore, Peppard and Ward (2004) point out that even for the competences underpinning the same organisational capacity, different resources can be integrated and coordinated, or in different ways, according to the organisational context such as history, people or structure. This distinction is helpful in conceptual understanding but capability can still be considered as part of a complex intangible resource even when based on the distinguished concepts.

Resources play a fundamental role of adding value to an organisation (Lynch, 2009). Value added is defined as the difference between market value of output and the cost of input in the organisation (Lynch, 2009). Value added contributes to the competitive advantage of an organisation through two routes: value chain and value system, which is also called value network (Lynch, 2009; Johnson *et al.,* 2008). Value chain links the process with the main functional parts of organisations and identifies where value is added in the categories of activities within the organisation (Lynch, 2009; Johnson *et al.;* 2008). Value system or value network links the inter-organisational value chain with other relationships that are necessary to create products or services and identifies the value added to incoming supplies and outgoing distributors and customers (Lynch, 2009; Johnson *et al.,* 2008). Value chain and value system are helpful in understanding and analysing the way that resources contribute to competitive advantages.

Competitive advantages are diminished when the resources delivering added value are copied by the competitors. Sustainable competitive advantage is an advantage that cannot be easily imitated by competitors (Lynch, 2009). In order to identify the exceptional resources which contribute to sustainable competitive advantages, the resource-based view is developed. The resource-based view emphasises the importance of individual resources to add value and deliver competitive advantage to the organisation (Lynch, 2009). It also requires a careful exploration of the resources in the organisation to identify those attributes that contribute particular strengths to the organisation. Value chain and value system discussed above can be used in the exploration process. Lynch (2009) listed some examples of those attributes,

including differentiation, low costs, niche performance, high performance or technology, quality, service, vertical integration, synergy, culture, leadership and style of an organisation. Furthermore, Johnson *et al.,* (2008) argued organisations need to develop capabilities to achieve sustainable competitive advantages in a changing environment, which is called dynamic capability. Dynamic capabilities are the abilities to renew and recreate the strategic capacities in the organisation to meet the requirements in a changing environment (Johnson *et al.,* 2008).

After analysing environment, resources and capabilities, the purpose of the organisation needs to be considered in the strategic analysis area. The purpose of the strategy is influenced by the corporate governance, social responsibility and ethics of the organisation, as well as by different stakeholder expectations (Lynch, 2009; Johnson *et al.,* 2008). Corporate governance is concerned with "the structure and systems of control by which managers are held accountable to those who have a legitimate stake in an organization" (Johnson *et al.,* 2008: 133). In addition, there are four stereotypes to illustrate the different stances of various organisations on social responsibility (Johnson *et al.,* 2008).

	Laissez-faire	**Enlightened self-interest**	**Forum for stakeholder interaction**	**Shaper of society**
Rationale	Legal compliance: make a profit, pay taxes and provide jobs	Sound business sense	Sustainability or triple bottom line	Social and market change
Leadership	Peripheral	Supportive	Champion	Visionary
Management	Middle management responsibility	Systems to ensure good practice	Board-level issue; organisation-wide monitoring	Individual responsibility throughout the organisation
Mode	Defensive to outside pressures	Reactive to outside pressures	Proactive	Defining
Stakeholder relationships	Unilateral	Interactive	Partnership	Multi-organisation alliances

Table 2.2 Corporate social responsibility stances (Johnson, 2008: 146)

In this framework, Johnson *et al.* (2008) explained that the *laissez faire* view means the organisations take the stance that the responsibility of a business only focuses on the short term interests of the shareholders. This type of organisation will meet the minimum obligations set by the legislation and regulation from the government. Organisations in the enlightened self-interest category pursue the long-term financial benefit for the shareholders as well as maintaining good relationships with other stakeholders. Reputation is important for the organisations in this stance for achieving long-term financial success. In the forum for stakeholder interaction category, multiple stakeholder interests and expectations are incorporated and the organisations are not just measured according to the financial line. For example, the organisations in this category may keep some unprofitable units for preserving jobs. Instead of regarding financial consideration as the most important, organisations seek to change society and social norms in the shape of society stance. Organisations have different views on social responsibility based on stereotype, so the purposes of strategy are various as well. Stakeholder expectations and influence play an important role on strategic choice (Johnson *et al.,* 2008). External stakeholders are usually classified at three levels including economic stakeholders such as suppliers or competitors; socio or political stakeholders such as policy makers; and technological stakeholders such as owners of competitive technologies (Johnson *et al.,* 2008). The concerns for internal stakeholders are that the expectations of stakeholder groups vary since they are in various departments, geographical locations or different levels in the hierarchy. All of these considerations for stakeholders are valuable for analysing the organisational context factor in the strategy development process.

In the strategy development area, strategic options are developed and selected. Corporate-level strategy and business-level strategy are mainly concerned with this area (Johnson *et al.,* 2008; Lynch, 2006; Padillo and Nuno, 1992). Corporate-level strategy concerns the organisation's scope and how the resources are used to add value to different business units in the organisation (Johnson *et al.,* 2008; Padillo and Nuno, 1992). It considers the basic decisions on the business the corporate will participate in and is also relative to the culture and leadership (Lynch, 2006; Padillo and Nuno, 1992). Furthermore, the objectives, purposes as well as the plans and policies contribute to achieving these as defined in the corporate-level strategy

(Lynch, 2006). Business-level strategy, which is also called competitive strategy (Johnson *et al.,* 2008), is concerned with the resources, capabilities and external relationships that help make decisions on responses to suppliers and customers, and so help maintain the competitive advantage (Lynch, 2006; Ward and Peppard, 2005; Padillo and Nuno, 1992). Moreover, business-level strategy is about the competition plan for the different businesses decided by the corporate strategy (Johnson *et al.,* 2008). Different techniques and tools are used to develop the strategic options in these two main levels of strategy: business strategy, which focuses on the competitive advantages; and corporate strategy, which focuses on the decision making on choosing markets that organisations position themselves in. For business strategy, generic strategies, which were also developed by Porter, are used to analyse the basic strategic options for the organisation. These options, which are formed from assessing competitive scope and competitive advantages from two perspectives include 'cost leadership', 'differentiation' and 'focus' (Johnson *et al.,* 2008; Lynch, 2006). For corporate strategy, Ansoff's matrix presented in 1988 is used to analyse the strategic directions of the whole organisation (Johnson *et al.,* 2008). In this matrix, the growth of products and markets are considered as two dimensions to decide on the strategic options of market penetration consolidation, product development, market development and diversification. Furthermore, a portfolio matrix is used to analyse the decision making on either adding or subtracting particular business units in the corporate. From low to high, the market share and market growth are two variables for deciding the balance, attractiveness and fit of business units through four dimensions known as 'stars', 'question marks', 'cash cows' and 'dogs' (Johnson *et al.,* 2008). Another kind of environment-based strategic option comes from the expansion method matrix. The expansion method matrix relates the expansion opportunities of the organisation to their geographical locations. The main strategic options resulting from this matrix are acquisitions, mergers, joint ventures and alliances, as well as franchises (Lynch, 2006). All these strategic options are related to an organisation's future and how it responds to the environment.

In terms of strategy implementation, Lynch (2009) argued there are two different approaches. As the prescriptive approach, a prescriptive strategy or intended strategy is the one whose objective has been defined in advance and the main elements of it

have been developed before the strategy is implemented (Lynch, 2009; Johnson et al, 2008). In a prescriptive strategic process, the strategy implementation area complements the chosen strategic position developed in the strategic analysis area directly in a linear approach (Lynch, 2009). In the emergent approach, an emergent strategy is the one where the final objective is not clear and the elements of it are developed during the strategy proceedings (Lynch, 2009; Johnson *et al.,* 2008). In an emergent strategic process, the strategy needs to adapt to human needs or the environment and other factors and continue to develop all the time; therefore there is no clear distinction between strategy development and implementation (Lynch, 2009).

These distinguished implementation approaches are related to another point of view on strategy, which considers strategy from context, content and process (Lynch, 2009; Raymond and Croteau, 2009; Sabherwal and Chan, 2001). Context refers to the environment within which the strategy is developed and operates (Lynch, 2009). Content is concerned with what strategy the organisation is pursuing, such as strategic taxonomies and types of strategic decisions, while process is concerned with the way the organisation develops and implements the strategy (Raymond and Croteau, 2009; Sabherwal and Chan, 2001). It is perceived that strategy content is mainly concerned with intended strategy, which contains the strategic option developed in the strategic analysis area. Both intended and emergent strategies are concerned with strategy process and show different approaches in the strategy implementation area. Strategy implementation requires adequate resources and effective resources allocation (Ward and Peppard, 2002). During the implementation process, it is important to measure the performance and control the activities to ensure the achievement of the overall set of objectives. The feedback of performance measurement will be used to refine the objectives and finally reflect on whether the strategies are realised or not (Ward and Peppard, 2002). Johnson *et al.,* (2008) defined a realised strategy as the one that is actually being followed in the organisation in practise. Figure 2.9 shows the relationships among intended strategy, emergent strategy and realised strategy.

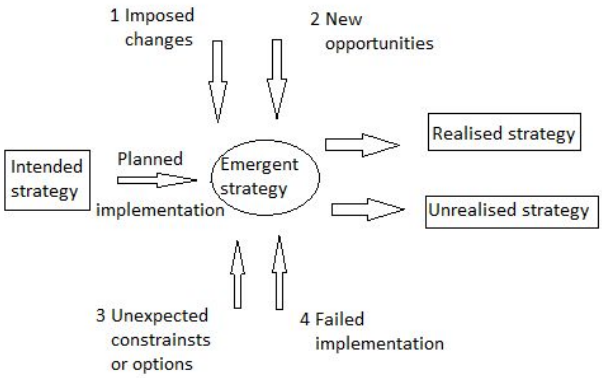

Figure 2.9 Intended strategy and realised strategy (adapted from Ward and Peppard, 2002: 86)

As shown in figure 2.9 above, the distinction between intended strategy and emergent strategy is helpful in developing a conceptual understanding, and also in practice for strategy implementation; the process of implementing an intended strategy so as to reach the realised strategy is known as an emergent approach. The adaptation to performance measurement and control of activities can feed back into the strategic options in the intended strategy.

The treatment of strategy in the strategic management field has heavily influenced the research on IS strategy (Chen *et al.,* 2010; Chan and Huff, 1992). A discussion of IS strategy follows in the next section.

2.4.2 Information systems strategy

Information systems strategy is inconsistently defined and has heterogeneous interpretations in the literature (Teubner, 2013; Chen *et al.,* 2010). In a broader understanding, information systems strategy is concerned with long-term strategic thinking and planning which aims to achieve effective management and best impact from all forms of information such as information systems, information technology or telecommunications (Ward and Peppard, 2005). Some researchers argue that information systems strategy is considered with a close integration with business strategy (Ward and Peppard, 2005). For instance, Chaffey and Wood (2005: 275) stated that information systems strategy is "the formulation of approaches and planning needed to deploy information systems resources to support organisational strategy". Furthermore, they pointed out that one of the purposes of planning an

information systems strategy is to combine the business aims of the organisation with an understanding of information and systems applications to determine the computer systems which should be implemented in the organisation (Chaffey and Wood, 2005). Ward and Peppard (2005) claimed through highly aligning with the business strategy, information systems strategy is better placed to develop organisational advantages compared to competitors. On the other hand, Chen *et al.,* (2010) stated IS strategy should be examined independently from business strategy since it is argued that business and IS strategies can support and lead each other mutually. They defined IS strategy as "an organisational perspective on the investment in, deployment, use, and management of information systems." In addition, some researchers equate IS strategy with existing IS application portfolios (Chan *et al.,* 1997). For example, Lederer and Sethi (1988) argued information systems strategy considers the objectives of the computing process and the applications the organisation should implement (Lederer and Sethi, 1988).

Similar to the discussion on business strategy, some researchers distinguish between content and the process of IS strategy (Sabherwal and Chan, 2001; Chan and Huff, 1992). In terms of IS strategy content, it is important to distinguish IS strategy from IT strategy (Ward and Peppard, 2005; Sabherwal and Chan, 2001). Information technology strategy refers to the demands of the organisation for technology that supports the information and systems, while information systems strategy addresses the information system's demands in the organisation (Ward and Peppard, 2005). To be specific, information technology strategy is more concerned with technology issues and technical terminology, rather than identifying applications that fit with business thinking (Ward and Peppard, 2005). Figure 2.10 shows the relationships among business strategy, information systems strategy and information technology strategy.

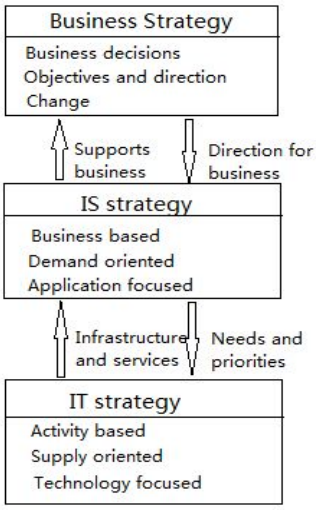

Figure 2.10 The relationship between business, IS and IT strategies (adapted from Ward and Peppard, 2005: 41)

There have been a number of research studies on IS strategy formulation, which refers to the process of IS strategy (Sabherwal and Chan, 2001). Following the process of business strategy development, Cassidy (2006) and Ward and Peppard (2005) designed the phases of IS strategy development. There are three phases for the information systems strategy formulation process (Cassidy, 2006). The first phase aims to finalise the objectives, goals and scope of the formulation process. It means making a decision on what should be included in formulating the information systems strategy. Usually, the review of the current business situation, assessment of the information systems situation and environment in relation to business needs, comparison to the IS situation in the industry, high level information systems direction, including vision, mission, and objectives, are included (Cassidy, 2006). The second phase is the analysis phase. This phase aims to understand and analyse the current information systems situation. In this phase, the external and internal business environments are analysed. Furthermore, the current business situation and business needs are identified. After this, current external and internal information systems environments are assessed according to the business situation and business needs (Cassidy, 2006; Ward and Peppard, 2005). Normally, information systems environment includes the business application environment, desktop environment, server environment, network environment, telecommunications environment and data centre environment (Cassidy, 2006). To investigate the IS environment implies a need to understand the business strategy. It means to determine the opportunities,

threats and to recognise the strengths and weakness of the business, and therefore determine the business requirements for information systems and information systems operations (Ward and Peppard, 2005). Based on the information systems environment, the current information systems situation is analysed through identifying the trends of the information systems industry and competitors (Cassidy, 2006). Finally, in the last phase, the direction phase, information systems visions, mission, goals and strategies are developed (Cassidy, 2006).

It is argued research on IS strategy content is limited while considerable research focuses on IS strategy process issues (Teubner, 2013; Sabherwal and Chan, 2001). Teubner (2013) stated that it might be expected that IS strategy itself is the outcome of strategic information systems planning, which should also be an issue of academic investigation. The evolution of IS planning is summarised by (Teubner, 2013; Ward and Peppard, 2002), which shows the emerging of the business-IT alignment concept. In the 1960s, IS/IT was in the data processing era; the aim of IS planning was to develop efficient systems to automate standardized data processing. During this time, IS planning was independent from business planning, without any direct relationship with strategic business planning (Teubner, 2013). During the 1970s, it became known as the era of management information systems (Ward and Peppard, 2002). IS deployment grew significantly, especially in the domain of management. New methods for IS planning were developed and applied to assist IS provide extensive management information (Teubner, 2013). During the 1980s, companies began to realize the strategic value of IT, which is defined as the strategic information systems era. During this time IS planning started to focus on the competitive advantage (Teubner, 2013). In the 1990s, it entered the "strategic alignment" era, with IS planning aimed at a mutual aligning of business and IS strategy (Teubner, 2013). The concept of business-IT alignment started to be developed from 1980-1990, which is discussed in the next section.

2.4.3 Business-IT alignment

Strategy fit was researched early on from 1962, and mainly focused on the alignment of the business strategy with the organisation infrastructure and processes (Chandler,

1962). Business-IT alignment is defined in a vague way in the majority of publications (Silvius, 2007; Maes, 2000). Previous definitions of alignment mainly focused on the strategic perspective. For example, Luftman (1993) defined alignment as the extent to which IS strategy and business strategy support each other. Similarly, Reich and Benbasat (2000) stated that alignment is "the degree to which the information technology mission, objectives and plans are supported by the business mission, objectives and plans". For some researchers, there are even contradictory interpretations for the definition of alignment. Burn (1997) considered alignment as a process. However, for some researchers (Coakley, 1996), alignment is just an outcome from some processes. For improvement, Maes (2000) proposed his definition of alignment as "the continuous process, involving management and design sub-processes, of consciously and coherently interrelating all components of the business-IT relationships in order to contribute to the organisation's performance over time". Furthermore, he pointed out that alignment involves not only the strategic perspective, but also the structural and operational level. Silvius (2007) defined business-IT alignment as "the degree to which the IT application, infrastructure and organization, the business strategy and processes enables and shapes, as well as the process to realize this". Moreover, Silvius (2007) pointed out the business-IT alignment can either be process, or state the degree of alignment.

To acquire deeper understanding of the concept of business-IT alignment, the business-IT alignment model is described in the next section.

2.4.3.1 Business-IT alignment concept

The most widely-used recent strategic alignment model was designed by Venkatraman and Henderson (1990), and first proposed in 1990. Four features were explained in this model, including business strategy, IT strategy, organisational infrastructure and processes, as well as IT infrastructure and processes. Furthermore, they pointed out that there are three dominant types of relationships among these four features and named them bivariate fit, cross-domain alignment, and strategic alignment.

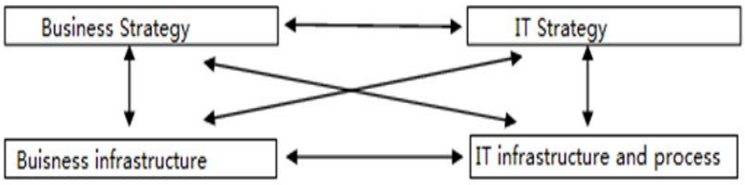

Figure 2.11 Strategic alignment model (adapted from Henderson and Venkatraman, 1990)

As shown in figure 2.11 above, bivariate fit indicates the horizontal or vertical relationship (Henderson and Venkatraman, 1990). For the vertical perspective, the alignment between business strategy and business infrastructure, and the alignment between IT strategy and IT infrastructure and process, represent the business strategy and IT strategy formulation and implementation processes. In the horizontal perspective, the relationships between business strategy and IT strategy, which has been extensively researched, indicate that business strategy helps to formulate IT strategy, and also that IT strategy supports the business strategy.

For the cross-domain alignment, business strategy and IS infrastructure and process, IT strategy and organisational infrastructure should fit with each other. As Henderson and Venkatraman (1990) explained, this indicates four dominant perspectives on IT planning. The most commonly understood perspective is the strategy implementation perspective. It means that the implementation of business strategy implies the design and development of the organisational infrastructure and the IS infrastructure. Conversely, the appropriate organisational and IS infrastructures are involved in the assessment of the business strategy implementation. Secondly, the technology exploitation indicates that new IT technology influences the business scope, business governance and competitive advantages. Therefore, the business strategy is influenced. This perspective emphasises that the business strategy needs to be modified according to emerging IT technology. Consequently, the organisational infrastructure design and development are changed following the modification of the business strategy. Technology leverage presents the perspective that business strategy implementation should be evaluated with IS strategy and IS infrastructure. The concerns are that the business strategy is not only a guide to the design of an efficient organisational infrastructure, but also needs to leverage the IS technology capabilities. Fourthly, technology implementation involves the alignment between the IT strategy and design and development of IS infrastructure and processes, which

in turn influence the organisational infrastructure.

Furthermore, each domain in this strategic alignment model is interpreted with its components (Ward and Peppard, 2005; Avison *et al*., 2004; Luftman, 2000).

- In the business strategy domain, business scope, distinctive competencies and business governance need to be considered. Business scope refers to the markets where the enterprises locate or position themselves in relation to the competition. Distinctive competencies in business strategy means the core competencies and the critical success factors that construct the competitive advantage of enterprises. Business governance means the management of the relationships among internal shareholders of enterprises as well as the relationships between enterprises and external influence environments such as government regulations or strategic partners.

- In the organisational infrastructure domain, the three components are administrative structure, processes and skills. Administrative structure refers to the way in which enterprises organise their business; for example, they use centralisation or decentralisation as an organisational structure. The processes of the organisational infrastructure indicate the business activities operated in the enterprises. Skills mean the people's skills in the organisation, which refers to the human resources management.

- In the IT strategy domain, technology scope means the information applications and technologies that are significant for the enterprise. Systemic competencies refers to the capabilities that make the IT services distinguished. IT governance indicates how to assign all the responsibilities of IT, such as authority for resources, or implementation risks to management, IT executives and service providers.

- In the IT infrastructure domain, the three components include architecture, processes and skills. Architecture indicates how to organise the infrastructure including applications, software, hardware, and networks in a cohesive way

in the enterprise. Processes include the practices and activities for developing and managing the IT infrastructure. Skills refer to the human resources management in the IT services area. These components are very important because Luftman (2003) developed strategic alignment assessment criteria based on them, which will be described in section 3.7.

Maes (2000) argued that there are two main disadvantages of the model from Venkatraman and Henderson (1990). Firstly, they consider the mutual influences between business and IT to be direct; in Maes' view they are actually much more complicated. Secondly, strategic level alignment is dominant in Venkatraman and Henderson's model and it leads the overall relationships. Maes (2000) considered that additional factors such as internal and external information sharing should be involved. Based on this, Maes (2000) redefined business-IT alignment with a unified framework as shown in figure 2.12.

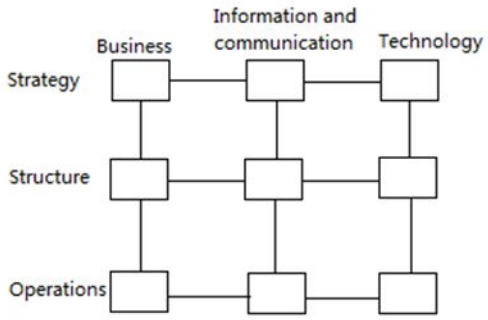

Figure 2.12 IT alignment unified framework (adapted from Maes, 2000)

In Maes' framework, information technology and business are connected through information and communication, which means information technology needs an interpretation, communication and knowledge sharing process in order to be used by the business. Instead of only analysing connections between strategy and infrastructure, Maes (2000) stated that three levels should be considered in business-IT alignment, including the strategic, structural and operational levels. The strategic level concerns the scope, core capabilities and governance of the business information and communication processes as well as the technology. The structural level mainly focuses on the architecture perspective. The operational level involves specific processes and skills. Considering the interpretation of the strategic

alignment model (Venkatraman and Henderson, 1990), Luftman (2003) described the "organisational infrastructure and process" dimension as comprising administrative structure, processes and skills; this refined framework does not have major differences from the original one. However, these factors are not structured and emphasised in the original strategic alignment model taken from Venkatraman and Henderson in 1990. The model from Maes (2000) clarified the "organisational infrastructure and process" dimension as structure and operations on two levels. Combined with the literature review above, it is proposed that the concept of business-IT alignment as set out in the research, which is defined as business strategy and IT strategy support fitted or aligned to each other (Reich and Benbasat, 1998; Luftman *et al.*, 1993), is not comprehensive enough. In terms of business-IT alignment, three main aspects need to be considered, including strategy, structure and operation; this means that IT should be aligned with business not only at the strategic level, but also at the structural and operational levels. Therefore, business-IT alignment must now include the three dimensions of strategic alignment, structural alignment and operational alignment (Chan, 2002; Maes, 2000). After synthesising the research on strategic alignment, a strategic alignment model in the organisation is proposed in figure 2.13 below.

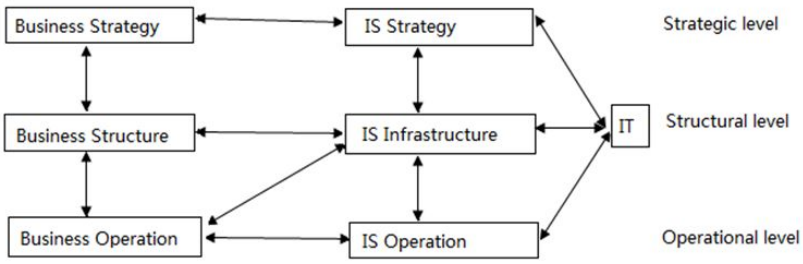

Figure 2.13 IS strategic alignment model

2.4.3.2 Description of proposed IS strategic alignment model

Compared to the original strategic alignment model from Henderson and Venkatraman in 1990 and the unified framework from Maes in 2000, there are two main developments in this model. Firstly, in the research, IS was not considered the

main component in the alignment. The concept of business-IT alignment was mainly about how IT supports the business strategy and activities. IS was considered to be one of the IT services. However, together with the technology development, IT strategy is implemented to support the information systems in the organisation (Ward and Peppard, 2002). Actually, how IT supports business in the organisation is mainly through the implementation of IS. Therefore, the main focus of business-IT alignment should be on the business-IS alignment. In the proposed model, it shows clearly that IT issues such as strategy, architecture and capabilities, are related to the IS implementation. The main concerns of the alignment are the relationships between the strategy, structure and operations of business and IS.

It is important to differentiate business-IT alignment and business-IS alignment. The term business-IT alignment is used in different forms in the literature, including business/IT alignment, business and IT alignment, and IT alignment. All these different terms actually mean the same. The terms IT and IS are often used interchangeably (Hiekkanen *et al*., 2013). As has been discussed in section 2.4.2, the strategic value of IT started to be realized during the1980s and the concept of business-IT alignment was developed from 1980 to 1990 (Teubner, 2013). However, together with the technology, management and organisational development, IT use is closely related to management through IS implementation in the organization. The strategic values of IT are captured through management and organizational improvement caused by IS use. Therefore, in this study, the term IS strategic alignment is used to emphasize the IS support to management and the organization and highlight the complex connections between IS and business. IT is considered as a technical support in IS strategic alignment.

Secondly, the operational level is emphasised in the proposed model. In the model from Venkatraman and Henderson, structure and some of the operational concerns were combined together as "infrastructure and process". In Maes' framework, although the operational part was separated and reinforced, the elaboration of operational alignment was missed in the research. In addition, the relationship between IS infrastructure and business operation is also emphasised in the proposed model which will be explained in the following section. Sabherwal *et al*. (2001) presented a punctuated equilibrium model for business-IS alignment, which regarded

the alignment as a dynamic process. This point of view is not considered in the proposed model because our original intent when researching business-IT alignment was to investigate the situation of business-IT alignment at some specific point in time.

To be specific, in the proposed model, business-IT alignment is considered as a multi-dimensional concept at the strategic, structural and operational levels.

The strategic alignment mainly concerns the mission, scope, governance and core capabilities of business and IT (Maes, 2000). To be specific, it means the priorities and activities of the IS function and the business unit should be aligned. IS priorities, capabilities, decisions and actions should support those of the entire business at the strategic alignment level (Chan, 2002).

Structural alignment involves the concerns for the architectures and capabilities of business and IS (Maes, 2000). At the structural level, the IS application structure and IS communications should match with the organizational structure and management hierarchies. Structural alignment aims not only at the fit of IS and business structure but also at the support IS and business structure gives to the organisational objectives (Chan, 2002).

For operational alignment, it is simply proposed as processes and skills involved in the operational alignment by Maes (2000). However, there is not yet any further research on the elaboration of alignment at this level. Luftman (2003) stated that variables such as how business activities operate or flow, and especially value-added activities and process improvements, human resources considerations and culture, should be included in the processes and skills factors. Therefore, the operational alignment indicates the alignment between IS functions and business operational activities.

In particular, the fit of IS infrastructure and business operations is one of the important perspectives in business-IT alignment. It indicates that the IS infrastructure should support business operations and different functional units such as the sales, finance, manufacturing, and human resources areas; while on the other

hand, IS infrastructure is also influenced when there are changes in business operations.

Hiekkanen *et al.* (2013) argued that the strategic alignment model from Henderson and Venkatraman (1990) is probably the most widely adapted alignment model. In the following literature, there are interpretations of each domain in the strategic alignment model (Ward and Peppard, 2005: 46; Luftman, 2000), and administrative descriptions of the model (Venkatraman and Henderson, 1993). Some researchers have studied the model in an empirical aspect (Avison *et al.,* 2004; Burn and Szeto, 2000) or extended the model (Avison *et al.,* 2004; Maes, 1999). Recent studies developed the dynamic concept of business-IT alignment (Leonard, 2008; Sabherwal *et al.,* 2001). Sabherwal *et al.,* (2001), developed a punctuated equilibrium model to investigate the dynamics of alignment in the long term. However, their studies are not popularly used and the fundamental understanding of business-IT alignment in the studies nowadays is still based on the strategic alignment model developed by Henderson and Venkatraman in 1990. It is necessary to develop the conceptual understanding of business-IT alignment after more than 20 years development of technology, management and organisation. The model presented in this section has developed IS strategic alignment at the strategic, structural and operational levels clearly and differentiates the role of IS and IT in strategic alignment along with the technology development. In terms of assessment of IS strategic alignment, the researcher found it difficult to use the strategic alignment model as a measure of strategic alignment in practice, especially in this study. For further investigation, some studies have been carried out to explore how to assess business-IT alignment, which is discussed in the next section.

2.4.4 Assessing business-IT alignment

Based on the description of the strategic alignment model (Henderson and Venkatraman, 1990), Luftman (2003) presented a strategic alignment maturity assessment method (Appendix 1). In this assessment method, there are two perspectives. Firstly, six IT-business alignment assessment criteria are summarised to evaluate different aspects of alignment maturity, including communications,

competency/value measurement, governance, partnership, scope and architecture and skills. Communication maturity criteria measure the effectiveness of exchanging information between the business and IT areas as well as mutual understanding and knowledge sharing. Competency/value measurements maturity refers to the contribution of IT to business success. It means to what extent in the enterprise the IT contribution can be measured when management decisions or strategic choices need to be taken. Governance maturity criteria assesses the priorities and allocation of IT resources. The communications on IT budget and investment between business and IT participants are important in business-IT alignment (Henderson, 1996; Sledgianowski *et al*., 2006). Partnership maturity refers to how the business and IT perceive the role of each other and whether they share the risks and rewards in the organisation. Obviously, the trust between business and IT is important in business-IT alignment. Scope and architecture maturity criteria are used to evaluate how the organisations make decisions on allocating IT infrastructure resources (Sledgianowski *et al*., 2006). As Broadbent (1990) described, IT infrastructure includes the two dimensions of reach and range; these criteria will be evaluated from these two aspects. Skills maturity refers to all the human resources issues in the organisation including cultural and social environmental ones. As Sledgianowski *et al*. (2006) pointed out these cultural and social environments should be especially considered in a change and innovation climate. The reason for this is so that an organisation anticipates that change will facilitate IT implementation.

Furthermore, based on these criteria, strategic alignment maturity is categorised in five different levels, including initial process, committed process, established focused process, improved process and optimised process. The characteristics of each level are shown in table 2.2 (Luftman, 2000).

Level 5 Optimised process
• Communications: informal, pervasive • Competency/value: extended to external partners • Governance: integrated across the organisation and partners • Partnership: IT-business co-adaptive • Scope and architecture: evolve with partners • Skills: education/careers/rewards across the organisation.
Level 4 Improved process

• Communications: bonding, unified • Competency/value: cost effective; some partner value; dashboard managed • Governance: managed across the organisation • Partnership: IT enables/drives business strategy • Scope and architecture: integrated with partners • Skills: shared risks and rewards.
Level 3 Established focused process
• Communications: good understanding; emerging relaxed • Competency/value: some cost effectiveness; dashboard established • Governance: relevant process across the organisation • Partnership: IT seen as an asset; process driver • Scope and architecture: integrated across the organisation • Skills: emerging value service provider.
Level 2 committed process
• Communications: limited business/IT understanding • Competency/value: functional cost efficiency • Governance: tactical at functional level, occasionally responsive • Partnership: IT emerging as an asset; process enabler • Scope and architecture: transaction • Skills: differs across functional organisations.
Level 1 initial process
• Communications: business/IT lack of understanding • Competency/value: some technical measurements • Governance: no formal process, cost centre; reactive priorities • Partnership: conflict; IT a cost of doing business • Scope and architecture: traditional (e.g. email) • Skills: IT takes risk, little reward; technical training.

Table 2.3 Strategic alignment maturity summary (Luftman, 2000)

In summary, in Luftman's (2000) assessment methods, strategic alignment is evaluated from communications maturity, competency/value measurement maturity, governance maturity, partnership maturity, scope and architecture maturity and skills maturity; that is, from six perspectives at five different maturity levels. Criteria from Luftman's assessment methods are comprehensive (Chen, 2010; Sledgianowski *et al.*, 2006). However, all of these criteria are at a relatively high level, and are complicated to use in practice. The fact that they are not widely used in practice is clear from the literature review. In addition, they are summarised based on the original strategic alignment model with four dimensions. Therefore, these criteria from Luftman's assessment methods are not used directly in this research.

There is other research on the assessment of business-IT alignment. Cresap *et al*. (1983) stated the measurement of business-IT alignment includes "the business plan states information system's needs" and "the IS plan makes reference to items in the business plans". Reich and Benbast (1996) defined the social dimensions of business and IT linkage as "the level of mutual understanding and commitment to, the business and IT mission, objectives, and plans by organisational members". They

identified that "IS executives understand and are committed to the business mission, objectives, and plans", and that "business executives understand and are committed to the IT mission, objectives, and plans" as the measurement of the linkage of business-IT alignment in the social dimension. Furthermore, they described how "the understanding of current plans between business and IT executives" is used as measurement of short-term linkage, while the "shared vision for the future of IT within the business unit" is used to assess the long-term linkage. Obviously, these measurements are at the strategic level alignment and there is little research on the assessment of business-IT alignment at the structural and operational levels.

On the other hand, some studies were conducted to investigate the strategic alignment influence factors (antecedents, preconditions, enablers, or inhibitors). In early research in 1983, Cresap *et al*. identified the following antecedents that influence alignment:

- IS plans are closely checked against business plans
- Line and staff managers participate actively in IS planning
- Business and IS planning calendars are carefully synchronised.

After conducting research on over 500 firms in 15 industries, Luftman (1999) argued that some activities in enterprises can facilitate the business-IT alignment while others will hinder it. He presented enablers and inhibitors of business-IT alignment, as shown in table 2.3.

Enabler categories	**Inhibitor categories**
1. Senior executive support	1. IT/ non-IT lack close relationship
2. IT involved in strategy development	2. IT does not prioritise well
3. IT understands business	3. IT fails to meet its commitments
4. IT/ non-IT have close relationship	4. IT does not understand business
5. IT shows strong leadership	5. Senior executives do not support IT
6. IT efforts are well prioritised	6. IT management lacks leadership
7. IT meets commitments	7. IT fails to meet strategic goals
8. IT plans linked to business plans	8. Budget and staffing problems
9. IT achieves its strategic goals	9. Antiquated IT infrastructure
10. IT resources shared	10. Goals/vision are vague
11. Goals/vision are defined	11. IT does not communicate well
12. IT applied for competitive advantage	12. Resistance from senior executives
13. Good IT/business communication	13. IT/non-IT plans are not linked

14. Partnerships/alliances	14. Other
15. Other	

Table 2.4 Enabler and inhibitor categories of business-IT alignment (Luftman, 1999)

Chan (2002) identified the preconditions of business-IT alignment after summarising the work from Enns and Murray (1997), Reich and Benbasat (1996), Broadbent and Weill (1991), Lederer and Mendelow (1987) as follows:

- Communication and understanding between business and IS executives;
- Linked business and IS missions, plans, and strategies;
- Business and IS planning processes are interconnected;
- Line executive commitment to IS issues;
- Formal reporting relationships and committees;
- IS skills for line personnel and business skills for IS personnel;
- Appropriate career path;
- Incentives and performance measurement;

Particularly in social dimensions, "shared domain knowledge" and "IT implementation success" are summarised as the antecedents of business-IT alignment in the social dimension (Reich and Benbasat, 2000). Furthermore, mutual trust and interests between IT and business people will influence the extent of shared knowledge and IT performance that will also be an influential alignment factor (Nelson and Cooprider, 1996).

The studies on influencing factors of business-IT alignment have never stopped in the past decade (Omari and Barnes, 2013; Chao and Chandra, 2012; Johnson and Lederer, 2010; Kearns and Lederer, 2010; Ali and Qing, 2009; Preston and Karhanna, 2009; Chan et al., 2006; Campbell *et al.,* 2005). Previous empirical evidence points to a lack of a comprehensive and structured model that can be used in this research. Firstly, studies on the influencing factors of strategic alignment focus on strategic level alignment. Researchers investigated the influencing factors based on the understanding of strategic level alignment or they identified the influencing factors based on the studies. Omari and Barnes (2013), Chao and Chandra (2012) and Preston and Karahanna (2009) use the factors originating from the ones identified by Reich and Benbasat in 2000 to investigate their impacts. Chung *et al.,* (2003)

identified their own influencing factors based on their understanding of strategic alignment only at strategic level. Silvius (2008) also investigated influencing factors according to the strategic alignment model from Henderson and Venkatraman in 1990. The conceptual understanding of strategic alignment that researchers have adopted to explore influencing factors focuses on the strategic level. Therefore the factors identified in these studies are mainly related to strategic level alignment. Secondly, there is a scarcity of research to investigate influencing factors in the Chinese SOE context. As has been discussed in the previous section, Chinese SOEs have their own unique special features. It is reasonable to conclude that different influencing factors exist in a Chinese SOE context.

To summarize, literature regarding business-IT alignment is reviewed from three perspectives, including concept of business-IT alignment, assessment of business-IT alignment and influencing factors of business-IT alignment. After reviewing the concept of business-IT alignment, it was found that although business-IT alignment has been researched in the last three decades, the concept of business-IT alignment is ambiguous. Researchers have different interpretations of business-IT alignment. The most common conceptual understanding used in the studies is from Henderson and Venkatraman in 1990; however, it was built more than 20 years ago. A model about conceptual understanding of IS strategic alignment is developed based on the literature review. This model was developed from business-IT alignment to business-IS alignment together with the technology development; therefore, the term 'IS strategic alignment' is used in this research. In terms of the IS strategic alignment perspective, criteria from Luftman's assessment methods are comprehensive (Chen, 2010; Sledgianowski *et al*., 2006). However, all of these criteria are at a relatively high level. The fact that they are not widely used in practice is clear from the literature review. In addition, they are summarised based on the original strategic alignment model with four dimensions. Therefore, these criteria from Luftman's assessment methods are not used directly in this research. After reviewing the influencing factors of IS strategic alignment, it can be argued that these factors mainly focus on strategic level understanding of IS strategic alignment and there is a scarcity of research in the Chinese SOE context. As has been discussed in section 1.2 and section 2.2.4, Chinese SOEs are positioned in a special national and organisational cultural environment. This lacks a comprehensive and structured

framework to follow a deductive approach. The review of literature thus indicates taking an inductive approach in this research.

2.5 Summary

This chapter reviews the main themes of the study in three areas, including organizational theory, systems theory and strategic thinking in the organisation. All organisational structure, business processes and management hierarchies are designed to facilitate management control in order to achieve organisational strategy. Culture, organisational structure, business processes, management and strategy are interrelated. IS strategic thinking aims to improve the way that IS and IT support these business factors. Through the improvement of IS strategic alignment, business and IS are mutually influencing each other in the strategic, structural and operational levels. This literature review was conducted with three aims in mind, including enhancing the theoretical sensitivity, locating appropriate conceptual understanding to guide the following research stages, and acquiring indications for the selection of the research methodology.

To be specific, with a grounded theory approach, the literature review was carried out to obtain theoretical sensitivity. This review of literature was not conducted in-depth; for instance the IS implementation in a Chinese context was not explored because a deep investigation may result in a biased study. Therefore the literature review was conducted in a general rather than a specific way. Furthermore, the conceptual understanding of business-IT alignment was built during the literature review to inform further data collection, which is discussed in detail in Chapter 4. In addition, there is not any sufficiently robust framework identified in the literature review that can be used as a prior framework to guide data collection and data analysis. This research project is thus using an inductive approach and aims at generating a theory.

Chapter 3: Methodology

3.1 Introduction

The methods of social research are not neutral tools, and are closely related to different visions of social scientists on how the nature of social realties should be studied (Bryman, 2004). Saunders *et al.,* (2003: 83) developed the research process 'onion', which clearly shows that the research philosophy, research approaches, research strategies, time horizons, and data collection methods are five main elements in the research process.

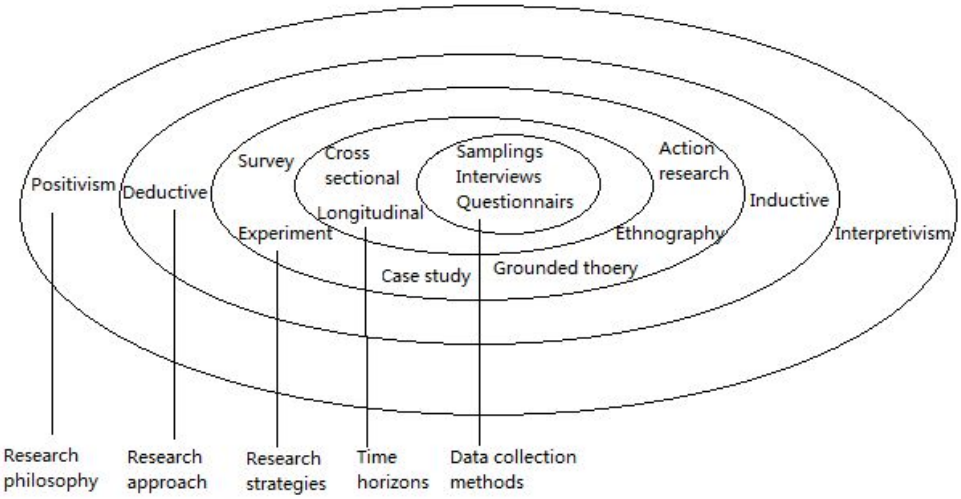

Figure 3.1 The research process (adapted from Saunders et al., 2003: 83)

Bryman (2004) argued that there are five main factors influencing the conduct of social research, including theory, epistemology, ontology, values and practical considerations. In addition, Blaikie (2000) summarised the quantitative and qualitative approaches as two different data collection techniques. To synthesize the literature, methodology in this chapter is discussed from the following five perspectives: research philosophy, research approach, research strategies, data collection techniques and data collection methods.

3.2 Research philosophy

Research philosophy is concerned with the stances and methodology you consider

appropriate to develop the knowledge (Saunders *et al.,* 2003). The main philosophical stances of research philosophy are positivism, interpretivism and realism. In terms of the research using the positivism principle, the researchers objectively analyse the data that is collected in a value-free manner (Saunders *et al.,* 2003). Normally quantifiable observation and a highly structured methodology are used to facilitate replication and statistical analysis (Saunders *et al.,* 2003; Gill and Johnson, 1997). This philosophical stance is usually adopted by the natural scientist facing an observable social reality and concluding with law-like generalisation research results (Saunders *et al.,* 2003; Remenyi*,* 1998). Interpretivism represents the view "that a strategy is required that respects the differences between people and the objects of the natural sciences and therefore requires the social scientist to grasp the subjective meaning of social action" (Bryman, 2004: 13). Researchers adopting the interpretivism stance hold the view that the phenomena in the social world are too complex to reduce to law-like generalisation rules and the generalizability is not that important in a changing or unique business or management environment (Saunders *et al.,* 2003). Researchers with this philosophical stance discover "the details of the situation to understand the reality or perhaps a reality working behind them", or explore "the subjective meanings motivating people's actions in order to be able to understand these" (Saunders *et al.,* 2003: 84). The philosophical position of realism commits to the view that there is a reality existing independent of human thoughts and beliefs as well as separate from the descriptions of it (Bryman, 2004; Saunders *et al.,* 2003). There are some similar features of realism with positivism. However, in a social science research study, realism indicates that there are social objects or phenomena that are independent of individuals actually influencing them without their awareness. This research is going to investigate the business-IT alignment in a particular Chinese SOE context. It is not a replicable statistical study in natural science. The situation that is going to be explored is not independent of human thought either. Therefore, this study holds the interpretivist view.

3.3 Research approach

A deductive theory refers to the approach where researchers deduce a hypothesis by collecting data in relation to researchable entities embedded within the hypothesis. In

the opposite direction, induction represents the process where researchers conclude generalizable inferences out of observations and findings (Bryman, 2004). In other words, in a deductive approach, researchers develop a theory and hypothesis and then test it with a designed research strategy; while in an inductive approach, researchers firstly collect data and then develop the theory from the data analysis results (Saunders *et al.,* 2003).

There are five sequential stages in a deductive research approach. Firstly, researchers deduce a hypothesis from the theory. Secondly, the hypothesis should be expressed in operational terms, which means the measurable variables, and the relationships among the variables. Next, researchers start to test the hypothesis with data collection. Fourthly, researchers examine the findings of the inquiry to confirm or reject the hypothesis. Finally, theory is reviewed or modified if necessary (Bryman, 2004; Robson, 2002).

There are four main characteristics of a deductive research approach. Firstly, it is the approach to explain causal relationships among variables. Secondly, researchers are in a high level of objectivity, which means they are separated from what they are observing. Thirdly, operational terms derived from the hypothesis should be able to be measured quantitatively. The final important characteristic is generalisation (Saunders *et al.,* 2003).

In an inductive approach, theory is developed based on the observations and findings. It is usually used for a small sample of subjects sometimes concerned with a particular context. Saunders *et al.,* (2003: 89) summarised the major differences between the deductive and inductive approaches.

Major differences between deductive and inductive approaches to research
Deduction emphasizes
• Scientific principles
• Moving from theory to data
• The need to explain causal relationships between variables
• The collection of quantitative data
• The application of controls to ensure validity of data
• The operationalization of concepts to ensure clarity of definition

• A highly structured approach
• Researcher independence of what is being researched
• The necessity to select samples of sufficient size in order to generalise conclusions
Induction emphasizes
• Gaining an understanding of the meanings humans attach to events
• A close understanding of the research context
• The collection of qualitative data
• A more flexible structure to permit changes of research emphasis as the research progresses
• A realisation that the researcher is part of the research process
• Less concern with the need to generalise

Table 3.1 Major differences between deductive and inductive approaches to research (Saunders et al., 2003: 89).

From the literature review, there is little existing literature on business-IT alignment in the Chinese SOE group context. Therefore the hypothesis cannot be formed through a literature review. Thus, the inductive approach is adopted in this study. The theory will be developed through investigation of the case study. The research design is discussed in detail in Chapter 4.

3.4 Research strategies

3.4.1 Selection of research strategies

The research strategies represent the plan that researchers adopt for answering the research questions, including the objective identification and research sources specification (Saunders *et al.,* 2003). The main research strategies considered consist of experiments, surveys, case studies, grounded theory, ethnography, and action research (Pickard, 2007; Saunders et al., 2003).

Experiment is a classical type of research that has dominated studies in natural sciences. Typically, it involves:

- Defining a theoretical hypothesis;
- Selecting the samples from populations;
- Allocating the samples based on different experimental conditions;
- Conducting planned change on one or more variables;
- Assessing a small number of the variables;

- Controlling the other variables.

Pickard (2007) argued that experimental research will not be advocated for a study involving human subjects because experiments need to be carried out in a controlled situation, as mentioned above. According to Corbetta (2003), this situation requires that "unwanted variables and external influences … be kept out of the experimental environment and that the researcher can establish the experimental conditions down to the smallest detail". From the discussions above, studies adopting an experimental strategy need to define a theoretical hypothesis and human subjects are usually not involved in the study. Therefore, the experimental approach is not suitable for this study.

Bell (1999) argued that a survey aims to obtain information which can be analysed and patterns extracted and comparisons made. It is a popular strategy in business and management research because it allows a large amount of data to be collected in a very economical way. On the other hand, the survey strategy is regarded as authoritative by people because of its easily understood research results (Saunders *et al.,* 2003). Pinsonneault and Kraemer (1993) stated that, as a quantitative method, survey research requires standardized information from or about the studied subjects and that very clearly defined independent and dependent variables and expected relationships are required before conducting survey research. Moreover, Pinsonneault and Kraemer (1993) argued that when understanding of context is required in detail, survey research is less appropriate than other research methods such as case study. In this study, as has been discussed above, the inductive approach is adopted in this research, which indicates that variables and expected relationships cannot be defined by the researcher. In addition, the Chinese SOE context is significant in the study and analysis. Therefore, the survey approach is not suitable for this research.

Case study is defined as "a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence" (Robson, 2002: 178). According to Pickard (2007:44), the case study is commonly defined as "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". Furthermore, case studies are characterized by researchers "spending extended time on site, personally in contact with activities and operations of the case, reflecting, and revising meanings of what is going on" (Yin, 2009: 18). The case study approach is selected when researchers intend to understand a real-life phenomenon that is involved in important contextual conditions in depth (Yin, 2009). In this study, the typical Chinese SOE context is emphasized. Case study is therefore a suitable approach for this research based on the discussion above.

In grounded theory, which is considered an inductive approach, theory is built according to the data generated from a series of observations rather than a theoretical framework with continual reference to the data process. It is regarded as the best example of an inductive approach (Saunders *et al.,* 2003). With grounded theory, researchers investigate the actualities and analyze the data without a preconceived hypothesis (Glaser and Strauss, 1967). A hypothesis formed from a literature review is usually needed in the traditional research design (Allan, 2003). In this study, the scant literature on business-IT alignment in the Chinese SOE context is not able to lead to a preconceived hypothesis. Therefore, grounded theory is considered as an appropriate strategy for this research.

With respect to ethnography, Pickard (2007:107) stated that "the goal of ethnography is to combine the view of an insider with that of an outsider to describe a social setting. The resulting description is expected to be deeper and fuller than that of the ordinary outsider, and broader and less culture-bound than that of the ordinary insider". It emphasizes the description and interpretation of a cultural and social group (Robson, 2002). This strategy usually requires the researcher to spend a considerable amount of time engaging with the research field as an 'outsider' to investigate the everyday lives of the 'insiders' (Pickard, 2007). For this study, as discussed above, the model developed from the literature review identified that the business-IT alignment should be investigated from the operational, structural, and strategic levels. Especially at the strategic level, the information on how strategy is established cannot be acquired through engaging with the research field or investigating the everyday lives of people or groups. Therefore, ethnography is not

appropriate in this study.

Robson (2002: 164) cited a table that compares the commonly-used research strategies in qualitative research, which is reproduced below as table 3.2.

	Grounded theory	Ethnography	Case study
Focus	Developing a theory grounded in data from the field	Describing and interpreting a cultural and social group	Developing an in-depth analysis of a single case or multiple cases
Discipline origin	Sociology	Cultural anthropology, sociology	Political science, sociology, evaluation, urban studies, many other social sciences
Data collection	Typically interviews with 20-30 individuals to "saturate" categories and detail a theory	Primarily observation and interviews during extended time in the field	Multiple sources-documents, archival records, interviews, observations, physical artifacts
Data analysis	Open coding, axial coding, selective coding, conditional matrix	Description, analysis, interpretation	Description, themes, assertions.
Narrative form	Theory or theoretical model	Description of the cultural behaviour of the group	In-depth study of a "case" or "cases".

Table 3.2 Comparing research traditions in qualitative research (Robson, 2002: 164)

According to Bailey (2004), action research couples the research and action tightly. Research and action are in progress in a parallel way. Action research focuses on the impact of researchers' actions of practice within communities and groups to investigate how change in one's actions or practises can benefit a community of practitioners mutually (McNiff and Whitehead, 2002). The action research approach is appropriate for studies on intervention, development and change within communities and groups, but this research focuses on the current situation of business-IT alignment in Chinese SOEs. Moreover, there is no action planned in this research. Therefore, research action is not an appropriate research strategy.

To sum up, case study and grounded theory are considered as appropriate strategies in this research, but use of either case study or grounded theory alone is not able to answer the research question well. Therefore, these two strategies will be integrated

into one design in this study, which will be discussed in the following sections.

3.4.2 Case study

Case study is defined in the *Penguin Dictionary of Sociology* as "the detailed examination of a single example of a class of phenomena, a case study cannot provide reliable information about the broader class, but it may be useful in the preliminary stages of an investigation since it provides hypotheses, which may be tested systematically with a larger number of cases" (Denzin and Lincoln, 2011:301).

A case study is widely used in research in different disciplines such as psychology, sociology, history, economics, education and so on. As Denzin and Lincoln (2011) mentioned, in the top political science journals, most of the articles have adopted case studies in recent years. Furthermore, much knowledge of the empirical world and many of our most treasured classics are produced through case studies.

The basic idea of a case study is that "one case (or perhaps a small number of cases) will be studied in detail, using appropriate methods. While there may be a variety of specific purposes and research questions, the general objective is to develop as full an understanding of that case as possible" (Silverman 2005: 126). The reason for choosing a particular case is often that it allows access (Silverman, 2005). Case study research design is flexible. It is generally inductive but not exclusively so (Cassell and Symon, 2004). As Denzin and Lincoln (2011) argued, case study can be suitable for hypotheses testing in some situations.

There are three types of case study: intrinsic case study, instrumental case study and collective case study (Silverman, 2005; Denzin and Lincoln, 2000)

- If a case study "is undertaken because, first and last, the researcher wants better understanding of this particular case", then this is an intrinsic case study (Silverman, 2005: 127). The reason for carrying out an intrinsic case study is just the intrinsic interest in the case rather than phenomenon construction or theory building, and there is no attempt to generalize beyond

the case (Silverman, 2005; Denzin and Lincoln, 2000). Qualitative researchers often resist a purely intrinsic case study since it lacks theoretical development (Silverman, 2005).

- "If a particular case is examined mainly to provide insight into an issue or to redraw a generation", it is an instrumental case study (Silverman, 2005: 127). It was pointed out that, in an instrumental case study, the case is used to support the research and to facilitate the understanding of researchers (Denzin and Lincoln, 2000).

- "A researcher may jointly study a number of cases in order to investigate a phenomenon, population, or general condition". This is defined as a collective case study (Silverman, 2005: 127). It can be considered to conduct a set of instrumental case studies for investigating some general phenomenon (Silverman, 2005).

When the general, context-independent knowledge does not exist in social science yet, case study is especially suitable to produce the concrete, context-dependent knowledge as a beginning. It is sometimes considered that essentially only specific cases and context-dependent knowledge exists in social science (Denzin and Lincoln, 2011).

Some researchers consider that the knowledge from a single case study cannot be formally generalized. There are two arguments to refute this. Firstly, the knowledge from a phenomenological case study without generalization is also valuable and is able to be entered into the collective process of knowledge accumulation. Secondly, knowledge from a case study can be used as the basis of generalization for contributing to scientific development (Silverman, 2005).

When the data is collected in context and social or organizational processes are required to be understood in detail, the case study is particularly suited (Cassell and Symon, 2004). In some situations, a case study is used to develop a theoretical framework through examining the data systematically within a rudimentary theory or

primitive framework at the outset. Grounded theory may be adopted to generate emergent theory (Cassell and Symon, 2004).

3.4.3 Grounded theory

Theory is defined as "a set of well-developed categories (e.g. themes, concepts) that are systematically interrelated through statements of relationship to form a theoretical framework that explains some relevant social, psychological, educational, nursing, or other phenomenon" (Glaser, 1992: 8). Strauss and Corbin (1998:22) interpreted grounded theory as the "theory that was derived from data, systematically gathered and analysed through the research processes". This research aims to produce a theory that is grounded in the case study and may inform about the Chinese SOE context.

Barney Glaser and Anselm Strauss developed grounded theory during their studies in the early 1960s. With a comprehensive exposition of grounded theory, their book *The Discovery of Grounded Theory*, published in 1967, has been the central reference in all of the grounded theory related studies (Heath and Cowley, 2004; Hughes and Jones, 2003). The development of grounded theory is based on the argument of Glaser and Strauss that qualitative methods can attain the same levels of rigour and validity as quantitative ones (Heath and Cowley, 2004). Although latterly, Glaser and Strauss went different theoretical ways in terms of grounded theory approaches in the 1980s and 1990s since they each have a different focus on research. Strauss is noted for qualitative research methods while Glaser does innovative work in quantitative methods adoption; however, the essentials of grounded theory have not significantly changed since their original publication in 1967 (Heath and Cowley, 2004). Strauss has continued to develop the grounded theory method with Juliet Corbin. In their book *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, which was first published in 1990, the Strauss-Corbin approach to grounded theory is outlined. With regard to this development, Strauss stresses there is no divergence from his earlier work with Glaser, and that his later work simply aims to further research with grounded theory; however, Glaser criticizes it as an entirely different approach that has nothing to do with the grounded theory method (Heath and Cowley, 2004; Glaser, 1992). From the opinions of following researchers

on these differences, Strauss's work provides guidelines, procedures and detailed rules to researchers for assisting their studies (Heath and Cowley, 2004). Considering the popular adoption of the Strauss and Corbin approach, as well as the clear process identified in it, this research is conducted using the Strauss and Corbin approach. In the following sections, the main processes involved in grounded theory, including use of literature, theoretical sampling, coding processes, and theoretical saturation are discussed.

3.4.3.1 Use of literature

With the grounded theory method, researchers derive the theory from the data within an area of study at the beginning of the project rather than starting the project with a preconceived theory in mind (Allan, 2003). Contradicting most methodologies, which consider a detailed literature review is an essential foundation to build a study (Dunne, 2011), Strauss and Corbin (1998) argued there is no need to review all the literature in the field at the beginning. However, researchers should have a general idea of where to begin when conducting grounded theory (Strauss and Corbin, 1998). In the Straus and Corbin approach, the literature is used as a basis of professional knowledge and to establish current thinking in the area without leading to any hypothesis (Allan, 2003).

Although Glaser and Strauss (1967) are explicitly against conducting a literature review in the substantive area of research at the beginning of the research, they both agree that in order to acquire theoretical sensitivity, the use of literature is necessary in the grounded theory processes. Theoretical sensitivity is significant for researchers to conceptualize and formulate a theory when it emerges from the data (Glaser and Strauss, 2006). Therefore, in this research project, a general literature review was undertaken at the start of the research, which provided background knowledge and a fundamental conceptual understanding of research; it therefore enhanced the theoretical sensitivity of the researcher to conceptualize and develop the theory. Furthermore, as Strauss and Corbin (1998) argued, the literature provided implications to the researcher for formulating the questions during the initial interviews. The literature thus suggested areas for theoretical sampling at the beginning of the research. The review of the literature also helped the researcher

consider the participants to be involved in the research. Moreover, an additional literature review was conducted after data collection and data analysis to compare the findings with the literature so as to extend, validate and refine the knowledge in the field (Strauss and Corbin, 1998).

3.4.3.2 Theoretical sampling and theoretical saturation

Theoretical sampling is defined as "data gathering driven by concepts derived from the evolving theory and based on the concept of "making comparisons," whose purpose is to go to places, people, or events that will maximize opportunities to discover variations among concepts and to identify categories in terms of their properties and dimensions" (Strauss and Corbin, 1998:201). It indicates the selection of the participants will be dependent on the analysis of data and emerging concepts and categories using a theoretical sampling approach.

The initial decisions for the theoretical collection of data are based on a general subject or problem area and a general sociological perspective such as a few principles or features of the structure and processes in the situation that will be studied rather than on a preconceived theoretical framework (Glaser and Strauss, 2006). As Strauss and Corbin (1998) pointed out the researcher could choose every third person or could proceed down a list of names, places or times, on the basis of convenience. The theoretical sampling is applied during the data collection and data analysis associated with the generation of theory; therefore the researchers are able to tailor the sampling and adjust the control of data collection in order to ensure the data's relevance to the emerging theory (Glaser and Strauss, 2006).

The process of selection of groups for data collection and comparisons in data analysis consists of maximization or minimization of both the differences and similarities of data (Glaser and Strauss, 2006). Minimizing the differences among the comparison groups helps to verify the existence of data on a given category and establish the properties of a category through similarities or important differences before differences among groups are maximized (Glaser and Strauss, 2006). Maximizing differences among comparison groups helps to increase the possibility

to collect different data on a category and therefore helps to understand the multitude of differences (Glaser and Strauss, 2006). The researchers establish the basic categories and their properties by minimizing differences in comparison groups at the beginning and then turn to maximizing the differences among comparison groups to obtain wider possible coverage on ranges, types, degrees, variations, conditions, causes, consequences and so on(Glaser and Strauss, 2006).

In grounded theory, data is gathered until each category is saturated (Strauss and Corbin, 1998). Theoretical saturation is defined as "the point in category development at which no new properties, dimensions, or relationships emerge during analysis" (Strauss and Corbin, 1998: 143). The researcher should continue to collect data until theoretical saturation is reached; otherwise, the theory will not be developed evenly and will lack density and precision (Strauss and Corbin, 1998). There are three perspectives that indicate the theoretical saturation has been achieved (Strauss and Corbin, 1998). Firstly, no new or relevant data is emerging on a category. Secondly, the category is well established on its properties and dimensions. Thirdly, the relationships among categories are well developed and validated (Strauss and Corbin, 1998).

3.4.3.3 Coding processes

After collecting data, the data analysis starts from the coding processes. There are three main coding processes in grounded theory, including open coding, axial coding and selective coding (Strauss and Corbin, 1998).

Open coding is defined as "the analytic process through which concepts are identified and their properties and dimensions are discovered in data" (Strauss and Corbin, 1998: 101). There are two basic analytical tools used in the open coding process to identify concepts and categories, referred to as "asking questions" and "making theoretical comparisons". During analysis of the word, phrase and sentence in detail, the asking of questions is used to break down the data (Strauss and Corbin, 1998; Pandit, 1996). Making theoretical comparison is "an analytic tool used to stimulate thinking about properties and dimensions of categories" (Strauss and

Corbin, 1998: 73). These two analytical tools help improve the conceptual ability of researchers on theoretical codes. As Glaser (1992) argued, researchers will be just informed or knowledgeable from the data rather than being able to generate grounded theory without the conceptual ability and training. From asking questions and making comparisons, the concepts and their properties and dimensions are identified, and then the concepts are grouped to a higher, more abstract level known as categories (Pandit, 1996).

Axial coding is defined as "the process of relating categories to their sub categories, coding occurs around the axis of a category, linking categories at the level of properties and dimensions" (Strauss and Corbin, 1998: 123). After identifying concepts and categories in an open coding process, axial coding is used to make connections between a category and its sub-categories (Pandit, 1996).

Selective coding is "the process of integrating and refining the theory" (Strauss and Corbin, 1998: 143). This process refers to the integration of categories that have been identified in axial coding to develop an initial theoretical framework (Pandit, 1996).

In addition, the conditional/consequential matrix can be used as a coding device to help researchers understand the phenomenon under investigation contextually (Strauss and Corbin, 1998). A conditional/consequential matrix is defined as "an analytic device to stimulate analysts' thinking about the relationships between macro and micro conditions/consequences both to each other and to process" (Strauss and Corbin, 1998: 181). This practical means is helpful for researchers to trace out different components of analysis.

3.4.3.4 Constant comparisons

Constant comparisons are an essential feature of grounded theory. The use of constant comparisons aims to stimulate the thinking about properties and dimensions, as well as to direct theoretical sampling (Strauss and Corbin, 1998).

There are two types of comparisons. The first type of comparison refers to looking for similarities and differences among the properties of incidents or objectives in order to classify them. The second type of comparison pertains to the comparing of similar or different concepts of categories in order to bring out possible properties or dimensions when these are not identified by the researcher therefore to help them recognize the properties (Strauss and Corbin, 1998).

In this research, code definition list, quotation list and concept map are used as practical tools to support constant comparisons in data analysis, which are discussed in detail in the research design section.

3.4.4 Combination of case study and grounded theory

In this study, the nature of the research indicates the significance of context in the research. Therefore, a case study approach is adopted. However, case study has been criticized for lacking theoretical development (Silverman, 2005). As an inductive approach, grounded theory is adopted to derive theory from data. Therefore, a combination of case study and grounded theory strategies is used in the research. Allan (2003) argued that there are certain tensions between use of case study and grounded theory. To be specific, Allan (2003) stated that, according to Yin (1994: 13), the case study approach "benefits from the prior development of theoretical propositions to guide data collection and analysis"; however, Glaser and Strauss argued that grounded theory should start without preconceived ideas or hypothesis. To avoid this potential conflict, Saunders *et al*. (2003: 99) argued that, as one of the advantages of employing multi-methods in the research, different methods can be used to fulfil different requirements in the study. This point is able to address Allan's concerns. In this study on business-IT alignment in the Chinese SOE group, a case study is used as a support tool to provide a social context for the adoption of grounded theory. Grounded theory is the main strategy used in the data collection and data analysis processes in the study. Furthermore, every research method or strategy has its own weaknesses and strengths that influence the research to some extent. To adopt a combination of different methods may reduce these effects so as to lead to better conclusions (Saunders *et al*., 2003:99). Grounded theory aims to

investigate the actualities in the real world and build theory from discovering the concepts grounded in the data. The adoption of grounded theory needs context, and case study provides the context for using grounded theory. The combination of these two methods is ideal.

3.5 Data collection techniques and methods

3.5.1 Quantitative vs. qualitative approach

To conduct social investigation, there are two main types of research approach: the quantitative approach and the qualitative approach. Quantitative research focuses on measuring and analysing the causal relationships between variables rather than processes (Denzin and Lincoln, 2000). Since quantitative data can be analysed statistically, it is more powerful to use this type of approach to explore complicated theoretical problems, compared to the verbal analysis of qualitative data (Hirschi, 1973). On the other hand, qualitative research is "a situated activity that locates the observer in the world" and "consists of a set of interpretive, material practices that make the world visible" (Denzin and Lincoln, 2000). Qualitative research focuses on the reality that is structured socially in nature, as well as on the relationship between researcher and subject being studied (Denzin and Lincoln, 2000). Dey (1996) argued that although qualitative data is often considered as too subjective, it provides richer and more valid data compared to a quantitative approach.

Both the quantitative and qualitative approaches can be considered to be appropriate by researchers according to the research questions. Each of them has its own strengths and advantages. Quantitative data facilitates standardized, objective comparisons. Furthermore, the overall situation or phenomenon is described in a systematic and comparable way with the quantitative approach (Punch, 1998). However, the qualitative approach is used in a wider range of circumstances since it is more flexible compared to the quantitative approach.

Considering the research questions and objectives of this research, the qualitative approach was selected for the following reasons. Firstly, this study aims to develop a

theoretical framework about business-IT alignment in the Chinese SOE group using an inductive approach. It is not a statistical study in nature. Secondly, this study holds the interpretivist view and the researcher will try to find meanings from interpreting the collected data. Thirdly, grounded theory strategy is used in this research, which requires a qualitative approach.

3.5.2 Questionnaires

Questionnaires are defined as "a general term to include all techniques of data collection in which each person is asked to respond to the same set of questions in a predetermined order" (deVaus, 2002). Questionnaires are one of the most popular data collection techniques (Pickard, 2007). There are some advantages to using questionnaires in the research. For example, questionnaires enable researchers to reach a geographically distributed organization at a relatively low cost, and also the researcher can acquire data from a large sample (Pickard, 2007). The questionnaires work best when they are designed in a standard way and all the questions are able to be interpreted in the same way by the respondents (Saunders *et al.,* 2003). This study stands in an inductive position with qualitative approach. Therefore, questionnaires are considered as an inappropriate method for the study.

3.5.3 Observation

There are two types of observation: structured observation and participant observation. Structured observation is a quantitative approach designed to investigate the frequencies of things happening rather than the reasons for them (Saunders *et al.,* 2003). In contrast, participant observation is a qualitative approach in which "the researcher attempts to participate fully in the lives and activities of subjects and thus becomes a member of their group, organization or community. This enables the researcher to share their experience by not merely observing what is happening but also feeling it" (Gill and Johnson, 1997: 113). The interpretivist and exploratory nature of this PhD study determined that a quantitative structured observation approach will not be suitable to explore the phenomenon under investigation. On the other hand, the relatively closed organisational culture in Chinese SOEs made it very

difficult for the researcher as an external person to carry out participant observation with members inside the company under review. Moreover, strategic use of IS as an organizational asset is not easily observed. Strategy refers to long-term implementation, but observation is conducted in a specific time period. Therefore, observation is not appropriate in the study.

3.5.4 Interviews

An interview is "a purposely discussion between two or more people" (Kahn and Cannell, 1957). It is commonly adopted in social science (Robson, 2002). Based on the depth of response sought, there are three types of interviews (Robson, 2002):

- Fully structured interview: "has predetermined questions with fixed wording, usually in a pre-set order. The use of mainly open-response questions is the only essential difference from an interview-based survey questionnaire" (Robson, 2002: 270).
- Semi-structure interview: "has predetermined questions, but the order can be modified based upon the interviewer's perception of what seems most appropriate. Question wording can be changed and explanations given; particular questions that seem inappropriate with a particular interview can be omitted, or additional ones included" (Robson, 2002: 270).
- Unstructured interview: "the interviewer has a general area of interest and concern, but lets the conversation develop within this area. It can be completely informal" (Robson, 2002: 270).

Interviews will facilitate the researcher to carry out a deep investigation of the business-IT alignment in a contextual environment. Since the concept of business-IT alignment includes strategic, structural and operational levels, the interviews can be given different designs when the researcher is exploring the various levels of business-IT alignment. Since a theoretical framework is developed from the literature review, semi-structured interviews are adopted in this study.

3.6 Summary of the research methods selected for the proposed research

The proposed research aims to investigate the current situation of business-IT alignment in the Chinese SOE context. Obviously, the nature of this research has decided on an interpretivist philosophical stance. After a comprehensive literature review, there are no existing theories or frameworks for business-IT alignment in the Chinese SOE context. However, a business-IT alignment model is developed based on the research, which can be used as the basis for further investigation. Based on these conditions, an inductive approach is selected for the proposed research. Furthermore, since the research is conducted to investigate phenomena in a special context, case study is chosen as the research strategy. As Pickard (2007) has pointed out, "using case study is the most appropriate research method when the purpose of the research requires holistic, in-depth investigation of a phenomenon or a situation from the perspective of all stakeholders involved." Moreover, he also argued that case study is suitable when the research "studies the particular within context and has a very specific purpose".

Considering this research, a typical Chinese manufacturing SOE group was selected to carry out a case study due to time and resource restrictions. The aim of this case study is to explore the current situation of business-IT alignment in the Chinese SOE group. Therefore, it is a form of instrumental case study as was discussed above. Considering the restriction of time and resources available, a single case was selected in this research. However, this seems reasonable. Ragin (1992) stated that if a particular case provides an understanding for important issues or offers significant explanations, it can be theoretically generalized. Therefore, Denzin and Lincoln (2000) pointed out that if clear expectation of generalizations is given, the majority of academic researchers will support the study of the case. In this research, considering the characteristics of the case and its context, it is considered that this case can offer a clear understanding for the research objectives. On the other hand, because grounded theory can be used in data collection and analysis processes for generating the theory, especially in an inductive approach to research, it is considered appropriate to adopt it as a complementary method to case study.

In light of this, the research here aims to carry out an in-depth investigation of the

Chinese SOE as the case study context, and use a basic framework summarized from the literature review as the basis of the semi-structured interview as the data collection method.

In summary, the proposed research, taking an interpretivist philosophical stance and using an inductive approach, is designed to be conducted using a combination of case study and grounded theory strategies, using the semi-structured interview as the data collection method.

3.7 Summary

In Chapter 3, the research methods of the proposed study are identified. All the elements identified in this chapter form the basis for conducting further research. A combination of case study and grounded theory strategies is adopted in the study. In light of the research questions and research objectives, the case study approach uses a Chinese SOE context for the study. The participants of the study will be selected from the case study Chinese SOE group. The data collection and data analysis will be conducted based on this context. Grounded theory is used as the driver for data collection and analysis. The research design based on the identified research methodology is described in Chapter 4 that follows.

Chapter 4: Research Design

On the basis of the discussion on research methodology, chapter 4 presents and discusses the research design of the project. The case study, research stages including the data collection, data analysis, as well as the research ethics are included in this chapter.

4.1 Case study

As discussed in section 3.4.4, this research project adopted single case study for providing the social context for the use of grounded theory. A suitable and sufficient case study site has been chosen for an in-depth investigation.

4.1.1 Case study site

This research project selected the Aluminium Corporation of China as the case study site. According to its website (http://www.chalco.com.cn/zglyen/index.htm), the Aluminium Corporation of China is a state-owned enterprise (SOE) established to be the primary aluminium producer in China in 2001. In 2001, with RMB 11.049 billion registered capital, the Aluminium Corporation of China was listed on the stock exchange. It has been recognized by ISO 9000 and ISO 14000 and is rated as BBB+ in Standard and Poor's rating scheme. Since its establishment, this Corporation has maintained an excellent financial performance. The assets of the Corporation increased at a stable rate of approximately 29%, while the total revenue grew at a rate of nearly 39%, every year from 2001 to 2007. Its total assets reached 470 billion yuan and its sales revenue totalled 240 billion yuan in 2012. It is a key state-owned enterprise supervised by the central Chinese government directly. The Aluminium Corporation of China is the largest producer of alumina and primary aluminium and also has the strongest copper capabilities in China. Furthermore, it is the second largest alumina producer, the third largest primary aluminium provider and the fifth largest fabricated aluminium producer in the world.

The headquarters and branches of the Corporation are distributed over 22 provinces

in China, with another 15 overseas offices spread across ten countries in 2006. Now the Aluminium Corporation of China operates in more than 20 countries and regions with different businesses. The size of the corporation has also grown since it was established. There were 116,000 employees in 2001, which increased to 191,000 in 2005. The Aluminium Corporation of China was made up of seven enterprises which are alumina and primary aluminium producers and one research institute when it was established in 2001. As per the company's official website, the aluminium business is still the core business in the corporation. This study focused on the headquarters in Beijing which is mainly responsible for the management of the original seven manufacturing branches since the research institute has no production function. These seven branches are geographically dispersed in six provinces including Shanxi, Shandong, Henan, Guizhou, Guangxi and Qinghai in China, as shown in figure 4.1.

Figure 4.1 Headquarters and branches of the Aluminium Corporation of China

The corporate ethic of the Aluminium Corporation of China is "Striving for Strength and Excellence through Hardworking and Innovation", and the operational philosophy is "Maximizing Returns through Honest Operation". Constant reforms and development are promoted and corporate social responsibilities are delivered actively within the company in order to build a resource-efficient, environment-friendly corporation with safe production. Furthermore, in the new economic environment with global competition, sound and rapid growth based on scientific development, excellent performance and well-developed corporate culture is being

pursued to build the Aluminium Corporation of China into a leading, stable and profitable organisation.

The main departments in the Aluminium Corporation of China are shown in table 4.1 below.

Expert consulting committee	Overseas Development Department	Mineral Resources Department
General Office	Audit Department	Party Discipline Inspection Office
Finance Department	Corporate Youth League	Research and Planning Department
Investment Department	Personnel Department	Legal Affairs Office
Science and Technology Department	Corporate Management Department	Aluminium Fabrication Department
Party Affairs Department	Marketing and Trading Department	
Administrative Services		

Table 4.1 Main departments of the Aluminium Corporation of China

It is important to note that the Aluminium Corporation of China was chosen as the case study site for three reasons. Firstly, according to the pilot study undertaken by the researcher as an MSc research project, this case study could provide meaningful and rich information that would help in achieving the research aims of this research. Secondly, this corporation was chosen as a typical SOE in China. As has been discussed in section 1.2, SOEs in China face very a special political, economic and cultural environment associated with massive social responsibilities. The SOE being studied is operating under these environmental challenges. Furthermore, Chinese SOEs have experienced a series of reforms. With the earliest branches built in 1958, the chosen SOE experienced the reforms prescribed by the Chinese government. A case in point is the reform of mergers proposed by the government in 1997. The Aluminium Corporation of China is a good and important case study as it was involved in the merger plan. In addition, SOEs have been instructed to operate in capital-intensive industries (Lin *et al.,* 1998). Different industries are dependent on various production technologies, technological innovation and organisational

practices (Tambe and Hitt, 2012; Oliveira and Martins, 2011). As a manufacturing company, special attention must be given to the SOE being used as a case study for this research project. Thirdly, as a pragmatic reason, the research obtained guaranteed access to all participants in this case study.

4.2 The base study

For the same case enterprise, a base study was undertaken as part of an MSc dissertation conducted by the same researcher. This base study's aim was to investigate the IS implementation situation and was carried out before the current study (the main study) commenced. The findings for this base study informed and helped the formulation of the research questions and objectives for the current study. The main findings of the MSc research project included two perspectives (Chen, 2009).

Firstly, the investment on information systems is satisfactory in the case company. The IT infrastructure investments are also sufficient in many dimensions. The hardware investment in the Chinese manufacturing SOE groups is adequate. The operating systems are valid and have been upgraded regularly. Application systems have received investment in the SOE group, and support systems are implemented in the enterprises. Although SCM, CRM and KMS have not been used, a sophisticated enterprise-wide ERP system has been extensively applied in both headquarters and the branches. In addition to this, networks such as LANs and WANs have been built in the enterprise to connect different business units within a branch as well as branches and headquarters. This facilitates communication via distributed systems. Although some problems exist in the IT infrastructure construction in the Chinese manufacturing SOE group, the overall investments are satisfactory.

Secondly, although the investment on information systems is adequate, the implementation of them varies. From the base study, it emerged that all staff in the SOE group are aware of the concept of ERP and its implementation in the organization, but they are not able to recognize the functions of ERP that facilitate the business organization. It indicates that, in the case the SOE group, the

implementation of ERP systems has been undertaken according to governmental and top management policy, but is often not understood and remains under-utilized by middle managers and end users.

From these findings, it was recommended that there is a need to investigate further the reasons behind this insufficient understanding and awareness of information systems implementation. This kind of situation may be one of the causes for the continued perceived failure of information systems implementation in the Chinese SOE environment. In addition, the current status of information systems implementation in the Chinese SOE group is unique. Firstly, the corporate context is unique. Chinese enterprises were merged according to the government plan rather than as a result of market competition. This indicates that information systems integration may not be in alignment with the corporate business following the merger. Secondly, the situation of information systems implementation is unique, as the Chinese government made the implementation decision. Moreover, from the findings in the base study, although information systems have been adopted in the Chinese SOE group, the implementation plan is not satisfactory. The issues relating to business-IT alignment are recognised as possible solutions to these problems in the case of the SOE group.

4.3 Research stages

The research stages followed by this research project consist of the literature review, interview script design, interview transcription, data analysis, and emerging theory building.

4.3.1 Literature review

This project started with a review of the relevant literature. As was discussed in section 3.4.3.1, use of literature is an important stage in the grounded theory approach.

To explore the causes and consequences of business-IT misalignment in Chinese

SOEs, the literature review mainly focused on the following three areas.

- An investigation was carried out to understand the concept of business-IT alignment, including definitions and models. At the end of this section, a refined conceptual understanding of business-IT alignment was developed based on the literature.

- The main components of business-IT alignment were explored further based on the proposed conceptual understanding to provide an explicit explanation.

- Literature relevant to the influencing factors of business-IT alignment was explored, such as antecedents, enablers, inhibitors or outcomes. Researchers used different terms to represent the influencing factors.

Placing the literature review stage at the beginning achieved three aims. Firstly, the literature review helped the researcher to enhance the theoretical sensitivity for further conceptualizing and formulating the theory as it emerged from the data. As presented above, the literature review carried out an in-depth investigation of the business-IT alignment concept and the components based on the conceptual understanding. The researcher gained professional knowledge and established the current thinking as a result of the literature review. This professional knowledge enabled the researcher to recognize the incidents as being conceptually similar or not during the data analysis, confirming the claim that the literature can be used as an analytic tool (Strauss and Corbin, 1998).

Secondly, the literature review provided implications for the selection of research methodology. The literature review identified a lack of literature as one of the causes and consequences of business-IT misalignment in the Chinese SOE context. The literature review has not identified any framework with sufficient theoretical foundation to be adopted as a prior framework to guide data collection and data analysis. Researchers have previously reviewed the literature from both Chinese and Western contexts. Even after a review of the Chinese academic database, there is a scarcity of research on business-IT alignment and influencing factors in the Chinese

literature. Very few studies on business-IT alignment focus on the conceptual understanding based on models developed in Western literature. It implied an inductive approach needed to be adopted in this research project. Moreover, this project aimed to establish a theory emerging from the data collected.

Thirdly, the literature review provided initial ideas for interview script design and theoretical sampling. The IS strategic alignment model in figure 4.2 developed in the literature review is used to guide initial interview script design. As the business-IT alignment model has been defined, there are three levels of business-IT alignment including the strategic level, structural level and operational level; and four types of business-IT alignment in the organization, including strategic level alignment, structural level alignment, operational level alignment and IS infrastructure and business operation alignment.

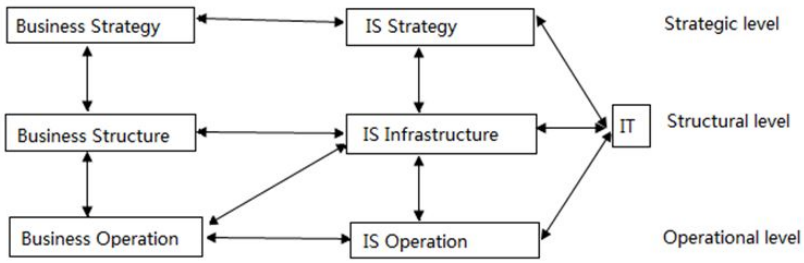

Figure 4.2 IS strategic alignment model

Structural level alignment means the IT infrastructure should align with both the organizational structure and the management structure. To be specific, IS applications should fit the different management hierarchies in the organization. IS/IT executives should be in a suitable position in the management hierarchy, and IS distribution and communications should fit the organizational structure. IS services should facilitate the management and communication within the organization. On the other hand, IT infrastructure design and construction are matters decided by the organisational and management structures.

Operational level alignment means IS implementations should actually support the business processes, such as SCM or CRM. On the other hand, the types of IS implementations are decided by the business processes and functions. The

competences and behaviour of staff in the organization facilitate the IS/IT operation. IT staff skills support the business operations as well.

IS infrastructure and business operation alignment means the communications and services of the IS infrastructure align with the business functions. Systems implementation, communication and services facilitate the operational activities of the organization.

It indicates that the interview script design should be conducted from four perspectives at these three levels in the organization. Therefore, there are four sets of interview questions in the study. For strategic level alignment, interview questions refer to the strategic issues and higher level issues in the organization, such as the connections between the business and IS plan as well as the situation of congruence between the businesses and IS executives. In the structural level alignment, research questions refer to IS applications and management hierarchies, organizational structure and IS distribution and communications. In the operational level, interview questions are mainly about how business operations support business processes and human resource issues. To investigate the alignment between business operations and IS infrastructure, interview questions are concerned with how the structure, distribution and communication of IS support the business' operational activities. These four sets of interview questions are designed for all of the interviewees in the initial interview.

4.3.2 Data collection

4.3.2.1 Obtaining access

Obtaining access to the case study site is considered as an extremely significant issue that determines the success of a qualitative research project (Saunders *et al*., 2007).

As was mentioned, the case study site used in this research project is the same as the one where the researcher conducted her MSc dissertation project. After several unsuccessful attempts to get responses from the case enterprises, the researcher

realised it is almost impossible to approach potential informants without personal contacts. Personal contacts, which provide security and personal trust for the individual are influential and treated very seriously in Chinese social culture since this concept is deeply embedded in a long history of Confucian socio theory (Gilbert and Tsao, 2000; Hammond and Glenn, 2004). This Chinese culture further influences the recruitment of potential interviewees. The managers and staff in the case enterprises are not likely to agree to be interviewed if they are not asked by someone who has a personal connection to them. Therefore, the researcher established contacts with the CIO of the enterprises through personal relationships. However, according to Hofstede's (1991) five national culture dimensions, which is explained in detail in the literature review section, China has a high power distance culture. The subordinates would like to do what they are told but it does not work the other way round. The CIO in the enterprises readily agreed to arrange managers and staff with lower standing in the organization to participate in the research project but refused to help for the contacts with higher level managers. The researcher tried to contact them but received no response. Consequently, the researcher established personal contacts with managers in all the seven branches and they agreed to participate and support the research project within their respective branches.

4.3.2.2 Translation

Since all the participants do not have the ability to understand and speak in English, all interviews were conducted in Mandarin Chinese, the native language of the informants. It is more appropriate to use the native language of the interview informants to maintain both the reliability and validity of the data (Marshall and While, 1994). However, the interview script was originally developed in English instead of Chinese because the literature review undertaken to enhance theoretical sensitivity and formulate initial questions, as argued by Strauss and Corbin (1998), mostly involved English language sources. Furthermore, Peng and Nunes (2008) argued that it is important to discuss and validate the design of the interview script with colleagues and advisors. Therefore the initial development of the interview script was in English since this project is undertaken in an English university and the research group uses the English language. As a result, the interview script was

designed in English originally and then translated into Chinese. This requirement created a potential risk in the research project due to the translation processes.

The translation risk was mitigated since, while the native language of the researcher is Chinese, she is fluent in both Chinese and English. Furthermore, the second supervisor of this project is a native Chinese speaker and has excellent English and Chinese language skills. The interview script in the Chinese version was verified by him. Potential ambiguities and errors were removed at this stage. In addition, in order to reduce the potential ambiguities further, the interview script was pilot tested with three Chinese PhD researchers. Two of them are in the Information School of the University of Sheffield while the other is doing research on engineering; they were involved to make sure there are no language problems or special terms which will influence the understanding of the interview questions. According to their feedback, some corrections were made to the script in terms of language.

In addition, the data collected was preserved, coded and analysed in the original Chinese language but the results of the data analysis were presented in English. There were two advantages in adopting this approach. Firstly, it would be rather difficult to translate large amounts of qualitative data from Chinese to English since there will be differences in interpretation of materials and unavailability of truly equivalent words between the different languages (Carlson, 2000). Therefore, using the data in the original language would mitigate the risk of mistakes, misinterpretations and inaccuracies in translation. Secondly, as two dynamic processes, data collection and analysis are ideally practiced simultaneously in qualitative research (Esposito, 2001). Grounded theory specifically requires that data collection and data analysis should occur concurrently; one of the features of data analysis with grounded theory is dynamic interaction between data collection and analysis (Dunne, 2011). Close relationships between data, analysis, interpretation and coding would be flawed because of an early translation. Furthermore, the researcher may overlook the subtle differences and deeper meaning of the original data in the translated qualitative materials (Marshall and While, 1994), which are important to understanding the research phenomenon.

4.3.2.3 Interview

Data collection adopted semi-structured interviews as the tool. The interview script design is based on the proposed conceptual understanding of business-IT alignment produced by the literature review. The researcher designed two different versions of interview script for the two types of informants chosen to be interviewed, including business people and IT people. These interview scripts were continuously revised through the data collection.

Interviews were conducted in Mandarin Chinese and the duration was from 40 to 60 minutes in general. The interviews were conducted between the 16th of September in 2013 and the 8th of November in 2013. The researcher travelled to all the seven branches and headquarters to conduct interviews. The interviewees' details, including their job position, department and branches are included in Appendix 3. All interviews were recorded with a digital recorder. The digital recordings were transcribed into Word files and then assigned into NVivo for data analysis.

Data collection processes are supported by two important tools, interview question script and digital recorder. The researcher used interview scripts to guide information gathering when conducting interviews. The interview script was designed to consist of a series of open-ended questions. These open-ended questions guided the researcher in collecting meaningful information for theory development. Furthermore, for each open-ended question, some trigger questions and follow up questions were designed, which help to increase the richness and depth of the response. These related questions gave more time to interviewees to think and organize their answers. In addition, there is a blank space after each main question, for the researcher to make notes about new emerging issues, potential follow-up questions, new ideas and so on. There were two different versions of the interview script. One is for the business departments; the other is for the IT department. As shown in section 4.1.1, the case company is structured with an IT department and other business functional departments. The interview script for the IT department is designed from the perspective of IT expertise. Based on the four types of alignment identified in the IS strategic alignment model, questions also include their opinions on business people and the IS implementation. In contrast, the interview script for

the business departments is designed from the perspective of IT and IS users. Based on the four types of alignment identified in the IS strategic alignment model, questions also include their opinions on IT/IS services provided by the IT department. Both interview scripts for functional people and for IT people have an English and Chinese version. The initial interview script used at the beginning of the research is attached in Appendix 4. The questions on the interview script were constantly being revised within the data collection and data analysis processes, based on the evolving theoretical concepts.

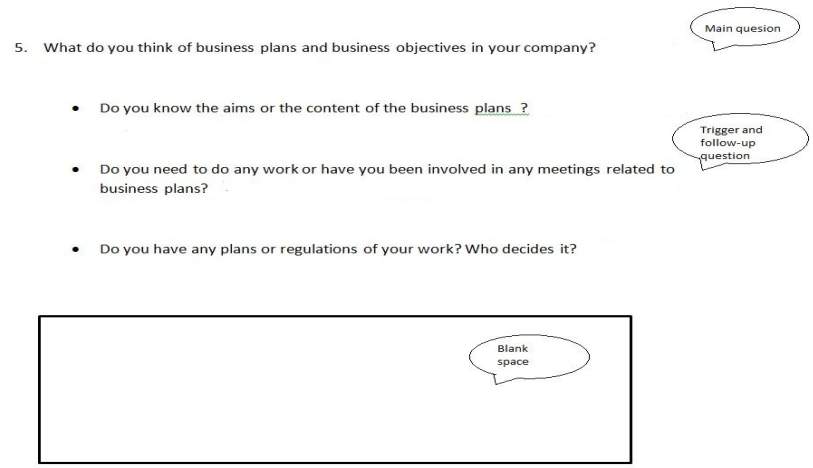

Figure 4.3 Sample of interview script

All the interview conversations were recorded with a digital recorder in order to protect the fluency of the interview conversation (Patton, 2002). Furthermore, the benefits of digital recording also occurred at the analysis stage, which freed the analyst to listen to the recordings carefully and preserved accurate information (Patton, 2002; Belisle, 1998). At the beginning of each interview, the interviewer informed the participants of the following information:

"This interview conversation will be recorded. But the recording materials will be kept confidential and will only be used by myself for research purposes. You can stop recording at any time with no reasons. Do you mind?"

After agreeing, the interviewer informed interviewees when the recordings were started. All the interviewees agreed to be recorded in this research. It needs to be

mentioned that one IT department manager asked to stop the recording because he was about to talk about price information and trade processes with software vendors, which he considered as confidential business information.

4.3.3 Data analysis

Coding is used for the data analysis with the grounded theory approach. As was discussed in the previous section, there are three types of coding adopted in data analysis with Strauss and Corbin's (1998) approach, including open coding, axial coding and selective coding. There are four tools used to support the data analysis practice, including data analysis software (NVivo10), code definition table, quotation list, and concept map.

The use of NVivo increases the effectiveness and efficiency of ways of learning from data. Researchers reported software provided new ways of seeing data compared to the time when they had to manage data without software. NVivo will help researchers to manage data and manage ideas during data analysis (Bazeley and Jackson, 2013). In this research, the interview data was assigned to NVivo after transcription. The researcher then adopted NVivo to read and manage the data. Furthermore, the open coding processes were conducted using this software, as shown in figure 4.4.

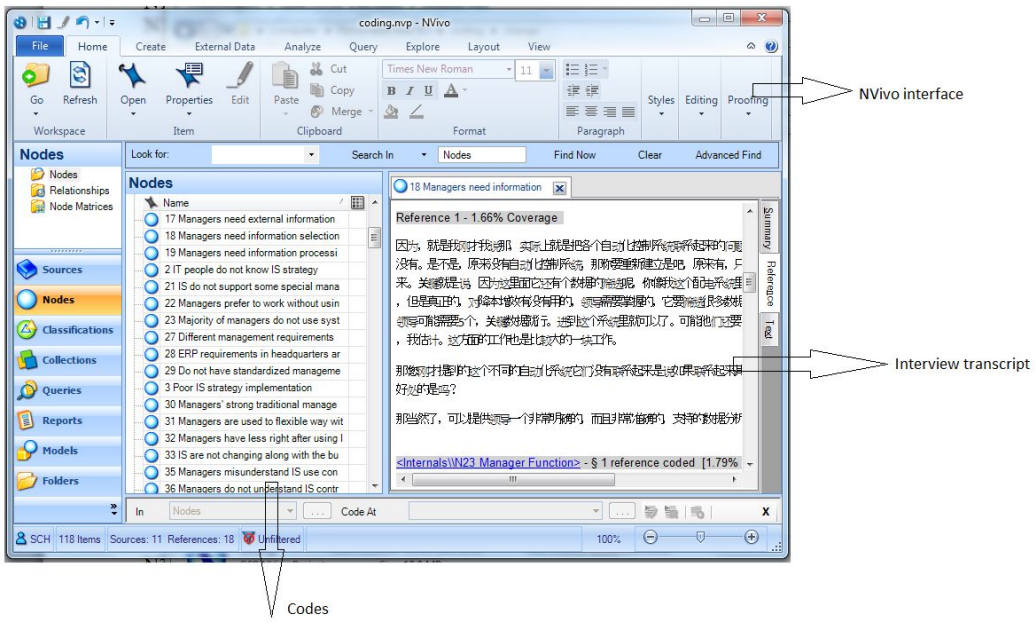

Figure 4.4 Sample of NVivo

The code definition table includes the following information: the definition for each code, the relation of codes to sub-categories, and categories, as shown in figure 4.4. The code definition table supported constant comparisons in the data analysis process. The codes were clearly defined and presented as shown in the table. When the researcher identified new codes from the data, the new emerging code was compared with the existing ones based on the definition. The results of the comparisons helped the researcher to decide whether to add the code as a new one or merge it with existing ones. Furthermore, the codes were related to the sub-categories or categories at the level of properties and dimensions. This code definition table presented clearly relationships among codes, sub-categories and categories. The researcher used this table to support open coding and axial coding in this research. A full code definition table is attached in Appendix 6.

A quotation list was used to record the quotations for each open code, as also shown in the figure. The quotation list also supported the making of constant comparisons in the data analysis. When a new quotation was identified for an open code, it was compared with the existing quotations on the list to find out which one is better suited to present the meaning of the code. Through the comparisons, the definition of the codes may be revised, or sometimes a new code would be added if the quotation presented a different concept. In this list, the quotations were translated from Chinese into English and the most appropriate ones are reported in this thesis. The quotation list is attached in Appendix 6.

Concepts maps are a visual device used to present the relationships among concepts, sub-categories and categories. Concept maps helped the researcher to analyse all the relationships explicitly and compare and validate the connections among concepts, sub-categories and categories. On the other hand, concept maps are products of axial coding and so form an integral part of the findings. As these maps form part of the findings of this research, all the concept maps are therefore shown in the findings chapter (Chapter 5).

4.3.4 Theoretical sampling and theoretical saturation

As discussed in the previous section, theoretical sampling is used to guide the researcher to obtain the necessary data for theory development.

In this project, a total of 41 interviews were conducted following the theoretical sampling strategy, as shown in table 4.2 below.

Headquarters or branches	**Henan**	**Zhong-zhou**	**Guang-xi**	**Shan-dong**	**Shan-xi**	**Qing-hai**	**Gui-zhou**	**Headquarters**
Number of participates	21	4	2	4	2	2	2	4
Functional department	IT department				Functional department			
	20				21			
Management positions	Managers				Operational staff			
	29				12			

Table 4.2 Interviewees summary

The data collection and data analysis were conducted concurrently. Participants were approached individually in groups of three or four, based on the need for theory formulation reflected by the data analysis. After each set of interviews, the interview data were immediately transcribed and a brief analysis conducted. The analysis results were used to revise the interview script and to guide further sampling. The data collection was stopped when it was perceived that the theoretical saturation had been achieved, as shown in figure 4.5.

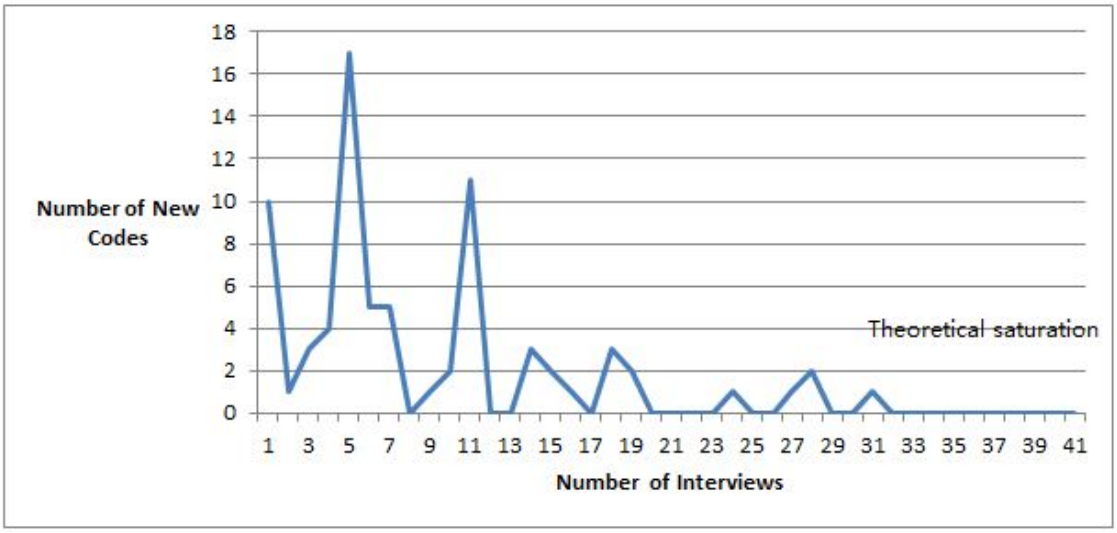

Figure 4.5 Theoretical sampling and saturation

The data collection started from the Henan branch, decided due to the location of the branch. As Strauss and Corbin (1998) pointed out, the sampling may start from whoever agrees to participate, sampling on the basis of convenience; this is a more practical way used most often by new researchers. During the theoretical sampling approach, the first group of participants were recruited from the Henan branch only in order to minimize the differences among comparison groups. This sampling approach was aimed at verifying the codes and categories, as well as establishing the properties of categories before maximizing the comparison groups. After this, more branches were involved in the data collection in order to find out different and varied data from a wider coverage. For example, the increase of new codes between the 18th and 21st interviews, as well as between the 28th and 31st relates to the recruitment of new branches. The headquarters were recruited last for the validation in the higher management level. Four interviewees in headquarters were recruited for two reasons. Firstly, comparing the size of headquarters and the branches, there are only a few hundred employees in headquarters responsible for management issues compared to 110,000 employees in the branches in charge of manufacturing. Secondly, the interviewees are recruited following the theoretical sampling approach. The researcher did not exclude any possibility to recruit more employees in headquarters. However, the theoretical saturation was reached after the 31st interview. Minimizing and maximizing the differences between comparisons groups was aimed at

maximizing opportunities to discover variations among concepts and to densify categories.

The data analysis was not very in-depth since it mainly focused on theoretical sampling. Another round of data analysis was carried out after data collection. The researcher did not exclude any possibility of further data collection until the completion of the coding process. After the completion of data analysis, it became clear that the theoretical saturation had been achieved from three indicators. Firstly, no new codes emerged from the data. Secondly, the emerging categories were established well. Thirdly, the relationships among categories were well established and validated. The theoretical saturation had been achieved after the 31st interview, as shown in figure 4.5, but the data collection and data analysis were continued until the 41st interview just to make sure.

4.4 Research ethics

This project follows the ethics policy for research at the University of Sheffield. An application for ethical approval has been granted by the Information School of the University of Sheffield (Appendix 2).

Before each formal interview, the researcher provided and explained sufficient information about the project to the potential participants individually. In addition, the information sheet (Appendix 4) was given to the potential participants to explain details about the purpose of the research, potential of participating, potential risks of participating, confidentiality of personal information and data. The participants who agreed to be interviewed were asked to sign two copies of the Consent Form. One is for the participants; the other one is for the researcher.

The interview questions were designed not only for data collection but also considering protection of individual privacy. Questions referring to sensitive information such as in political or religious perspectives were avoided.

The interview recording was transcribed immediately after interview. The

participants remained anonymous in the transcript. It is guaranteed that information could not be traced back to particular participants. The interview recording and the transcript were kept strictly confidential.

4.5 Summary

Chapter 4 has described the design of the research. A typical Chinese SOE which has seven branches and headquarters is selected for the case study. The research is designed according to the grounded theory approach from Strauss and Corbin. The use of the literature aims to increase the theoretical sensitivity and guide the data collection and theoretical sampling. Based on the proposed IS strategic alignment model, the interview script is designed to support data collection. There are 41 interviewees recruited for the research in accordance with a theoretical sampling approach. The data collected from interviews are analysed with the support of data analysis tools including data analysis software (NVivo10), a code definition table, quotation list, and concept map.

Chapter 5: Research findings

Chapter 5 is aimed at presenting and discussing the research findings. The first section in this chapter describes and discusses the current situation of the case study SOE group in order to provide a contextual understanding of the research findings. The following sections present misalignment situations and the causes and consequences related to them.

5.1 Current situations

This section is a contextual description of some general situations in the case enterprises, which is aimed at providing a context to the presentation of the research findings. This section is considered to be essential, since it explains some important situations that contextualise the discussion of misalignment and the causes and consequences of misalignment, which will help in the understanding of the developed theory.

As has been described in the previous chapter, the case SOE includes one headquarters and seven branches located in different provinces in China. Furthermore, five issues are addressed in order to gain a deeper understanding of the current situation, based on the data analysis. Firstly, the organizational reforms are described, since they are the background in which the study was carried out. Business and IS strategy changes made in the headquarters are discussed as a basis for further presenting strategic alignment. The IS communication section introduces the IS services connections among headquarters and the branches. The IS implementation section describes the current main IS applications used in the case enterprises. Both of these two sections help to create a better understanding of the construction of IS infrastructure in the case enterprises, which are also fundamental to describing and discussing strategic alignment situations.

5.1.1 Organizational reforms

The aluminium industry is not in a very good developmental state at present; as one participant commented, the "Aluminium Corporation of China is in winter times now" (N7 Manager IT). Facing fierce competition in the industry, there have been three reform processes in the enterprises recently in order to simplify the organizational structure and increase competitive strength.

> "But our Aluminium Corporation of China is now facing… aluminium in the manufacturing industry, including Alumina, Aluminium, Copper, is a highly competitive industry, very intense competition, including private enterprises. Market price is not good these years; especially as the benefits are influenced a lot. Under this situation, in order to increase the competitive strength, in condition of good markets, the structures in the organization are complete. For instance, there is a dependent IT department in each branch. Along with the market competition, the functional department, not just IT department, you can find out in branches, many of the departments are large. It's not like previously, we have more than ten, or more than twenty, maybe now they are becoming several integrated sectors. It's probably for the purpose of simplifying the structure and increasing management efficiency." (N39 Manager IT H)

To be specific, the three tranches of reforms took place between 2008 and 2013, as stated by a functional manager:

> "In the middle [between 2002 and 2013], in 2008, 2009, there were reforms, respectively. The mining unit was merged; some more units were merged, simplifying the structure. At the start of this year [2013], this January was the latest reform." (N16 Manager Function)

As reflected in the quotation, the SOE group has experienced institutional reform three times over this period, which is considered to be too frequent. Along with these organizational changes, the IT department has also experienced reforms, as the interviewed IT manager stated:

> "After the corporation was built in 2002, as it is one of the listed companies, there are some specifications. According to those specifications, an IT department was built in headquarters and branches. They are in charge of information systems strategy and information management. Corporations developed more than 20 regulations for this. After reform in 2009, the IT department was removed and incorporated into the measurement and control department. Management responsibilities are also taken by that department. It means IT staff were not managed in the IT department but were under the control of the measurement and control department. There was another reform last year [2012], when the measurement and control department was outsourced to Huasuo. We were merged with the organizational management department. We are dealing with information services as an information sector." (N11 Manager IT)

To summarise the quotation above, there have been two tranches of reforms since the IT department was created. However, the IT department has become less important as a result. It was a very important department and was strategically positioned when it was first established. During the first reform, the value of the IT department was neglected and its responsibilities considered similar to those of data measurement and control. IT people do not have any management responsibilities anymore. Fortunately, it became a bit more important through the second reform, which considered it to be part of the organizational management department. However, it is still not an independent department, as it was created in 2002, alongside the corporation's development. The IT department, on the other hand, is taken less seriously.

5.1.2 Business strategy change

As has been explained in the previous section, the case SOE includes headquarters in Beijing, and seven other main manufacturing branches located in different cities in China. Business strategy has changed since 2002, when the corporation became a listed company and has remained listed up to the present day. There are two main obvious changes of business strategy. Firstly, the business in the corporation has experienced a product diversification process, from the single product aluminium to

multi-products, including different types of aluminium, the product Gallium, and so on.

> "In 2010 we had an important restructuring adjustment. The corporation proposed a new strategy...It indicated that we had a single business sector previously, which means we just had one business. Now we are involved in ten business sectors. The business scope has changed." (No40 Manager IT H)

> "Now we are trying to achieve product diversification and sustainable development. Our strategy is to develop diversified products on the base of the mines. Previously we only had alumina. Now, as well as alumina, aluminium hydroxide, we have Metal gallium… We are developing diversification." (N13 Manager Function)

To summarise the quotations above, the corporation now has many more business sectors than previously and a long term sustainable development plan.

Secondly, centralized control was undertaken when the corporation was listed while changing to strategic control in parallel with the development.

> "When ERP was implemented, there was only the aluminium business and at that time the management idea was centralized control...The idea was raised in 2002. At that time, the corporation needed restructuring in order to be listed on the stock market. The first goal for restructuring is to withdraw the branches and institute unified management." (N40 Manager IT H)

Moreover, the contents of the business strategy were mentioned in the interviews: for instance, a functional manager stated:

> "When branches started to implement ERP systems, it was based on management ideas, and management requirements to set the configurations of ERP. It refers to our strategy requirements, and strategy requirements in headquarters, such as financial centralized management, centralized management of funds, investment centralized management and centralized management of purchasing and sales." (N28 Manager Function)

As reflected in the quotation, there are five main requirements for centralized control in business strategy, including "financial centralized management", "centralized management of funds", "investment centralized management" and "centralized management of purchasing and sales". For these five perspectives of the centralized management, the manager in the headquarters argued that "we do not mention them anymore" (N40 Manager IT). Furthermore, the roles branches play in the SOE group under centralized management are similar to the manufacturing plants:

> "We are actually a factory. It means headquarters consider the strategy. We are just a cost centre for them or a production plant." (N14 Manager Function)

To summarise, under the centralized management, finance, funds, investment, purchasing and sales were all managed and controlled at headquarters, while branches were just in charge of production. However, together with market-oriented reforms and market development, the SOE group is growing, and the business strategy has changed from centralized management to "strategic control" (N40 Manager IT H), as one of the interviewees stated:

> "The SOE group is developing. However, there was only several hundred staff at headquarters. It is impossible for them to manage so many staff in branches. You must allow branches to adapt to the markets themselves. So we use strategic control now. There is a huge change in management ideas." (N40 Manager IT H)

As shown in the quotation, headquarters use strategic control to manage the branches now, which means "the headquarters manage the branches at a strategic level without considering the business operations specifically… headquarters formulates the strategic objectives and performance assessment objectives" (N40 Manager IT

H), and all the branches "self-manage the business" (N41 Manager IT H). The business strategy has changed in this large SOE group with the development of enterprises and markets. It is realised that centralised management is not suitable to manage different branches located in various cities in a large area of China. Strategic control is used instead in order to activate the enthusiasm of the branches.

5.1.3 IS strategy change

Correspondingly, there was an IS strategy change in parallel with the business strategy change at headquarters. Previously, the IS strategy was produced there, which provided overall IS management thinking, while branches implemented the IS strategy with a few developments for some special IS projects, based on individual requirements, as one of the IT staff stated:

> "We all comply with the strategy command in headquarters. We must not deviate from it since there is a master plan. It means our plan is an implementation under an overall plan in headquarters." (N8 Manager IT)

> "The IS strategy for the SOE group is made in the IT department in Beijing. We made IS strategy in Henan. Subject to standards in Beijing, called 'five unified plan', we made ours in Henan, considering our characteristics". (N7 Manager IT)

To explain the process of putting the IS plan into action in the branches, he stated further:

> "Our plan is made according to the standards in Beijing, including 'unified planning and construction, unified investment, unified management and maintenance'. Based on this five point unified plan, we refer to our Henan branch. For instance, we are considering IS built in [the] mining part, including exploration, mining, and digital mine. Or including all the other branches, we are considering communications, such kinds of things, for further implementation. Project implementation is our further consideration. This kind of implementation refers to a cost, if above one million or two million, we should report to headquarters for approval. If the project needs a large investment, it is organized in Beijing." (N7 Manager IT)

As reflected in the quotations above, the IS strategy is made at headquarters. In branches, the "IS strategy in Henan" is actually given some consideration on IS projects based on business requirements, showing a lack of overall planning referring to business strategy. As another IT manager stated:

> "IS strategy is not involved in our job. The reason for saying this is the IS strategy is generated at headquarters." (N11 Manager IT)

To summarise, headquarters are responsible for generating an IS strategy while branches are implementing IS strategy in the enterprises. However, it was not realised that there was an IS strategy change in 2010. As mentioned, a new business strategy was proposed in 2010. In the same year, the IT department in headquarters formulated the new IS strategy to support the business strategy.

> "It was in 2010 when we made the plan because in China there is planning every five years. We made further development plans for the next five years. So the current strategy is consistent with the strategy. The IS strategy is consistent with the business one." (N40 Manager IT H)

As reflected in the quotation, a new IS strategy was produced in the same year as the new business strategy, i.e. 2010. IT managers argued that the current IS strategy "is consistent with the business one". To be specific, the process of new IS strategy formulation refers to the business and management development objectives in the corporation.

> "Firstly, you need to understand the corporation itself, its development direction, which means the main business. [To understand] whether the future development emphasizes the main business or if there are any strategic adjustments, such as new business being involved. According to this development direction… the IT department created an IS development plan based on the requirements." (N40 Manager IT H)

As shown in the quotation, the new IS strategy is made according to the new business development direction. In addition, since the business strategy has changed to strategic control, which means the branches need to manage the business themselves, the branches also need to consider the IS development plan themselves, as headquarters do not generate IS plans for them in this situation.

> "The current operation mode in the corporation is self-management, which means that whatever the business branches want to do, they take responsibility themselves. What they are going to do for IS development, actually we did not participate at all, we did not manage or plan… We were in charge of the budget in branches. In terms of what they are going to build, we are not helping". (N41 Manager IT H)

As reflected in the above quotations, headquarters no longer participates in decision-making on the IS development plan. Branches need to consider the IS construction and development plan themselves. However, headquarters takes responsibility for the IS development budget. It is perceived that it will influence the strategic and creative thinking of IS development in the branches if there is a lack of good communication between headquarters and the branches.

5.1.4 IS communications in the SOE group

The current IS services facilitate communications between headquarters and the branches but the communications between branches are restricted. When talking about the connections between branches, one of the interviewees stated:

> "Our enterprises are a wide area network. The domain assigned to us was arranged in headquarters uniformly. Headquarters, Henan, Shanxi, Shandong… These branches, including the research institution, were all in a unified network. The networks were connected. Now they are not connected because the connections are restricted… There is no need for them to communicate. They all operate independently. If they need to communicate, it's directly to headquarters." (N11 Manager IT)

As reflected in the quotations, the capacities of the hardware fulfil the communications between the branches, while the connections are restricted at present. However, a number of interviewees stated that they needed to communicate with other branches. For instance, one stated:

> "These data you need to request, sometimes need to request everywhere. Sometimes they are not willing to tell us because now the branches are competing which one is doing better. For these data, we really hope to have them. But it's very difficult to have them. Sometimes we request data from headquarters. Sometimes headquarters are not willing to give us this. We collect them through various channels." (N28 Manager Function)

This quotation suggests that branches need some types of information urgently from other branches but they cannot always get it from headquarters. Furthermore it was argued that some information obtained from headquarters arrived late.

> "But when you get this data, maybe it lags behind. After each branch report, you request from the top. This information comes late, not in time." (N28 Manager Function)

Although in this kind of situation, branches need in-time information transactions, the current IS connections are still set as star-type, which is all the branches connected to headquarters, for information safety.

> "In principle, it should be like this because whether the information is authorised to be available in the public domain at headquarters, branches have no idea. For example, if Henan branch requests information from Shanxi branch, Shanxi branch has no idea whether the information should be given or not. Maybe management requirements changed in this period of time, and this data should not be given. In principle, you should request from headquarters; they are all branches, they are not legal entities. Headquarters are their only legal entity. (N40 Manager IT H)

As reflected in the quotation, there are some management requirements about information communications between branches. Therefore, the current IS services facilitate communication between headquarters and branches rather than between all the branches.

5.1.5 IS implementation

It was identified in the data gathered that the main IS used in the SOE group, which was organized in headquarters, included ERP, BI (Business Intelligence) and the electronic information platform.

> "I will talk about it in two aspects. The first is the one [ERP] we used previously, in 2007, when it was implemented. After ERP implementation, generally it was good. It's a system of information centralized management. For normal production use in enterprises, from purchasing to sales, the whole process, generally it is good and achieves the aim of centralized management in headquarters… The BI system was a management decision. This was just implemented, and is organized in headquarters uniformly." (N3 Manager Function)

> "What you mean is our electronic information platform. This is normally used for higher level staff to check and approve something to subordinates. This is not ERP or BI. This is another electronic information platform. Now all of ours are electronic. For instance, my higher level manager receives the documents from his manager, then he will assign the documents to his assistants, or chief, after they receive the documents, assign to the lower level staff, based on the contents of the documents or the nature of the work." (N3 Manager Function)

> "Electronic information platform and BI were newly built, after 2010…The core object of BI is decision-making It means they must choose the decision-making level to manage the lifeline of the enterprise or corporation. Of course, if you ask whether the middle manager uses it, I'd say he has to use it because he needs to report… or explain some data. He needs to know the situation, so he also uses it. But the core object is to serve the decision making level." (N40 Manager IT H)

To summarise from the quotations above, the main IS applications bought for use in headquarters were ERP, BI and the electronic information platform in the enterprises. ERP was used to support business and operations, BI was used to support decision-making by top managers, and the electronic information platform was a kind of IS service to support communications within each branch.

In addition, in this large SOE group, the IS implementation was not arranged in all the branches at the same time. When there was a decision regarding IS use in headquarters, some branches adopted it earlier, as a pilot. After successful adoption in the pilot branches, it was gradually introduced in all the branches.

> "The current situation occurred after one branch used it well, so we implemented it in another branch. Because the fundamentals of IS development are different in each branch, the ones which have a better basis are among the first group to implement it." (N5 Manager IT)

As reflected in the quotation, considering the different IS development situations in various branches, IS implementation started from the branches with better conditions

and was then promoted to others. In this case, the three main IS applications organized in headquarters had not spread to all the branches at this point.

> "It [ERP] is in first half of 2005, in Guizhou, Shandong these two branches used as pilot. After successful implementation, it was promoted in Zhongzhou, Henan, including seven branches and one research institution… After implementation in seven branches and one research institution in 2007, other subsidiaries began to adopt… This is the second period." (N35 Manager IT)

> "Such as BI, it's the same situation. Mainly you are not software enterprises after all, so for the advanced things in software industry, there are still some gaps in understanding; there is a need of introduction. Now it [BI] is our pilot project; the two pilot projects in Henan and Lanzhou." (N12 Operation IT)

> "This platform is mainly at our branch, at the research institution, Shanxi and headquarters. In terms of other branches, maybe they have a similar IS, but not as powerful as ours, or with such powerful functions." (N12 Operation IT)

To summarise, ERP has been adopted in all the seven branches, while BI and electronic information platforms are just used in some branches. Various IS use fundamentals and different current IS use situations in different branches are special characteristics of the Chinese SOE group.

5.1.6 Section summary

This section discusses five issues about the context of the research findings. The market for aluminium is not in a good condition currently. Facing fierce competition, the enterprises have made several organizational changes to increase competitive strength. Furthermore, business strategy has changed and correspondingly IS has changed, due to further development of the enterprises. Therefore, the investigations of strategic alignment are in a context of frequently changing environments, including organizational and strategic changes in the enterprises. In addition, in this large SOE group, the IS services facilitate the communications between headquarters and the branches but the communications between branches are restricted in IS in terms of information safety and headquarters' management. Headquarters organize

the main IS implementations, including ERP, BI and the electronic information platform. These systems support business operations, management and communications in the branches. These situations are important contextual issues for the presentation of the research findings in the following sections.

5.2 Brief description of emergent theory on misalignment

This section provides a brief description of the emergent theory. The central theory produced is the IS strategic misalignment in Chinese SOE. There are five main categories representing the misalignment situations; five main categories and four main categories discuss the causes and consequences, and are subsumed into the central theory. In order to show the progression of coding, sub-categories and main categories emerged and were organized for clarity in three perspectives: misalignment, causes and consequences of misalignment. Three separate tables are presented in this section. In practice, these concepts and categories are interrelated and form the theory produced, as shown in figure 5.1.

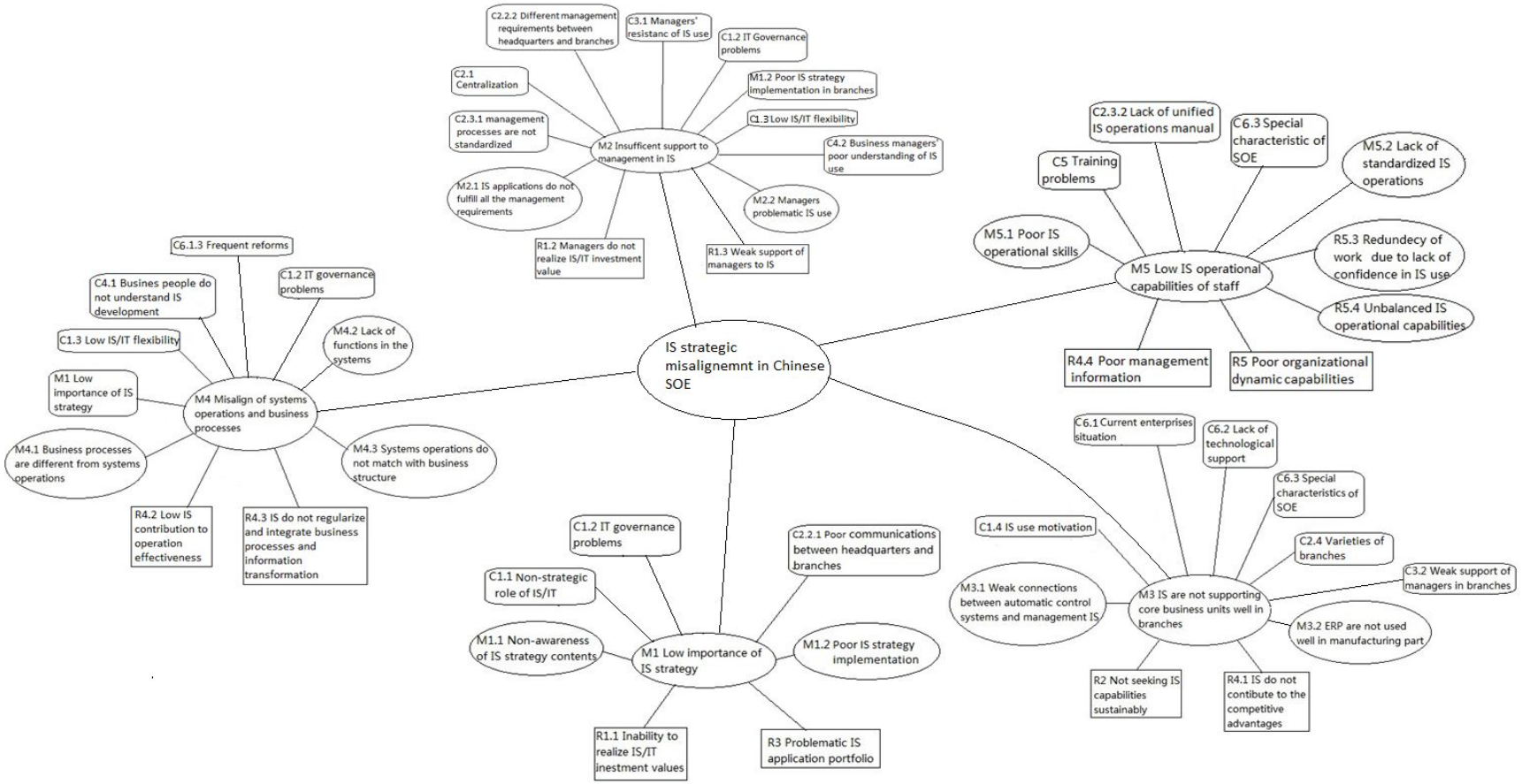

Figure 5.1 Presentation of IS strategic misalignment in Chinese SOEs

5.2.1 Misalignment situations

For misalignment situations in enterprises, there are five main categories. From the strategic to the operational level, these misalignment situations include the low importance of IS strategy; insufficient support to management in IS; IS do not support main business units well; misalignment of systems operations and business processes; and low operational capabilities of staff, as shown in table 5.1.

Main Category		Sub-Category	Misalignment
IS strategic misalignment in Chinese SOE	M1 Low importance of IS strategy	M1.1 Non-awareness of IS strategy contents	M1.1.1 Operational people are not aware of IS strategy contents
			M1.1.2 Managers are not aware of IS strategy contents
		M1.2 Poor IS strategy implementation in branches	M1.2.1 IS strategy is disregarded
			M1.2.2 IS implementation is decided based on the separated business requirements
	M2 Insufficient support to management in IS	M2.1 IS applications do not fulfil all the management requirements	M2.1.1 Lack of support for strategic management
			M2.1.2 Lack of support for analysis and decision making
			M2.1.3 Lack of support for management report
		M2.2 Managers' problematic IS use	M2.2.1 Managers do not operate the systems even when needed
			M2.2.2 Managers use traditional ways to obtain information
	M3 IS do not support core business units well in branches	M3.1 Weak connections between automatic control systems and management IS	M3.1.1 Information collections during production processes still need manual work
			M3.1.2 Manually input production information to management IS
		M3.2 ERPs are not used well in manufacturing	M3.2.1 Rough materials management
			M3.2.2 Rough inventory control
	M4 Misalign of systems operations and business processes	M4.1 Business processes are different from systems operations	M4.1.1 Systems operations do not match with the business reality

		M4.2 Lack of functions in the systems	
		M4.3 Systems operations do not match with organizational structure	
	M5 Low IS operational capabilities of staff	M5.1 Poor IS operational skills	M5.1.1 Just use simple functions
			M5.1.2 Just acquire the skill in their own responsibilities
		M5.2 Lack of standardized IS operations	
		M5.3 Redundancy of work due to lack of confidence in IS use	
		M5.4 Unbalanced IS operational capacities among departments	

Table 5.1 Presentation of findings for misalignment

The categories were saturated and identified five main categories, since no new open codes emerged. These situations identify the weak strategic alignment in the case enterprises, which are the fundamentals of further exploration of causes and consequences.

5.2.2 Causes and consequences of misalignment

In order to investigate the misalignment situation more thoroughly, causes and consequences of misalignment are identified and discussed. Six main categories are addressed to present the causes of misalignment and for the presentation of the consequences of misalignment four main categories are addressed, as shown in tables 5.2 and 5.3.

Main Category		**Sub-category**	**Causes**
IS strategic misalignment in Chinese SOE	C1 IS issues	C1.1 Non-strategic role of IS/IT	C1.1.1 IS/IT is in service position
			C1.1.2 IS/IT is not playing strategic role
		C1.2 IT governance problems	C1.2.1 Insufficient decision making rights in IT department
			C1.2.2 Insufficient resources and financial support in IT department
			C1.2.3 Improper IS unit structure
		C1.3 Low IS/IT flexibility	C1.3.1 IS applications do not change with the organizational structure

			changes
			C1.3.2 IS applications do not change due to complicated process
		C1.4 IS use motivation	
	C2 Organizational structure	C2.1 Centralization	
		C2.2 Conflicts between headquarters and branches	C2.2.1 Poor communications between headquarters and branches
			C2.2.2 Different business requirements between headquarters and branches
		C2.3 Low level of formalization	C2.3.1 Management processes are not standardized
			C2.3.2 Lack of unified IS operations manual
		C2.4 Diversity of branches	
	C3 Managers' negative attitudes to IS use	C3.1 Managers' resistance of IS use	C3.1.1 Managers are not used to the new management way and management ideas with IS
			C3.1.2 Managers are used to the flexible way influenced by the shortcuts and personal contacts
			C3.1.3 Managers have less right after using IS
		C3.2 Weak support of managers	
	C4 Business people's poor understanding of IS	C4.1 Business people do not understand IS development	
		C4.2 Business managers' poor understanding of IS use	C4.2.1 Misunderstand IS use conditions
			C4.2.2 Poor understanding of IS contribution to management effectiveness
	C5 Training problems	C5.1 Not enough training	
		C5.2 Problematic training for new staff and key users	
	C6 Environmental influences	C6.1 Current enterprises situation	C6.1.1 Poor business performance
			C6.1.2 Poor production equipment and IT infrastructure
			C6.1.3 Frequent reforms
		C6.2 Lack of technological support	C6.2.1 Special production process
			C6.2.2 Low technical levels in the industry
			C6.2.3 Lack of IT

			knowledge sharing
		C6.3 Special characteristics of SOE	C6.3.1 Less consideration of sales
			C6.3.2 Social responsibility
			C6.3.3 Lower enthusiasm of staff

Table 5.2 Presentation of causes of misalignment

The categories were saturated and six main categories were identified in presenting the causes of misalignment, including IS issues, organizational structure, managers' negative attitudes to IS use, business people's poor understanding of IS, training problems and environmental influences. These causes are closely related to the misalignment situation and the consequences of the situation, which are presented next.

	Main Category	**Sub-category**	**Consequences**
IS strategic misalignment in Chinese SOE	R1 Inability to realize strategic values of IS/IT investment	R1.1 Functional people do not realize strategic value of IS/IT	
		R1.2 Managers do not realize strategic value of IS/IT investment	
		R1.3 Weak support of managers to IS	
	R2 Not seeking IS capabilities sustainably	R2.1 The importance of IS/IT depends on the business situation	R2.1.1 IS has less influence on core business operations
			R2.1.2 IS development is marginalized when profit loss
		R2.2 Importance of IT department depends on business situation	
	R3 Problematic IS application portfolio	R3.1 Developed systems are disregarded	
		R3.2 Islands of automation in branches	
	R4 Low IS business value	R4.1 ISs do not contribute to the competitive advantages	
		R4.2 Low IS contribution to operation effectiveness	
		R4.3 ISs do not regularize and integrate the business process and information transformation through all the business processes	
		R4.4 Poor management information	
	R5 Poor organizational dynamic capabilities	R5.1 Problems due to frequent staff changes	

Table 5.3 Presentation of consequences of misalignment

The categories were saturated and five main categories were identified in presenting the consequences of the misalignment situation, including: inability to realize strategic values of IS/IT investment; not seeking IS capabilities sustainably; problematic IS application portfolio; low IS business value; and poor organizational dynamic capabilities. These consequences are closely related to the misalignment situations, and causes of the misalignment situations.

To summarise, all these main categories were saturated by the end of the data analysis, since no more new codes emerged. These causes and consequences are related to the misalignment situations identified in the discussion in the following sections, in order to provide a deeper analysis of IS strategic misalignment in the Chinese SOE.

5.2.3 Section summary

This section provides a brief description of the research findings. Concepts and categories about misalignment situations are discussed, the causes and consequences of misalignment are identified, related and saturated with the data analysis to formulate the theory of IS strategic misalignment in Chinese SOEs. The following sections, including section 5.3, 5.4, 5.5 5.6 and 5.7, present the five main categories identified regarding the misalignment situation and the related causes and consequences which emerged from the data analysis; finally there is a discussion of the IS strategic misalignment in Chinese SOEs.

5.3 Low importance of IS strategy

This section discusses the misalignment situation of the low importance of IS strategy, as shown in figure 5.2. A number of interviewees argued that IS strategy is being ignored in the enterprises, which is considered to be a crucial strategic alignment problem. The main causes of the low importance given to IS strategy include the non-strategic role of IS/IT, IT governance problems, and poor communications between headquarters and the branches. As the results show,

following the low importance placed on IS strategy, people are not able to realize the IS/IT investment values. Furthermore, an IS application portfolio is problematic in the enterprises.

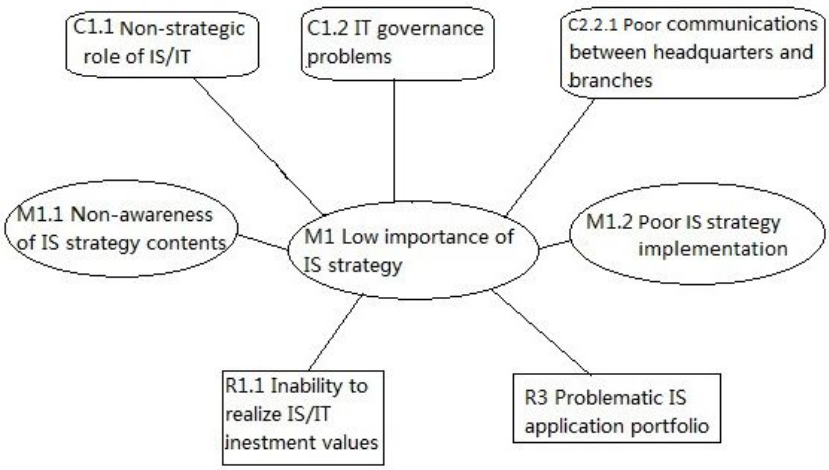

Figure 5.2 Presentation of low importance of IS strategy

This section discusses the misalignment situation of the low importance assigned to IS strategy from three perspectives. Firstly, the misalignment situation is described in section 5.3.1 from two aspects: non-awareness of IS strategy content in section 5.3.1.1 and poor IS strategy implementation in branches in section 5.3.1.2. Secondly, the causes of the low importance assigned to IS strategy are discussed in section 5.3.2. There are three causes identified: non-strategic role of IS/IT in section 5.3.2.1, IT governance problem in section 5.3.2.2, and poor communication between headquarters and the branches in section 5.3.2.3. Thirdly, the consequences of the low importance of IS strategy are discussed in section 5.3.3. There are two different consequences identified: inability to realize IS/IT investment values in section 5.3.3.1 and problematic IS applications portfolio in section 5.3.3.2.

5.3.1 Low importance of IS strategy

One of the misalignment situations revealed from the coding on the data collected is the low importance given to IS strategy. The SOE group has grown exponentially since it was created in 2002. However, the IS strategy in the branches is being

ignored. As mentioned in section 5.1.3, headquarters formulate the IS strategy and branches implement it under their centralized management. In the current situation of strategic control, headquarters still formulate the IS strategy for the whole corporation but it is the responsibility of branches to make plans for IS construction and IS development. It was found that IS strategy is actually neglected in the branches. Obvious evidence is that managers and staff in the enterprises are not aware of the strategy contents.

5.3.1.1 Non-awareness of IS strategy contents

It was very surprising to find that a number of staff and managers in enterprises were not clear about the IS strategy contents. The operational people in functional departments did not have any idea of the IS strategy. For instance, when asked about this, one interviewee from the financial department, which is closely related to ERP implementation in the enterprises, stated:

> "I don't know. All the information systems are managed in a sector of the measurement and control department (the interviewee does not know this situation has changed). They are in charge of information, systems configuration. They made it." (N1 Operation Function)

On the other hand, some interviewed operational staff in the IT department were not able to describe the IS strategy contents. For example, one of them stated:

> "There are no very clear objectives…and overall [plan], we are not involved in. It is at the managers' level" (N21 Operation IT)

Furthermore, for strategic alignment, it is required that line executives have responsibility for IS issues and initiatives. However, a number of managers in functional departments stated that they were not clear about the IS strategy. For instance, a senior manager stated:

> "It is something like this. IS management is special work in enterprises. I remember after reforms in 2002, including following several IS updates, we were just asked about human resources management requirements in a survey from the IT department. Because I am always in charge of human resources management, I do not care about the IS plan, IS strategy concerns. Previously we have reported on it but I did not pay attention to it. It is difficult to find the report now." (N16 Manager Function)

What is worse, even some IT managers were not able to explain the contents of the IS strategy. One of the IT managers stated: "It is on the official document. I can't remember it now" (N8 Manager IT). Another one of them stated "I can check for you [online]" (N5 Manager IT).

As reflected in the discussions above, operational staff and managers in the enterprises did not pay enough attention to the IS strategy. Headquarters formulated the IS strategy but, in branches, this was not implemented well. Furthermore, it was found that not only were the staff and managers not clear about the contents of the IS strategy, but also there was a lack of IS strategy implementation to guide the IS use and development in the branches.

5.3.1.2 Poor IS strategy implementation in branches

Although headquarters formulated the IS strategy for the whole group for IS implementation, the current situation in the branches is that the IS strategy is disregarded. A number of interviewees mentioned this situation. For instance, one of the IT managers complained:

> "Now you mention strategy we are not familiar with it anymore. Now does the enterprise have any IS strategy? There is no IS strategy. To the current management situation, I think there should be a strategy, but it is not very clear." (N11 Manager IT)

Furthermore, IS implementation is decided based on the business requirements of the functional departments. There is no strategy used to guide overall planning of IS implementation in the branches.

> "Now the IS are adopted to provide services to manufacturing. It is when there is a need from production or there are any inconveniences requiring IS use, that it is adopted…It is something like when they feel something is wrong, they adopt something [IS project] to serve it. Lack of overall planning, it is this kind of problem" (N18 Operation IT).

As reflected from the quotations above, there a lack of IS strategy implemented in the branches. The decision-making on IS implementation in branches is just about whether there is any business requiring the IS project. The IS role still stands at the traditional administrative support level. The enterprises are not using strategic thinking for IS planning.

Sections 5.3.1.1 and 5.3.1.2 above reflect that IS strategy is unimportant in the branches. This problem shows a very crucial misalignment situation in the enterprises since a basic idea derived from strategic alignment is that the IS play a strategic role rather than just supportive functions in the enterprises. To be specific, IS strategy is disregarded in the enterprises, which reflects misalignment from three perspectives. Firstly, IS strategy does not support or shape business strategy when it is being ignored. It means in the current situation, when all the branches self-manage their business, they do not consider the components of IS strategy to support or shape their market positions and competitive advantage. Secondly, there is no IS strategy for decision-making regarding the IS structure, applications and infrastructure, in order to identify the best possible competencies. As has been stated, IS implementation was decided based on business needs. As a consequence, the support for IS structure, applications and infrastructure for IS strategy is weak, since people just consider the linkage of IS/IT and business from a functional viewpoint without any strategic thinking. This is considered as the third perspective of the current misalignment situation. The causes and consequences of these misalignment situations are discussed in the following sections.

5.3.2 Causes of low importance of IS strategy

This section discusses the causes of the misalignment situation and the low importance given to IS strategy in enterprises. There are three main reasons for the low importance of IS strategy in the case study enterprises, including the non-strategic role of IS/IT, IT governance problems and poor communications between headquarters and branches.

5.3.2.1 Non-strategic role of IS/IT

The IS are still in the traditional backup or complementary position in the case of the SOE group. A number of interviewees argued that IS were not able to be in a very important position in manufacturing enterprises and "it is actually icing on the cake in some industries" (N11 Manager IT).

> "In the strategy of enterprise, IS development is involved. However, they are more concerned with production capacity, costs, human resources… than IS."(N17 Manager Function)

> "In this industry, the main business of the enterprise is manufacturing. No matter how important the IS are, they cannot reach that kind of level. They just provide services to production." (N12 Operation IT)

Even in headquarters, some of the interviewees understood the IS position similarly.

> "As for the manufacturing enterprises, the traditional types, it (IT) is just used as a tool. Its role in the production is just to improve the management, make it better. For others, I don't think there are more advantages." (N41 Manager IT H)

As reflected from the quotations above, IS/IT was not being given any importance in the enterprises. In addition, it is considered that ISs were not playing a strategic role in the enterprises.

> "We are now just going out to have a study. For example; I studied outside and found something was beneficial in our enterprise and then came back and wrote a report reflecting the benefits of implementing this. After this I talked with the manager. Now we are actually playing a guiding role. It is not something like we have strategic management, we have CIO, it (IS) is considered at the strategic level. We are not able to do this in our enterprise." (N31 Manager IT)

To summarise, IS/IT is still considered to have a traditional support function rather than being an essential component in the enterprises. It is argued that in manufacturing enterprises the IS/IT is not essential. However, it is not realised that IS/IT has been closely connected to all the business work in the organization from the time it was implemented. It is actually absolutely necessary and should be elevated to a strategic role with fast technology development.

5.3.2.2 IT governance problems

Apart from the point that IS/IT is not in a strategic position, it was found that IT departments in the branches did not play an important role in the enterprises. This was also one of the reasons for the low importance placed on IS strategy in the branches. Since the department which plays a crucial role in IS strategy formulation and implementation is being ignored, no attention is given to IS strategy. There are three main issues of IT department problems since centralized management is not adopted in the enterprises any more. Firstly, IT departments in the branches are unable to make decisions on IT/IS project implementation.

> "We applied for two projects this year, one small project. We have related reports. After approval from managers at different levels, they reported to the headquarters. And then the IT Department at headquarters, which is in charge of IT projects in each branch, will examine and approve."(N9 Operation IT)

> "In branches we just have a few (investments). It means branches need to report to headquarters every cent they want to spend. After approval, you can spend it. IS should be applied in headquarters. They approve it if they agree. After approval, we can make it, otherwise we can't do anything." (N9 Operation IT)

As reflected in the quotations above, every project proposed in IT departments of the branches should be examined and approved by headquarters. It is at headquarters that the IT/IS project implementation is decided. Under this situation, it is perceived that IT departments in the branches consider that they were less responsible for an overall IS development plan or IS strategy implementation since their decisions could be easily denied at headquarters. IT departments in the branches are not independent enough to formulate strategic thinking or they were not aware that they should conduct IS management strategically in the branches. Therefore, IS strategy was being ignored in the branches.

In addition to a lack of autonomy in IT departments in the branches, a number of interviewees claimed that resources and financial support are insufficient in the IT departments.

> "IS means capital investment. Now the capital investment is small and the staff allocation is not much." (N29 Operation IT)

As reflected in the quotation, there was a lack of human resources and financial support in the IT departments, which is a fundamental barrier to preventing IT departments carrying out deep and comprehensive IS management. The IT departments lacked resources and motivation to formulate an IS development plan and IS strategy implementation. Furthermore, the IS management job division was not reasonable in the SOE group under the prevailing conditions. The IT department in headquarters takes responsibility for ERP management while IT departments in the branches are mainly in charge of hardware and network maintenance.

> "This issue is considered in headquarters as a whole because ERP systems are under unified management in headquarters and we just implement it." (N33 Manager IT)

> "We do not maintain ERP. It is headquarters that does the maintenance." (N8 Manager IT)

> "IT department in branches mainly does maintenance. It means for the aim of maintaining the systems operation, they do the work in technical aspects, technical maintenance. Technical aspects inside the systems, hardware maintenance in the systems are branch level responsibilities. There is an IT department at headquarters whose main responsibility is software maintenance. They instruct, manage and complete directly. It means the IT department in branches are not authorised to do so. They are mainly doing hardware maintenance." (N27 Manager Function)

As reflected in the quotations above, ERP systems are managed at headquarters and IT departments in the branches are responsible for hardware maintenance. Therefore, for ERP implementation issues, the IT departments in the branches are just able to solve IT problems rather than IS problems.

> "We can't solve the problems in systems. We can only communicate these to headquarters. [We solve] normally some simple questions, such as system crashes, not being able to connect to the internet, more of these kind of environmental problems." (N11 Manager IT)

It was found that just a few responsibilities of IS management are taken by the IT departments in the branches. Even for maintenance, the IT departments in the branches are just responsible for hardware and networks. From the perspective of ERP management, the IT departments in the branches work as technical support centres rather than as departments with management responsibilities. In this situation, it is difficult for them to carry out IS strategy implementation in the branches.

Based on the quotations and discussions above, IT departments in the branches had insufficient decision-making rights and financial and human resources support, as

well as few responsibilities for IS management. The IT departments worked as service departments rather than as important departments in charge of organizational management. Therefore, IS strategy, which should be formulated in these departments, or IS strategy implementation, which should be managed in these departments, was not paid much attention. Furthermore, IT departments in both branches and headquarters were in a service or support position without organizational strategic management responsibilities. For instance, one of the interviewees stated:

> "If you know about our branch, it focuses more on technology, mainly in maintenance… operations and maintenance… In these aspects we do more. In terms of strategic level, [it is] far from being strategic." (N31 Manager IT)

As reflected in the quotation, the IT departments pay more attention to technology support than strategic level management. Moreover, the position of the IT department in headquarters is similar. For instance, when asked about this, one of the interviewees stated:

> "Basically no, you can think about it as a service department, just a bit better than branches and leaves. Not only us, in all the companies, it's important orally but no attention is paid to it in reality." (N41 Manager IT H)

For the decision-making on the IT project, it was further explained:

> "The way of ours is to propose the project, demonstrate the proposal, and then make the budget and carry out the plan. Basically, we make the project and then apply for the funds to see if it's approved from corporate managers." (N41 Manager IT H)

It is shown in the quotations above that the IT department in headquarters was also considered as just a service department. Although they formulated IS strategy, as discussed in section 5.1.3, the IT department in headquarters was not able to make decisions on IT project implementation. The projects needed to be approved by business managers.

To summarise, the IT departments in both the branches and headquarters were in a service position, therefore the IS strategy was not given enough attention for strategic management to function properly in the organization. Moreover, the IS strategy formulated in headquarters is being ignored in the branches.

5.3.2.3 Poor communication between headquarters and branches

As has been mentioned in the previous section, headquarters formulated IS strategy for the whole SOE group. Furthermore, when there was a strategic adjustment in 2010, the IT department at headquarters made changes to the IS strategy in order to adapt to business change. However, staff and managers in the branches were not aware of this change. For instance, one of them stated:

> "[In 2002], this IS strategy was made at headquarters. There was an IS strategy. We did plan information development. We had this kind of strategy. Because the strategy is related to the production and business in the enterprises, this strategy was not able to match with them when the business changed very quickly. When there was no further strategy applied in headquarters, we did not work in this area anymore." (N11 Manager IT)

As reflected in the quotations above, people considered "there was no further strategy applied" while actually IT managers in Headquarters stated they had formulated "the further development plan for the next five years" (N40 Manager IT H), which was thought to be consistent with the business strategy. It indicates that the IS strategy formulated in headquarters is actually not implemented in the branches. The communications between headquarters and the branches are problematic, which is one of the reasons that IS strategy is being ignored in the branches.

5.3.3 Consequences of low importance of IS strategy

This section discusses the consequences of the low importance given to IS strategy. There are two main consequences: the inability to realize IS/IT investment values and a problematic IS applications portfolio.

5.3.3.1 Inability to realize IS/IT investment values

While the IS strategy was disregarded in the enterprises, people still considered IS implementation was supporting the business requirements. There was no clear understanding that the IS was implemented based on the IS strategy, thus further supporting and shaping the business strategy in the enterprises. The IS investment is considered to involve investing in management or supportive tools or functions, rather than to increase the competitive strengths or help to discover new market positioning. It was found in the enterprises that managers and staff were not clear about the IS/IT investment values, including IT people and functional people. For instance, one of the interviewed operational staff stated:

> "[IS investment value] is not likely to create direct economic benefits, so obviously. It requires people to understand it, to claim it. What are the benefits we have to implement it, you should claim it." (N18 Operation IT)

Furthermore, the IT managers had similar opinions. For instance:

> "The problem of IS development is we are always making investments. We are asking for money and spending money all the time. If you want to calculate the beneficial results, it's difficult to do this. For instance, how you calculate the beneficial results, for energy saving, how much you have saved. It's very difficult [to calculate]. It's just auxiliary." (N31 Manager IT)

As reflected in the quotations above, people were still trying to seek tangible returns from IS/IT investment. In this way the IS/IT investment values can be identified in their opinion. The intangible returns were considered to be "you should claim it". Not only IT people but also the functional staff and managers were unable to realize the IT investment value, having only a superficial understanding of it.

> "At the beginning the workers were not well educated. They didn't understand computers and stated it was not worthwhile to spend so much money. Now, after using the computer, from materials deployment, to sales, including our financial accounting, the staff has been reduced by a half. Saving large amounts of manual accounting, the computers are very convenient; they release a lot of labour." (N1 Operation Function)

> "IS is just playing assisting roles. If you claim IS is able to improve profitability, this is not realistic, not playing such a big role." (N24 Manager Function)

> "It [IS] is effective in internal management. Although there are a lot of disadvantages to it, but overall it's effective. But this does not mean that the effectiveness should not be regarded as being able to create values. This is a misunderstanding." (N3 Manager Function)

As reflected in the quotations above, the IS value was just considered as a replacement for manual work, releasing those involved to become operational people. For managers, IS were not able to "improve the profitability" or "create values". All underestimated the IS values. As a consequence, the enterprises did not pay enough attention to IT/IS, IT staff and IT departments, which in turn would have a negative impact on strategic alignment.

5.3.3.2 Problematic IS application portfolio

When there is lack of IS strategy in the branches, an overall plan for IS implementation is also missing. As discussed in the previous section, the alignment between IS strategy and IS structure, applications and infrastructure is weak. Without respect for the IS implementation based on the IS strategy formulated in headquarters, the IS adopted in the branches lacks common goals or a unified plan, which results in two main problems in the enterprises. Firstly, some developed systems are disregarded; since they have been developed without a clear aim of supporting the overall IS building plans and business development. The decision-making on the implementation of these systems may just refer to the business needs of some staff or to certain departments. Secondly, a lack of IS strategy leads to an

"island of automation" phenomenon in the branches, since some IS are developed and implemented separately without a unified plan.

In the branches, there is a phenomenon that some developed systems are ignored. It has been mentioned that they had implemented some systems, such as "equipment inspection IS" (N12 Operation IT), "Barcode management IS" (N25 Manager IT), and "Digital achieves" (N9 Operation IT), which were implemented based on local decisions rather than planned from headquarters. However, these systems were often abandoned or not well used. For instance, one interviewee stated:

> "Previously we developed [IS] also: for example, problem management systems. Last year, after development, we ended up with nothing definite. It means nobody uses it, we just leave it there." (N11 Manager IT)

Decisions on these systems are not based on the IS strategy delivered from top executives to the operational staff; therefore, importance is not attached to their implementations. As an interviewed IT manager stated:

> "If attention is insufficient, sometimes, because these are small projects, people do not use them. But if the systems are developed for everyone, the situation will not be like this. If developed just for a small part of them, and those we developed ourselves, when they consider the systems are not easy to use, they do not use them." (N25 Manager IT)

This quotation shows that people did not pay attention to the systems, which were implemented without clear strategy guidance. As a consequence, the resources spent on IS development were wasted while the beneficial results were not acquired. Furthermore, since these systems were developed without an overall plan, the phenomenon of "islands of automation" occurred.

Lack of IS strategy in the branches results in the IS phenomenon of "islands of automation". It refers to the current IS use phenomenon in the branches, where IS applications are developed using different hardware, software and data resources and these isolated IS are run separately, without communication or data and information sharing.

> "The best thing is some IS can be integrated because IS applications in enterprises are separated relatively...Some of them can be integrated together. There is no need for many small systems. If these systems could, for instance… each system has its own username and password, if these could be unified. The only one all the systems could use… There is a need for integration because each system has its own database, its own user management mechanism. To integrate these is one of the prospects." (N9 Operation IT)

> "Because now many IS in enterprises seem not fully integrated. It means they are not creating the values there should be. I feel sad about this. Many things are developed which just some people are using, in a small area, not fully playing their roles." (N12 Operation IT)

As reflected from the quotations above, there were some isolated IS applications applied in the branches. Since there were no unified plans for implementation, they were not integrated. These isolated systems actually brought inconvenience to the users and IS staff, such as data and information management problems. In addition, the benefits acquired from the systems' implementation are decreased and the values that are created through an integrated system are missing.

5.3.4 Section summary

This section discusses the low importance given to IS strategy, which is a crucial problem of strategic misalignment. In some case enterprises, IS/IT is considered in the traditional complementary position. IS/IT is just used as a supportive tool rather than playing a strategic role to support and shape competitive advantage. Furthermore, the IT department also works as a service department in the branches without any thought of the strategic importance of IS management and organizational management. Although headquarters formulate IS strategy which supports the business strategy, the branches do not implement it due to the problematic communication between headquarters and the branches. As a result, IS strategy is being ignored. Under these situations, managers and staff are not able to

understand the IS investment values. The developed IS is disregarded and not integrated due to the lack of a unified plan.

5.4 Insufficient support of management in IS

This section aims to present and discuss the misalignment situation of insufficient support from management for IS, as shown in figure 5.3. Two main subcategories identified during the data analysis are subsumed due to insufficient support from management for IS, including IS applications which do not fulfil all the management's requirements, and managers' problematic IS use. The main causes of insufficient support from management for IS include centralized management, different management requirements between headquarters and the branches, traditional management ideas and management ways, IT departmental problems and deferred IS and IS strategy changes in the branches. As the result of insufficient IS support from management, managers do not understand IS use well.

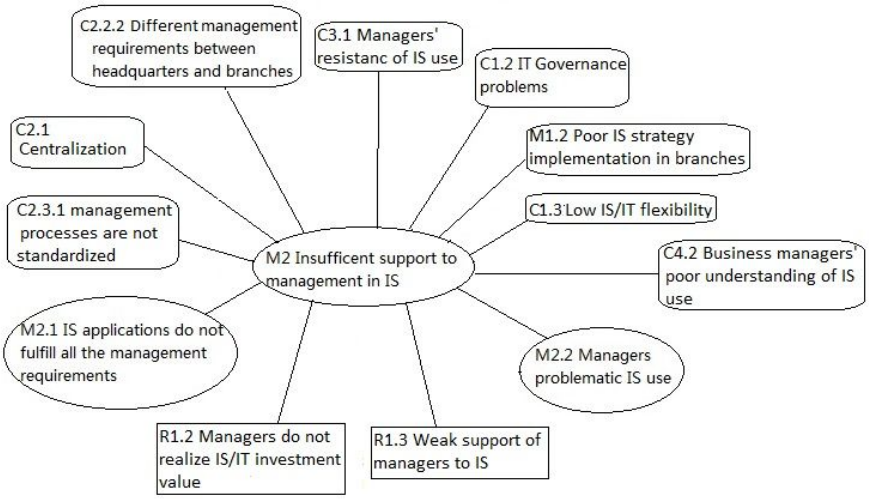

Figure 5.3 Insufficient support from management for IS

This section discusses the misalignment situation of insufficient support from management for IS from three perspectives. Firstly, the misalignment situation is described in section 5.4.1. Secondly, the causes of the insufficient IS support from management are discussed in section 5.4.2. There are seven causes identified: centralization in section 5.4.2.1; different business requirements between

headquarters and the branches in section 5.4.2.2; management processes are not standardized in section 5.4.2.3; managers' resistance to IS use in section 5.4.2.4; IT governance problems in section 5.4.2.5; low IS/IT flexibility in section 5.4.2.6; and business managers' poor understanding of IS use in section 5.4.2.7. Thirdly, the consequences of low importance of IS strategy, which include the poor support from managers to IS are discussed in section 5.4.3.

5.4.1 Insufficient IS support from management

As mentioned in section 5.1.2, there was a business strategy change in the SOE group. All the branches needed to face the market competition themselves. The managers in the branches needed to consider the market conditions to improve their management. As one of the senior managers stated:

> "As a manager, you control the overall situation, from strategic considerations, from adapting to the market's development, from marketing strategy, you need strong IS support, to facilitate your decision-making." (N16 Manager Function)

From the quotation above, the manager realised they needed IS to help them understand the overall situation, based on the business strategy. However, the existing IS applications were not able to fulfil these requirements. For instance, some managers claimed that IS should provide more extensive information to support managers' strategic thinking.

> "In fact, when we develop the analysis of IS I feel like we need more extensive data. It should not be limited to the information inside SOE group and also should be more focused on the industry, and international data. It means we should have knowledge of what levels we are in, both in terms of domestic industry and the international area. I feel this is more important… I think this is more effective for strategic adjustment, strategy development in enterprises. Furthermore, in enterprises, to promote enterprise management, it will be more effective." (N14 Manager Function)

As reflected from the quotation above, managers need both internal and external information to support analysis, management, and decision-making in the enterprises,

including long term considerations about strategy. The current IS lack strategic level support. Instead, it was found that lower level tactical support which helps vital information selection and provides information for decision-making in the enterprises was missing in the systems. For instance, one of the interviewed functional managers stated:

> "It is important to say this, because there are information selections inside, for instance, in the distribution systems, there is a large amount of data. But for real, the data helps reduce the costs and improve efficiency, which should be controlled by the leaders. There is a need to select the data. It is possible that only five data are needed out of one hundred. Just key data needs to be in the system. Maybe they need to do further work on this part, I think." (N22 Manager Function)

As seen here, the current information systems do not support information selection. Managers need "key data" for analysis and decision-making. Furthermore, some analysis support which is required by managers is also needed in the current IS. For example, one of the managers in a functional department said:

> "We hope the IS are developed to the situation that, especially in our power providing plant, every day, after the data comes, the systems are able to show, such as a total amount, everyday… not just a total amount, total amount is just accumulation, there is also analysis. For instance, the cost of coal during production, I have a target, at last, when I achieve the target in reality, then according to the power plant systems, how advanced this target is in domestic area and deviation, such analysis is the best" (N32 Manager Function)

Managers need IS to provide both vital internal information and external information to support analysis and management. However, the current IS in the enterprises lack this support. Although different types of IS are used in the enterprises now, applications that support strategic management and analysis are missing. It is worth noting another misalignment situation between IS applications and management activities, namely that some required management reports were not provided in the existing IS. For instance, when talking about IS use of managers, one IT manager stated:

> "They are not using (IS) directly. There will be someone just exporting the data and then showing it to them...It should be sent to the reports directly (in the system). But because headquarters are not able to keep up, we make them ourselves in branches." (N25 Manager IT)

As shown, when managers needed reports they needed someone else to export the data and then create the reports for them. The systems were not able to show some required reports because the functions were not developed in the systems at headquarters. Moreover, it is further confirmed from the coding on the data collected that there were some management requirements not developed in the system, although these functions were actually needed in the branches because the information was not requested by headquarters. For instance, one of the functional managers stated:

> "Basically, according to the requirement of headquarters, for the current operations, we all make systems based on this. But if there are no special requirements, we make them outside the systems…The data required in headquarters is all inside the systems…For example, some classification of staff, some estimation inside our department, some specific analysis based on our needs, we finish outside the systems…The functions in the systems are not complete. For some aspects, the functions are lacking and we need to do some ourselves." (N27 Manager Function)

As discussed here, some management needs in the branches were not satisfied by the systems. When managers needed reports or analysis, they required additional work to be undertaken outside the systems. As claimed, headquarters did not "keep up" with these developments or this kind of information was not required by headquarters. However, it is also found that, even if some management requirements were supported by the systems, managers still worked outside them.

> "Sometimes it's the problem of method. For instance, when you do some analysis in the systems, there are no obvious advantages to deal with it inside the systems compared with outside the systems. Thus, probably I would deal with it outside the systems." (N27 Manager Function)

This quotation suggests that managers are used to working in traditional ways rather than using IS, therefore when they have both ways of working available they prefer to deal with issues outside of the systems. A number of interviewees argued that managers were not used to working using these systems.

> "To be honest, situations of IS use by middle and top managers are not good here. Basically many people do not log in to the system (ERP)." (N24 Manager Function)

> "Managers always delegate to lower levels, for instance, when there are some demands, it's always you help me to do it. He almost never has a view of them in the systems… For example, there is a need for a report on the enterprises, and they never find them in the systems. They are all reported by us, in a paper copy or e-copy." (N28 Manager Function)

> "Ordinarily, when there is a computer you can learn yourself. They would not learn it. When they want data they just ask you to bring them the data, bring them the forms. They are used to this mode. They are not used to look at it themselves. Since you have IS development, you can have a look on the computer. Including managers in headquarters, branches, they all have this disadvantage, as well as departmental managers… The chief of the business unit, to ERP, usually logs in to the systems to have a look because they need to operate it every day."(N35 Manager IT)

From this we see that managers who do not need to operate ERP did not use them to deal with the business. They asked for the reports from lower level managers or staff. This is not contradictory with the previous findings, which showed that managers argued that some required management reports were not provided on the systems. On the one side, the current situation is that IS development was not complete in the enterprises and there were different management focuses between headquarters and branches so there were management requirements not supported in IS. On the other

side, it was further confirmed that managers were still used to the traditional management ways; therefore the information provided in the systems does not comply with their management ideas. They were not used to working with the systems and ask subordinates to provide reports to them.

To summarise, the support of IS for the management activities are problematic in the branches. There are five perspectives of misalignment subsumed into the main sub-categories which emerged from the coding of the data collected. Firstly, the external information required by managers to support strategic thinking and management was not provided in the existing IS applications. Secondly, some analysis functions were missing. The functions of information selection and further comparisons to support decision-making were also lacking. Thirdly, some required management reports were not generated in the systems. Managers and staff needed to organize the data outside the systems, which will influence the accuracy and effectiveness of the information transformation. Fourthly, managers did not operate the systems even if the functions were supported. They preferred to work outside the systems. Fifthly, managers were not used to working with systems, instead using traditional management methods. The causes and consequences of these misalignment situations are discussed in the following sections.

5.4.2 Causes of insufficient support by management in IS

This section discusses the causes of insufficient IS support by management. There are five reasons identified, including centralized management, different management requirements between headquarters and the branches, traditional management ideas and management ways, IT department problems and deferred IS and IS strategy changes in the branches.

5.4.2.1 Centralization

Referred to in section 5.1.2, the SOE group implemented a centralized management strategy from 2002 when it was created, until 2010. Under the centralized management, branches play the role of a “production plant” (N14 Manager

Functions) in the SOE group. They do not need to consider the financial issues, funds, investment, purchasing and sales. All of these issues are managed at headquarters. Furthermore, IS implementation was planned under the circumstance of centralised management when the SOE group was created in 2002. At that time ERP was implemented to support management in headquarters. As interviewees stated:

> "This IS (ERP) was recommended from headquarters in Beijing when we became a listed company." (N1 Operation Function)

> "When ERP was built there was only the aluminium business and at that time the management idea was centralized control." (N40 Manager IT H)

Since the implementation of the main IS application ERP, this has been decided under centralized management, for which the branches are considered as a "cost centre" (N14 Manager Function). The fact that IS applications do not support tactical and strategic level management in the branches is actually in line with the business strategy. However, there was a strategic adjustment in 2010, after which branches have had to manage the business and consider market developments. The applications supporting centralized higher level management are no longer required. The current IS applications and their management are thus misaligned. Centralized management is still one of the causes of this since the initial IS implementation based on this was not concerned with strategic or tactical management at the branch level.

5.4.2.2 Different business requirements between headquarters and branches

IS implementation is arranged in headquarters based on a unified plan. One of the original implementation aims was to support the centralized management at headquarters; therefore the systems developments were mainly concerned with this. However, considering the particular and special nature the SOE group as outlined earlier, branches are not homogeneously merged and the management requirements are different between headquarters and the diverse individual branches.

> "If you want to form a report, you not only need to take out the data in financial department, but also in manufacturing, logistics, marketing, including the data in each package. The data is the report that has been unified at headquarters. But branches have their different management requirements themselves. If we want to customize a report, it is very troublesome, difficult to do. Moreover, many people have no idea of how to define it and they can't do it." (N24 Manager Function)

As reflected in the quotations above, there are different management requirements in the branches. However, the most recent IS implementation was not able to fulfil these requirements. To solve this problem, branches tried to customize the systems but failed, which indicates the low capabilities of the IT departments in the branches. This part is discussed in section 5.4.2.4. When branches report these requirements to headquarters, they are ignored. For instance, one of the interviewees stated:

> "Generally it is headquarters (that propose the requirements). The requirements from branches all go down the drain, and are not useful; nobody cares. The requirements from leaders and departments in headquarters are investigated…. If those are personalized requirements, nobody cares. You proposed for nothing. We have proposed previously, which part of ERP suits with our branch, or which part is not suitable, as well as the management requirements. Not useful, you are disregarded." (N35 Manager IT)

As shown in the quotation, headquarters ignores management requirements. It may have been reasonable during the centralized management period, since, regardless of the requirements of the branches, it reflected the centralised management ideas of headquarters. At that time management requirements that matched the diverse characteristics of the individual branches may not have complied with the concept of centralized control. After the strategic adjustment, strategic control replaced centralized management and branches were allowed to manage the business themselves. IS applications should have been reconfigured to support personalized management requirements at branch level based on strategic control management thinking. Different management requirements between headquarters and the branches now exist yet IS applications remain configured according to the requirements of headquarters, resulting in IS strategic misalignment.

5.4.2.3 Management processes are not standardized

Management IS had been implemented for a long time, but support for IS by management remains weak in the branches. One of the reasons is that managers were used to traditional management ideas and approaches, lacking management standardization processes based on systems management views.

> "In fact, the premise of IS use is standardized management. The fundamental is when the management is not standardized it is not able to use IS. How can you use IS if you manage in this way today and change to another way tomorrow? That's impossible. That's not practical… If only you have standardized processes, standardized management in advance, even if you have something which needs to be adjusted. It is fine, you can implement IS. Now we are not in this condition." (N11 Manager IT)

Similarly, one of the functional managers stated:

> "In the enterprises in China, maybe the management is not standard, so not suitable to the foreign advantage management software ERP. If we were operating more formally, adjusted to systems more, or the systems were more flexible, it would be good." (N20 Manager Function)

As shown above, the manager realised the importance of standardized management. Standardized management activities and management requirements will facilitate IS support to managers. However, the management processes were not standardized in the case company, which bought difficulties to IS support.

5.4.2.4 Managers' resistance of IS use

It was found in the case company that the attitudes of managers to IS use are negative. They are resistant to working with IS. Traditional management ideas and culture remain influential in Chinese enterprises.

> "I think more often the problem is they are used to the previous management ways but ignore the new management tool, new management method… For our management, many things are still done based on the traditional manual management idea, ignoring the value of system management. This is why concept of deepening the application was mentioned previously. You should use the systems for real. It's not like you need a report when you use it. When you use the systems well, there is no need to form the report in the systems; you just need to have a view of some data every day." (N40 Manager IT H)

As explained, managers ignored the changes in management approach after IS adoption. IT managers argued this was the reason that managers always required reports which were not provided by the systems. These are the two sides of the problem. On the one side, there were some management requirements, especially in the branches, but these were ignored by headquarters, which had a different business focus. On the other side, managers needed to pay more attention to management using the systems. However, the Chinese way of thinking, culture, and traditional working habits of managers influence their ways of doing things, which results in a situation where managers are reluctant to change management style.

> "This [IS] is good. I think it's good from a management perspective. Where is the most difficult part of IS development, the barrier of IS development. It is actually people's thinking. People always think of shortcuts, think about simplifying….A simple example, I make a phone call, the problem is solved if we have a good contact. This number is wrong. There is no assessment and I made changes myself. Everyone thinks I own the rights to master the greatest. IS development precisely needs to deny their rights but you want him to like it. They are different from the foreigners. Germans consider it should be like that……Our product is from SAP, German. Why it does not work well in China? Everyone considers it's very difficult to use, very rigid. They all prefer Oracle from the USA. You can have customization in Oracle. Americans are better than Germans, they are more flexible. But Chinese people are too flexible, excessively flexible." (N31 Manager IT)

As shown in the quotation, "flexible" is the Chinese way of doing things. A lot of factors influence the activities and decision-making of managers, such as "shortcuts" or "personal contact". Managers are used to dealing with things flexibly since they

need to consider different factors under various situations. IS processes are strict and stable therefore they are resistant to using them. In addition, IS use impairs the rights of managers. For instance, one of the interviewees stated:

> "Before ERP implementation, managers of branches were afraid that their rights would be impaired. Actually after ERP implementation the rights of managers did weaken… Every cent you spent is on the account. You can't avoid it. You should submit all of them and it's impossible to save any." (N35 Manager IT)

It was found that managers in the branches have fewer rights after ERP implementation. This is one of the reasons that managers are resistant to using IS. Since management using systems does not comply with their way of doing things and also reduces their rights, managers in the enterprises do not pay attention to understanding and using IS for management purposes.

To summarise the two sections above, there are two factors influencing the managers' use of IS. Firstly, Chinese people are used to dealing with business flexibly; therefore managers do not like to use systems with strict process requirements. Secondly, IS use reduces the power of managers, so they prefer to work outside the systems. Based on these points, managers were reluctant to understand, study and use IS in management activities and retained traditional management ideas and management ways. Furthermore, a lack of regularized management is the fundamental reason that managers did not use IS well, since there is no enforcement.

5.4.2.5 IT Governance problems

When IS applications do not support management requirements well in the branches, IT departments in the branches are not able to solve these problems, which indicates that IT department problems is one of the causes of misalignment between IS support and management requirements. There are three main problems identified from the coding of the data collected, including insufficient decision-making rights, insufficient resources and financial support, and too few responsibilities for IS management, as discussed in section 5.3.2.2.

IT departments in the branches had no rights to make decisions on IT project investment and implementation. All of the projects they proposed needed to be approved by headquarters. Therefore, when there were distinctive management requirements which were not supported in IS applications, the IT department was unable to decide if new IT projects should be implemented. They should have reported this to headquarters. However, the disparities of branches were ignored; headquarters did not pay attention to the management requirements based on the individual characteristics of the branches. At this time, IT departments in the branches had no rights or capabilities to solve the problem.

Considering the geographical distance between headquarters and the branches, and the business distinctiveness of branches and the existing strategic control management idea, the low capacity of IT departments had a negative impact on IS development and implementation in the branches. One of the consequences was insufficient IS support to management.

5.4.2.6 Poor IS strategy implementation in branches and low IS/IT flexibility

As discussed in section 5.1.3, there was an IS strategy change in parallel with a business strategy change from headquarters, who did not help with IS planning and implementation in the branches after this. However, the IS strategy was disregarded in the branches, as discussed in section 5.3.1. As a consequence, IS strategy change was ignored in the branches as well, as one of the interviewees argued:

> "Headquarters considered this kind of thing [IS strategy], but without having sufficient experience. It means this strategy is always changing and it is related to the enterprises development strategy. But when there is a change for enterprises, nobody cares about this IS strategy, so you end up with nothing." (N11 Manager IT)

As suggested here, IT managers in the branches did not realize the IS strategy change in headquarters, which further reflected the poor IS strategy implementation. Furthermore, IS applications were also not flexible enough to adapt to these changes.

> "But overall, there is a disadvantage to this information system. When some previous strategies changed, such as when some previous internal management ideas changed, because the systems had been configured, a lot of trouble was involved in making changes. This system is also more difficult to change, not very flexible. For example, previously, centralized management had centralized purchasing and sales. Now we have market-oriented reforms…. Branches are given adequate purchasing power, marketing rights. The current IS makes it difficult to achieve these." (N28 Manager Function)

Thus, IS applications were too inflexible to change when the organizational structure changed. Especially, IS did not change in parallel with the organizational change at branch level and so technical support from headquarters is still needed.

> "If [Managers] need reports from any perspectives not shown in the systems we make them by hand...This is what I have told you that the IS development process is complicated, and there is a need for technical support… from headquarters in Beijing...Now the reports are almost the same as the ones when the systems started to be implemented. There is not a lot of update and the development is very slow at branch level" (N15 Operation Function)

As reflected in the quotation, there is a lack of further development of reports in the systems, although there have been several strategy and organizational changes. Therefore, the higher level management requirements are not able to be fulfilled.

To summarise, poor IS strategy implementation and low IS/IT flexibility causes misalignment between IS applications and management hierarchies from two perspectives. Firstly, the IS strategy was ignored and not changed in parallel with the business and organizational changes in the branches. Therefore, there was a lack of IS strategy to guide IS application plans for higher level management. Managers did not pay attention to an overall IS plan for higher level IS implementation. Secondly, IS applications were not flexible; therefore, when there were different management requirements from business strategy and organizational change as well as organizational development, IS applications were not able to change to fulfil them.

5.4.2.7 Business managers' poor understanding of IS use

It emerged from the coding of the data collected that the managers did not understand IS use very well. For instance, some misunderstood the IS use conditions.

> "The enterprises with good benefits implement this system to facilitate the management of the corporation, but once the enterprises have a poor performance, you still use this, it will pull your enterprise down and destroy it." (N3 Manager Function)

Thus, managers considered IS to only be useful when enterprises had good results, which is an obvious misunderstanding of IS use. Furthermore, some managers did not understand IS contribution to management effectiveness.

> "For example, when the manager needs the data for aluminium, he just needs to make a phone call. Why would I implement the IS? I have to spend money on IS implementation, development. Actually, he does not consider these issues: it's the short term. What is the long term? It is when you implement IS, it is standardized management. This is the biggest benefit. If it is able to regularize your management, eliminate management vulnerability, and then combine with the business, this way it brings benefits." (N11 Manager IT)

As suggested, some functional managers did not understand IS contribution to management effectiveness. Therefore, they did not work with IS, as shown in the quotation above, they preferred to "make a phone call" and lacked a long term view.

5.4.3 Consequences of insufficient support of management in IS

As discussed in the previous section, there are two misalignment situations regarding IS support to management. Firstly, IS applications are unable to fulfil all management requirements. Secondly, managers still used traditional management ideas and approaches and did not like using IS. As a consequence, managers in the enterprises were not actually using IS a lot. Since IS use is not essential for the managers, they lacked the motivation to understand IS deeper and more

comprehensively. Furthermore, managers were not able to realise the IS values, thus the support of IS use from managers was weak.

The inability of managers to realise IS values was discussed in section 5.3.3.1 in detail. In the case company, the IS support to management was not sufficient. Furthermore, managers did not work with IS a lot. Therefore, managers did not pay enough attention to IS. As some IT managers stated:

> "If this project [project for managers] is implemented well, I think the managers would pay more attention to the IS. This [managers ignore the IS] is caused by the objective factors." (N40 Manager IT H)

As reflected in the quotations, because of the insufficient IS support to managers, managers did not pay attention to IS. Furthermore, their support for IS use was minimal.

> "Let's talk about investment. There are ten to two billion investments in the corporation. When you want to build an investment management system, they are not asking what is brought from this system, they asking about how much should be spent on it. You answer thirty million. They will respond too much. You said ten million, they still respond too much." (N41 Manager IT H)

> "For these things, the idea is different; it's very difficult to apply for the financial support needed to make efforts repeatedly." (N5 Manager IT)

We can see that managers who make decisions on IS investment did not provide a strong support to IS implementation. Since there was misalignment between IS applications and management, managers were unable to realise the IS benefits and values well, and support was weak.

5.4.4 Section summary

This section discusses the misalignment situation regarding insufficient IS support by management. IS support to management is not sufficient in the case company. On the one hand, IS applications do not fulfil all the management requirements,

including strategic management, decision making, and analysis and management reporting. On the other hand, managers' IS use is problematic. Managers do not operate the IS even when there is a need to do this and they use traditional ways to obtain information. Centralized management, and different management requirements between headquarters and the branches, resulted in the situation that IS implementation focused on the requirements of headquarters but ignored the management requirements in the branches. Poor IS strategy implementation, low IS/IT flexibility and the low capabilities of IT departments in the branches reinforced the problems. As a result, the IS applications at the time of writing are not able to support all the business requirements in the branches. Traditional management approaches, ideas and managers' poor understanding of IS use, led to the misalignment situation of managers' problematic IS use. The insufficient IS support to management resulted in managers not realizing the IS/IT investment value and weak support of managers for IS.

5.5 IS did not support core business units well in branches

This section discusses the misalignment situation where IS did not support core business units well in the branches, as shown in figure 5.4. Two subcategories identified from the data analysis were subsumed to this main category, including weak connections between automatic control systems and management IS and ERP not used well in manufacturing. The main causes of this misalignment situation include the aims of IS implementation and the diversity of branches, weak support of managers in the branches, current enterprise situations, lack of technology support, the special characteristics of SOEs and lack of a platform for IT knowledge sharing. The result is that people did not seek IS capabilities sustainably and also IS did not contribute to business advantage.

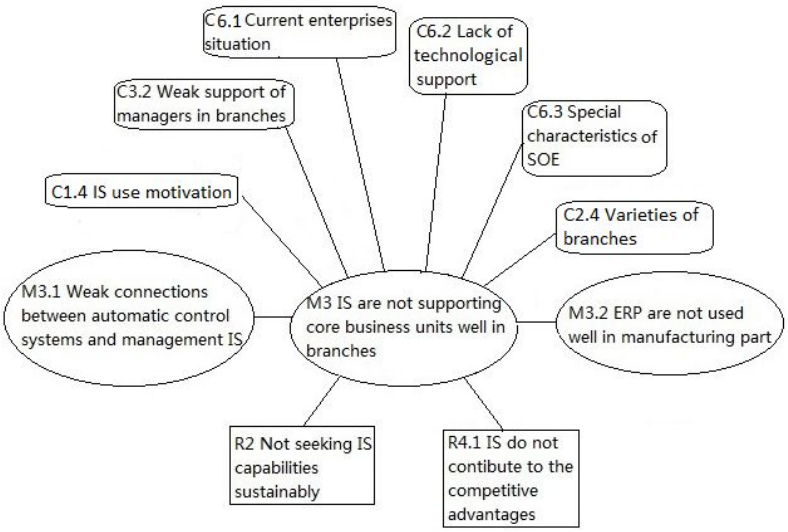

Figure 5.4 Presentation of IS not supporting core business units well

This section discusses the misalignment situation that IS does not support core business units well from three perspectives. Firstly, the misalignment situation is described in section 5.5.1. Secondly, the reasons that cause IS not to support core business units are discussed in section 5.5.2. There are six causes identified: IS use motivation and diversity of branches in section 5.5.2.1; current enterprises situation in section 5.5.2.2; lack of technological support in section 5.5.2.3; special characteristics in section 5.5.2.4; weak support of managers in the branches in section 5.5.2.5. Thirdly, the resulting consequences if IS does not support core business units are discussed in section 5.5.3. There are two different consequences identified: the importance of IS and the IT department depends on the business situation in section 5.5.3.1; and IS does not contribute to competitive advantage in section 5.5.3.2.

5.5.1 IS does not support core business units well

As mentioned previously, IS implementation is emphasized when the SOE groups became listed companies and ERP was implemented. However, it was claimed that the new IS applications did not support the main business well.

> "Due to when the SOE group was established, the IS development was incomplete. In order to achieve the demands of a listed company, they made aggressive investment on hardware, and increased the size of the management. But I still feel maybe the efforts were inadequate, which resulted in no effects… on competitiveness." (N11 Manager IT)

As stated here, large investments were made in IS development. However, as manufacturing enterprises, the IS support to the core business and core competitiveness was not considered sufficiently, as the IT manager stated further:

> "IS development is reflected in specific projects. When you develop these projects, they must be connected with competitive advantage and core business." (N11 Manager IT)

> "When we were in the individual IT department period, I saw this kind of plan. After implementing ERP, ERP I, ERP II, after implementing them completely, and then developing MES, and then making them communicate, and then developing business intelligence: it was a whole set of things. But now we only implement SAP not others, so they are not connected closely to the production." (N11 Manager IT)

As stated here, there was a plan for IS development to support manufacturing, but which was not implemented. Therefore, the current situation in the enterprises is that IS does not support the core business well. Firstly, information collection during production processes still needs manual work.

> "Now some of them are collected automatically. Some are manually collected, such as meter readings, collected from backstage supporters, because there are backstage supporters. The signals from backstage are transferred, data is transferred, different types of meters, such as measure meters are used… and then there are a set of collection methods, including manual management and automatic collection." (N22 Manager Function)

Thus, the data during the production process was collected both automatically and manually. Furthermore, it was pointed out that the manual work existed because of the separated networks.

> "But for the report some of the data is collected on site in real time, some data is input manually. Because now we have some islands of automation, networks are not complete. Unable to upload online, there is some manual work. So the next step, along with our development of IS, after solving all the islands of automation problems, when all the important parameters are monitored online in real time, is for us to be are able to develop and apply management and control integration better." (N5 Manager IT)

Moreover, the data collected during production processes is input into a daily report, as required by the managers.

> "Important indicators are input by our dispatchers. Every day there is a production daily report. This is what we make for them. What the systems need are outputs of production every day, materials consumed, spare parts used. This is a statistical daily report." (N32 Manager Function)

The information needed in the ERP system was input manually according to these reports.

> "He can make them in ERP systems after looking at the reports. For example, how many spare parts or how many raw materials I need now, can be input to ERP. Basically this is the current situation." (N8 Manager IT)

In the above quotations we find that the processes of information collection during production are summarised. Firstly, the data related to control and management is recorded either automatically or manually from the manufacturing equipment. Secondly, dispatchers collate these important indicators to form a daily report. Finally, the information needed for purchasing or planning is input manually into ERP. IS/IT does not support automatic data collection, which will influence the accuracy and real time transformation of data. Furthermore, this process indicates the weak connection of production systems and management systems, as one of the IT managers pointed out:

> "I think the current IS operation is still in a preliminary stage. Now the whole management IS and whole control systems are separated. Inside our ERP systems, it is a pure management system that operates independently. The automatic control system on site is also operated independently. These two systems, so called management and control integration, are not realized. In order to achieve the management and control integration for real, there is still a large amount of work to do."(N5 Manager IT)

In this case, ERP was not used well in manufacturing. The support of ERP for the main business units in the enterprises was problematic. For instance, one of the interviewees stated:

> "When I was scheduling meetings, we discussed how many raw materials, fuel, or materials are needed in the current situation, the current consuming situations, what kind of things lead to the main problem. It [ERP] can roughly control what the approximate situation in this part is. It is not able to achieve much detail, how many days these materials will serve, or how to solve the problems in some parts. It probably can't achieve such detail. It is just rough, or as a general plan, it can achieve, ERP can achieve." (N19 Operation IT)

As reflected in the quotation, due to the mismatch between automatic control systems and management systems, ERP was not able to support accuracy control. In practice, ERP functions were not realised in manufacturing enterprises. As one of the examples, a functional manager complained:

> "Our current inventory, whatever spare parts or materials exist, for instance, how much inventory every month is suitable, it is all decided by the managers for us. It does not have a scientific basis. For example, the inventory of the spare parts…, I need to refer to the importance of production, priorities, different materials, different backgrounds, the inventory is different. But now, stock management is all input manually." (N32 Manager Function)

Based on the quotation above, it is very surprising to find materials scheduling and inventory management are still in an unsatisfactory state in the enterprises, even after ERP implementation. It is perceived that the main focus of ERP use was on centralised management in headquarters. The manufacturing support, which was

extremely important in the branches, was not paid much attention, in comparison. The causes and consequences of this misalignment situation are discussed in the following sections.

5.5.2 Why IS did not support core business units well

Six reasons have been identified as the cause of this problem, including the aims of IS implementation and diversity of the branches, weak support of managers in the branches, the existing enterprise situation, a lack of technology support, the special characteristics of SOEs and a lack of platform for IT knowledge sharing.

5.5.2.1 IS use motivation and diversity of branches

The corporation made large investments in IS implementation when it was created "in order to achieve the demands of [a] listed company" (N11 Manager IT). The main aim of the IS implementation was for headquarters to strengthen the centralised management. The manufacturing systems which supported the main business sector in the branches was actually not the focus of IS implementation, as decided in headquarters. When talking about the reason that the manufacturing system was not paid enough attention, one of the IT managers stated:

> "The reason is very simple. It is because branches existed first and then the Corporation of China was built. The Corporation of China cares about centralized management… through ERP. The corporation is not interested in the manufacturing system. It's very simple. The corporation does not make investment in it." (N33 Manager IT)

As reflected in the quotation, the Corporation of China was established in a typical Chinese way, which has been discussed in the previous section. The seven branches already existed and operated and then were merged together as one corporation, which resulted in the corporation being created; thus the main concern of managers was centralized management. In this case, manufacturing IS are not given enough attention in headquarters. Furthermore, since the seven branches were created

independently and distributed in different areas in China, business distinctiveness was obvious among the branches.

> "But when you achieve the aim concretely, each branch is different in development progress. Based on the fact that some of the organisation [produces] aluminium… it means that, based on the development mode and development status, different branches have their own characteristics. Some have better IS development while for some, IS development is primitive and slow." (N19 Operation IT)

Since different branches have diverse manufacturing characteristics and IS development situations, it was difficult for headquarters to develop the manufacturing systems uniformly.

> "The production characteristics, equipment characteristics and the producing procedures are different in each enterprise. There is a lack of a standardized [software], such as SAP. We can't find such standardized software. Each enterprise uses more custom development." (N39 Manager IT H)

> "In headquarters, large application systems have unified construction. For the manufacturing systems in enterprises, they are more varied. In order to fulfil the individual requirements of the branches, they are built in an enterprises-based manner." (N39 Manager IT H)

Thus, distinctiveness of the different branches results in the difficulties of unified construction of manufacturing systems in headquarters. It is also claimed that it lacked unified construction because there was no standardized software which could be used, considering the diversity of the branches. Although these can be seen as the reasons for lack of investment in manufacturing IS by headquarters, these were not the reasons why headquarters did not pay attention to manufacturing IS. More focus on the management and ignoring the manufacturing in the branches were important reasons for the lack of investment in manufacturing systems at headquarters. Moreover, to investigate the reasons for poor alignment between IS applications and manufacturing in the branches further, the enterprises' business situations at the time of writing is discussed in the next section.

5.5.2.2 Current enterprises situation

A number of interviewees mentioned the current business situation of the enterprises was not good. The enterprises were losing money; therefore there was a lack of financial support for further manufacturing IS development.

> "It was designed to try to integrate with production to develop in addition to IS development, which can be integrated into production control, MES systems. We did not have MES systems yet, at headquarters level, considering different aspects, beneficial results, and financial support. We never had (MES)." (N10 Operation IT)

> "Now the business situation is not good, maybe the production is more important. IS development is being ignored. Ordinarily, it should be when the IS development is better the production will be improved. The current situation is, the production does not proceed well and IS development maybe put aside." (N18 Operation IT)

> "If the business situation, when the enterprises have money, gaining profits, we hope the IS development is becoming better. Now because the whole [enterprises] are losing money, nothing can be invested in this perspective. The current situation is good." (N12 Operation IT)

As suggested here, in the situation at that time, the enterprises were losing money. Even the production was problematic so it meant lack of investment for manufacturing IS development. In addition, since some branches were "sixty years old" (N31 Manager IT), it was claimed that the production equipment was too old to fulfil the requirements of IS development and investment in IS development to acquire information from the out-dated production equipment would be very large.

> "On the perspective of production, full automation requires high levels of equipment on site, including high requirements of control systems. Our current actual situation is not able to reach it." (N26 Operation Function)

> "In addition, the equipment initially used on the aluminium production line, the meters and instruments do not support digital information…When you want to reconstruct these meters, you need to pay a significant amount." (N19 Operation IT)

As shown in the quotations, in order to connect automation control systems and management systems, there were higher level requirements of the automation control equipment which needed large investments for reconstruction. Considering the poor business situation of enterprises, it was very difficult to develop manufacturing IS, which leads to the weak alignment between IS applications and core business units.

5.5.2.3 Lack of technological support

The SOE group is in a process production industry in which it is difficult to make accurate measurements, as one of the interviewees explained:

> "Because, as an enterprise, its production mode is this kind of mode, it's very similar in the petrochemical industry and metallurgy industry. During the production process it's not piecework, it's a process, such as pressure, flow, temperature, heat, water, when they are measured, it's not accurate as such. It needs a cumulative process." (N19 Operation IT)

> "When we went outside to communicate with other branches, a similar situation was observed; they faced this difficulty as well… In terms of the process production industry, such as metallurgy, petrochemical, these industries, which are different from the assembly line piecework production, have their own characteristics. In this type, the combination between IS development and automatic control is relatively more difficult." (N19 Operation IT)

As explained here, the indicators during the process production were more difficult to measure compared to piecework production, which is a common difficulty in the

industry. Furthermore, it is claimed there is a lack of technology support for data collection in the industry.

> "In the manufacturing department, these new technologies have just started. Previously we have data collection for this part, but it's not stable… I want stable data which do not die after a period of time. It is a lack of data when you urgently need to use it. Maybe it is related to technological development." (N18 Operation IT)

Technology that supports data collection needs to be improved in the enterprises. Since there has been a lack of technology development and new technology implementation to support the data collection from automatic control systems, the integration between automatic control systems and IS is difficult to improve. The technology used to support information collection in the special production processes needed to be improved in the enterprises. Moreover, a platform was needed for the new IT knowledge learning and sharing among managers and staff.

> "Update knowledge is required because the current IT industry is changing very fast, under the current situation in the manufacturing industry, there are changes of technology. There is a certain period of time for technology replacement. The new knowledge, I am afraid there is a need for a platform to learn and build. There is a lack of such a platform." (N7 Manager IT)

When IT changes in the manufacturing industry, the new knowledge needs to be updated and distributed in the enterprises but there was not this kind of platform at the moment. If people are not aware of the new IT knowledge and its benefits, it is difficult to promote the new IT use to support information collection in the manufacturing part of the enterprise.

5.5.2.4 Special characteristics of SOE

SOE characteristics also influence IS use in enterprises. Although with the market-oriented reforms in China, the SOEs gradually faced market competition themselves. In the case enterprises studied, there was no clear order or production plan. This was

one of the reasons that ERP were used poorly in materials and inventory management.

> "You can have a look at the ERP itself, the package and functions ERP. Now we use ERP from SAP. Because in the current environment, it is to make decisions on sales based on production, or make decisions on production based on sales. This kind of management, this operation mode, such as in these kinds of companies, decides the sales based on the production. It means however, that when many products are produced, you have to sell them. There is no need for order management. Or like a pure manufacturing industry, however many orders come I will take and then make a plan to guide the production according to the orders. This kind of enterprise is totally different now. Now what you need to understand is the current situation of our enterprises. It is in a different production mode or process." (N31 Manager IT)

As reflected here, in Chinese SOEs, sales were based on production and there was no order management. The advantages of ERP in terms of order management and inventory management are not taken when there is less consideration given to sales in SOEs.

5.5.2.5 Weak support of managers in branches

Apart from a lack of attention in headquarters, weak support of managers in the branches is also one of the management problems which causes misalignment of IS applications and core business units. Weak support by managers was discussed in detail in section 5.4.3.1. Furthermore, it is argued that the attention of managers is important to IS use.

> "I think it's related to the leadership attention in their department. One is that IS can fulfil their requirements and they are interested in using it. The other is the attention of functional managers." (N25 Manager IT)

> "I think how to solve the problem, it must be company executives, at a high level, knowing how to integrate them (IS and core business). Otherwise, this problem is difficult to solve. The leaders, in other words, must have this consciousness." (N11 Manager IT)

As reflected in the quotations above, the managers' attention is crucial to IS use in the functional department. Moreover, managers need to pay attention to the combination of IS and the core business. Managers' attention and views are extremely important in Chinese culture. Managers' poor support was one of the reasons that the IS applications did not support the core business units well.

5.5.3 Consequences of IS not supporting core business units well

This section aims to discuss the consequences of the misalignment situation of IS not supporting the core business units well. ISs were used mainly as management tools and did not support the core business units well in the enterprises. As a result, IS did not contribute to the business advantages when enterprises were not using IS well to reduce the production costs and increase the quality of the products. The importance of IS and the IT departments depends on the business situation since they are not considered core parts of the business operations.

5.5.3.1 The importance of IS and IT departments depends on the business situation

In the situation at the time of writing, the IS did not support the core business well in the enterprises; therefore it was not in a strong position. When enterprises are not in a good business situation, IS is ignored. As one of the interviewees stated:

> "But without these IS projects, production operates as usual. It is in this situation. IS, in another word, before IS implementation, the enterprises worked well, operated well, it means [IS had] no influence. But after implementation it will be better. In the current situation why would we implement IS? " (N18 Operation IT)

Thus, the enterprises worked well without IS implementation. Since the current IS was mainly used for management purposes rather than for production processes, IS had "no influence" on the operation. In this case, when enterprises were losing money, no IS investment was made since it was not essential in the enterprises. As summarised by an IT manager:

> "Actually, we have gradually understood over the last 20 years that when ISs in enterprises are developed to the final stage, if the IS development is not able to be combined with competitive advantage, which means with the main business, with the central issues, inevitably, it will be marginalized." (N11 Manager IT)

As reflected in the quotations, IS applications did not support central management, which is a crucial misalignment problem. IS was not generally considered to combine with the production processes in the manufacturing enterprises, therefore IS use was considered as an additional service. IS use was decided based on the business situation, thus it was "marginalized" when enterprises had poor business performance. In addition, the importance of the IT department was also decided based on the business situation, so the IS applications and core business units were not combined closely.

> "Previously, when enterprises were in good business situation, there was a dependent department for IS… Now it is marginalized. The enterprises are not in a good business situation." (N18 Operation IT)

> "They moved from a low to a higher position and then back to a low position. It means IS applications were not well used, and when enterprises had money, the managers thought IS development is beneficial, so IS started. An independent department was built. Now the business situation is not good, some parts are cut off, or put aside." (N18 Operation IT)

As manufacturing enterprises, IS applications did not support the production processes well, and were not considered as essential to the enterprises. Under this kind of situation, not only was IS not strategically placed in the enterprises, the IT department which supported the IS development and implementation was also "marginalized" when enterprises were losing money.

5.5.3.2 IS does not contribute to competitive advantage

It should be emphasized from an IS perspective that it was not only the case that, when there was a lack of coordination between IS applications and the core business units, ISs was disregarded in difficult business situations; from a business perspective, the benefits of IS use were also not realised very well.

> "The mismatch situation is not visible. If it becomes so, I think not only the benefits of IS use do not come out, but also there are no effects of IS use. This is the key point." (N11 Manager IT)

As suggested here, the mismatch between IS applications and the core business units led to a situation where, although the enterprises undertook IS implementation, since the main business was not in a good situation, people just considered IS as a management tool or service and were not able to realise the beneficial effects. Furthermore, IS use did add value to the main business processes.

> "But for many production processes, the information acquiring and people who needed the information had no idea what advantages could be brought to the production processes [from IS]" (N41 Manager IT H)

> "To the manufacturing enterprises, there will also be this issue. When the IS development is made well, it will decrease the cost, strengthen management and control, reduce consumption and increase efficiency, thus it may be an important part of competitive advantage. At this time, it may become a very good, valuable, business value…I think now we haven't reached this level yet, but it becomes an inevitable means for management in production. It aims to in the future, along with increased IS effects, IS development has become an important method of management control, reduction of costs, supporting management improvements and increasing competitive advantage. It will be in the future." (N39 Manager IT H)

As shown in the quotations above, in the recent situation, people were not clear what IS would bring to the production processes. Weak alignment between IS use and production in manufacturing enterprises led to the phenomenon that IS was just a method of management but did not support the main business process to increase competitive advantage.

5.5.4 Section summary

This section discussed the misalignment situation where IS did not support the core business units effectively. Information collection during the production processes was not timely or accurate. IS did not help the standardized production and manufacturing management. The poor business situation during this recent phase in the enterprises had negative influences on the manufacturing IS investment. The production processes, technology and the lack of a new technology knowledge sharing platform restricted IS use in manufacturing. Furthermore, the disregarding of manufacturing IS by headquarters and weak support of managers in the branches influenced manufacturing IS use and investment. The mismatch between IS and core business in the enterprises led to the situation where IS did not contribute to competitive advantage. The importance of IS and the IT departments depended on the business situation since they were not considered to be in the core business sector.

5.6 Misalignment of system operations and business processes

This section discusses the misalignment of system operations and business processes, as shown in figure 5.5. Three subcategories subsumed to this main category are identified based on the data analysis, including business processes being different from systems operations, a lack of function in the systems and system operations not matching with the business structure. The causes of these misalignment situations include the low importance given to IS strategy, IS applications not changing with business strategy and organizational change, functional people not understanding IS development, IT department problems and frequent reforms. As a consequence, IS did not regularise the business processes.

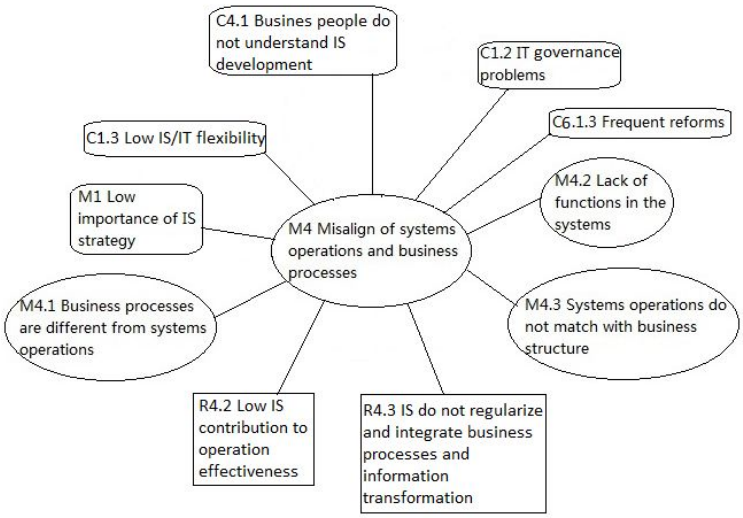

Figure 5.5 Presentation of misalignment of systems operations and business processes

This section discusses the misalignment of systems operations and business processes from three perspectives. Firstly, the misalignment situation is described in section 5.6.1. Secondly, the causes of the misalignment of systems operations and business processes are discussed in section 5.6.2. There are four causes identified: frequent reform and low IS/IT flexibility in section 5.6.2.1; business people do not understand IS development in section 5.6.2.2; and IT governance problems in section 5.6.2.3. Thirdly, the consequences of the misalignment of systems operations and business processes are discussed in section 5.6.3. There are two different

consequences identified: low IS contribution to operational effectiveness in section 5.6.3.1; and IS did not regularise and integrate business processes and information transformation in section 5.6.3.2.

5.6.1 Misalignment of systems operations and business processes

It was found that the functions and operations of the current systems do not match with the business functions and processes from three perspectives. Firstly, ERP operations do not match with the business processes in reality. For instance, one of the interviewees stated:

> "I think ERP is under the ideal processes… but different from reality. In real operations, it is not possible to be ideal…In ERP, when you receive the products, you settle the account in the same month. But we can't make it like this now. We need a period for quality acceptance check… as delays in the pricing system means they don't reflect the real price". (N4 Manager Function)

As reflected here, the business processes in reality are not the same as the ones set out in the IS. There are some business processes which are not considered by the systems. Furthermore, for some business functions or business requirements, there is a lack of function in the IS to support or fulfil the requirements.

> "I think there are differences between the IS and their requirements…For example, I think for many people, when they need systems support, maybe it is not available. For instance, previously I learnt contract approval… They need IS applications to facilitate the fast delivery and joint check and approval. These were not available and they have to do it by hand." (N11 Manager IT)

As reflected in the quotations, some business work is still finished by hand. The existing IS applications did not support all the business functions. It is also worth noting those misalignments between business processes and systems processes are caused by organizational change.

> "The production situation changes very quickly. This system is relatively fixed. It is not able to change whenever you change. It is very difficult to make changes on systems…For instance, last year, at the beginning, there were two alumina producing plants, and then these two were merged together. After merging, the costing in the systems should have been modified. It was very difficult when we made changes. (N20 Manager Function)

> "For instance, the financial system has recently been abandoned… because the financial system is SAP, as decided by headquarters. After implementation, no changes were made to it, such as… data measures and the control department; it has disappeared. The electrolysis plant disappeared and production management units disappeared. But in SAP, these cost centres are still there. Although these departments do not exist in reality, the costing still needs to be issued here, even after merger. Now the system has peeled off, and operates with great difficulty… If the information does not change along with the management, information is dead." (N11 Manager IT)

As reflected in the quotations, when there are organizational changes, IS applications are not able to change in time; therefore the operational processes in systems do not match with the real business processes. As a result, IS use brings problems for the business functions.

To summarise, there were three types of situation where systems operations are not aligned with the business processes. Firstly, some systems processes did not match the business process reality. Secondly, the IS applications were unable to support all the business functions, so some parts of the business processes still required manual input. Thirdly, some business processes changed without corresponding IS applications changes being made, which resulted in misalignment. The causes and consequences of these misalignment situations are discussed in the following sections.

5.6.2 Causes of misalignment of system operations and business processes

This section discusses the reasons that system operations and business processes are misaligned. The main causes identified include the low importance given to IS

strategy, IS applications not changing with the business strategy and organizational change, functional people not understanding IS development, IT department problems and frequent reforms.

5.6.2.1 Frequent reforms and low IS/IT flexibility

As mentioned in previous sections, enterprises are not in a good business situation at the moment; therefore there are frequent changes made in order to reduce the costs and increase efficiency.

> "Because now the conditions of the enterprise are not well, they are constantly undergoing transformation. Maybe there were reforms last year and then other reforms this year. This is not suitable." (N20 Manager Function)

As reflected in the quotation, when there are frequent changes, the IS applications are no longer suitable for the business structure or processes. The low IS/IT flexibility has been discussed in the previous section.

5.6.2.2 Business people do not understand IS development

It was perceived that business people not only do not care but also do not understand the requirements of statements during the IS development process which is also an important reason for misalignment between systems operations and business processes.

> "Thus we have talked about it, as a consultant company, what is his work, it works like a translator. I try to make your business process in the systems and make systems understand the business process… Its method is you propose the requirements, I won't talk with you about the systems, you just tell me what your business work…is. At the beginning of the interviews, the requirements of all people are organized, but not carefully, in order to look at the logical thinking, to consider if things fulfil my requirements. It's an idea of key projects. Just give me the things to use. Why do I need to learn or look at whether things are right or not?...As users, they are not going to talk about these things very carefully. They hope the keys are ready for use. You give me the keys and then tell me how to use them. But the systems development is not in such a procedure now." (N41 Manager IT H)

As discussed here, IS development is an interactive process that connects the business process and systems process through communication between developers and users. However the users misunderstood this procedure and considered IS development to be one of the "key" projects, which indicates that they just considered the ISs to be a tool to support their work and wanted to use them directly without making any contribution to the development process. This raises the issue of user perceptions. When they do not understand the importance of the roles they are playing in IS development, they do not pay attention to the requirements. In this situation, it is not surprising to find a mismatch between business processes and systems operation processes.

5.6.2.3 Lack of guidance of IS strategy and IT governance problem

As discussed in the previous section, there was a misalignment situation in that the existing IS applications could not support all the business functions. There were some business functions not covered by the IS. Referring to the previous section, there was a lack of IS strategy to guide IS use in the branches. In this situation, the connections between IS strategy and business strategy were weak. Furthermore, the guidance of IS strategy to IS applications portfolios was also weak. In addition, there were few responsibilities allocated to IT departments in the branches, so they were not able to make decisions on IT projects. The communication between headquarters and the branches was problematic, considering the long geographical distances

between them and the different business focuses. Therefore, there was a lack of overall IS planning to realise the plan in order to support all the business work.

5.6.3 Consequences of misaligning systems operations and business processes

This section discusses the consequences of misaligning systems operations and business processes. The main consequences identified in this study include low IS contribution to operations effectiveness, as well as the inability of IS to regularise and integrate the business processes and information transformation throughout all the business processes.

5.6.3.1 Low IS contribution to operational effectiveness

As discussed in section 5.6.1, system operations and business processes were misaligned, including business processes being different from systems operations, a lack of functions in the systems, and systems operations not matching with business structure. Differences between systems operations and business processes cause inconvenience for people in their work.

> "The inconvenience is that we need some hand-made ledger. For instance, when we make payments to the vendor, we need to create an Excel file… It is not allowed to be in this format in the systems. They are all accounts by the day." (N4 Manager Function)

> "After I have the Excel file, (data is) input into the IS." (N1 Operation Function)

It was found that, when the real working operations and data processing are distinct from the processes in the systems, people need extra working processes to deal with the data. Furthermore, when systems functions and operations are not closely aligned with the business processes, staff use the traditional way to deal with the work, which influences the IS use effects.

> "When making the project, the job and IS developments are separated… In this case, the project leads to a mismatch situation. It seems like the project is implemented. It is not really implanted for your business process…They mismatch, actually. It seems there are some new things, some changes, but it is not fully integrated. The effects are limited, finally. Ultimately, people rely on the previous method and existing ways of dealing with work and data extraction. Actually, after IS implementation, the data arrangement and summary or analysis should be raised to a higher level, but they are not, in reality." (N38 Operation Function H)

As reflected in the quotation, when IS projects and business processes were not closely aligned, staff did not use IS in the whole processes of the work. Furthermore, the information management and transformation were not improved after IS implementation.

5.6.3.2 IS did not regularise and integrate the business processes and information transformation

Some business processes were not supported in IS, and IS processes did not match with the business process in reality. The business processes across all the enterprises were not regularized in the systems. Business process re-engineering was not concerned with IS planning. Furthermore, the information flow was not transferred fluently to the enterprises.

> "IS in enterprises should play a leading role, whether in the overseas or domestic area. As you just mentioned, we lead on how to integrate the requirements in each department. Each department considers the problem in terms of its own position rather than in a whole situation context. As for the IT department, its position is at the centre of the whole situation rather than considering the issues from an individual or departmental perspective… For IS, it puts the responsibility for departments onto the systems to execute. In this case, IS are able to regularize, in some Chinese enterprises, labour intensive enterprises… Basically it is led by the work of people. From an IS development perspective, it's actually not just the issue of information. It's about people operating the machine in the whole process. But now we can't reach this point, such as which types of data we can share, which types of data we can integrate through the systems…. The current function is just to replace, which means emancipation of labour. They are not playing a very good role." (N41 Manager IT H)

As reflected in the quotation, the IT department should have considered the responsibilities of all the departments as a whole in order to regularize and integrate the whole working process and information transformation throughout the system. Information transformations should have been concerned with the whole process. In terms of ground-up design of business processes and support for the business processes as a whole, it is difficult to use IS for ground-up design for business processes in order to improve efficiency.

5.7 Low IS operational capabilities of staff

This section aims to present and discuss the misalignment situation of low IS operational capabilities of staff, as shown in figure 5.6. Four subcategories subsumed to this main category were identified, including poor IS operational skills, lack of standardized IS operations, redundancy of work due to lack of confidence in IS use, and unbalanced IS operational capabilities. There were three main causes of this situation, including: training problems; a lack of a unified IS operational manual; and the special characteristics of SOEs. As for the consequences of these IS operational problems, some useful information was missed during the operations. Especially in

the changing environment at this time, the low IS operational capabilities of staff had a negative impact on organizational reforms.

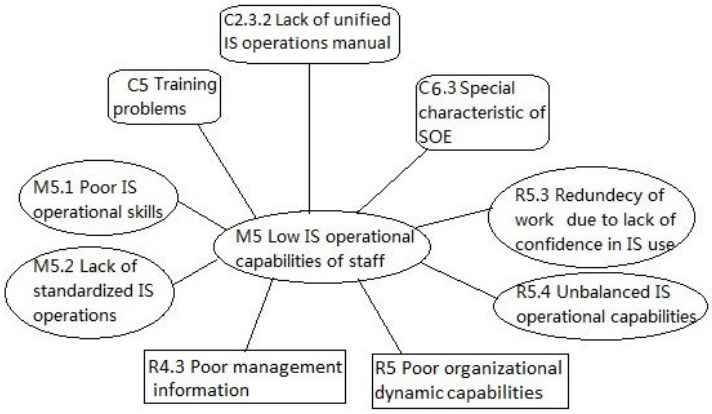

Figure 5.6 Low IS operational capabilities of staff

This section discusses the misalignment situation of low IS operational capabilities of staff from three perspectives. Firstly, the misalignment situation is described in section 5.7.1. Secondly, the causes of low IS operational capabilities are discussed in section 5.7.2. There are three causes identified: training problems in section 5.7.2.1; SOE characteristics in section 5.7.2.2; lack of unified IS operational manual in section 5.7.2.3. Thirdly, the consequences of low IS operational capabilities are discussed in section 5.7.3. There are two different consequences identified: poor management information in section 5.7.3.1; and poor organisational dynamic capabilities in section 5.7.3.2.

5.7.1 Low IS operational capabilities of staff

Some staff in the enterprises are unable to manage and operate the IS effectively, which has influenced the effects of IS use. It emerged that there are different performance levels for problematic operational skills. Basically, some operational employees are just able to manage simple functions in the systems. They need to improve their skills to successfully complete more complicated work.

> "Not well means because some people do not operate it well; so maybe I arrange for them to use some simple functions. If they improve their skills they need to do some things in costing, some more complicated things…." (N36 Manager Function)

As reflected in the quotation, when managers allocated the work they needed to consider the operational skills of staff. Some could only do the work using simple functions. Furthermore, some people were only able to use the systems functions to support the work in their present roles, so when they changed their positions, the operation became problematic, as one interviewee stated:

> "ERP is a system with very detailed job divisions. It means our staff can work very skilfully in their roles. But if there is a job adjustment, it is very difficult for them to adapt to it because they usually work in the area they are familiar with, when they are given another post, they are not able to get very comprehensive knowledge." (N24 Manager Function)

We can thus say that staff in these enterprises did not have a "comprehensive knowledge" of the systems, but were only familiar with the operations of some functions. It indicates that some staff actually did not understand IS well and they just learned the operations mechanically. In this case, the cost of personnel change in the enterprises was higher than previously, since staff needed more time to adapt to the new job. In addition, it was claimed that lack of standard operation in enterprises brought problems for the management, as one manager stated:

> "In fact all these functions are in the systems. But when making the purchase order, they do not fill in some elements in the contract, which results in a lack of this information getting captured in financial systems when verification is required. Because, without this information, some further information is not created neither. Some of them fill in the information; some do not. As a result, the final data collected does not match with reality. But nobody is patient enough to find out the reason for the mismatch, to set a standard." (N14 Manager Function)

As reflected in the quotation, there is not a clear regulation for staff to make standardized operations. If the information acquired is not unified, the further analysis will be influenced. Some repeatable work may be delayed since people need to go back and check for further verification. Moreover, it is worth noting another operational problem, namely that people are used to traditional working habits; they do not trust the systems' operations.

> "Previously we have an account on the table because they needed to export, which meant an Excel table; then generating an account on the system. Afterwards, I would check the account manually to see if they were exactly the same… then operate the ERP system. Whatever the financial department did, such as making a payment and so on, they were consistent. The staff knew they could check the accuracy, at least." (N6 Manager IT)

It is shown in the quotation that, for the same work people need an Excel version and then export it to the systems for operations. After checking both versions, they approved the results. "At least" they used the IS to check accuracy. This indicates that people did not change after IS implementation. They trusted the results of manual work more than the systems. This kind of operational problem increased the time and resources consumed, since it involved repeating work unnecessarily. To solve this problem, it is not only about improving operational skills, but also people having a deeper understanding of IS.

In addition, it was found that the operational skills of people in different functional departments were not balanced. Staff in the financial department were more skilful than those in the manufacturing department. A number of interviewees claimed the abilities of IS operation by people in the manufacturing department are "really poor".

> "I can just say the capabilities are different and there are huge differences. This financial department is very good indeed… But in many production units, the ability to use IS was really poor. If there is a difficulty, they come to us." (N5 Manager IT)

> "Relatively simple problems can't be solved, as they had not used computers previously. There will be all kinds of questions, strange questions. Some pay attention and then remember it. They operate step by step.... Some do not remember and then make a phone call to you every day." (N18 Operation IT)

As reflected in the quotation, staff in the manufacturing department are even unable to remember the operational stages, and their operational skills are really problematic. The low capabilities of IS operations is one of the barriers to manufacturing IS use and manufacturing IS development.

To summarise, the IS operations are not effective in enterprises. Problematic IS operations not only waste time and resources, but also influence information transformation and business processes, which further have negative impacts on management and IS use effects.

5.7.2 Causes of low operational capabilities of staff

Three main issues have caused the low operational capabilities of staff in enterprises; including training problems, SOE characteristics and lack of a unified IS operations manual.

5.7.2.1 Training problems

A number of interviewees considered that training was insufficient in the enterprises, including managers and operational people.

> "Principally, there should be more training for every level." (N27 Manager Function)

> "In fact, [we] should increase training and awareness. The more important is to standardize operations." (N14 Manager Function)

> "I think we should reinforce [training]. It is because including the SAP, there are some functions I do not really grasp. I think I have used it a lot but I still feel some parts I am not managing well. For some parts I need to ask some staff who are more skilful, they can create the forms. But some I do not operate it well, or I am not very clear about some operations. It means it will be better if we have more regular training." (N26 Operation Function)

As reflected in the quotations above, operational staff consider they need more training to improve their IS skills. Moreover, managers are not satisfied with the current IS operations situation and they have considered increasing "training and awareness". In particular, it is argued that, since there are frequent reforms in the enterprises in the current situation, new staff and key user training should receive more attention.

> "But now maybe there are a lot of staff changes, frequent staff mobility, because enterprises often make reforms...Probably all of them have this problem, such as the financial department, production units. This software is designed very strictly and complicatedly. Maybe there was a lot of training when they first implemented it. Afterwards, maybe because the business situation of enterprises was just generally good, it was impossible to put on so much training. But when there are many staff changes, the business may become problematic." (N15 Operation Function)

> "The current situation is there is no training for new staff. You just learn it when you handover, there is no special training. (N20 Manager Function)

It is shown in the quotations above that, when there were situations of new staff coming or staff changing to a new post, there was no induction training. When there are frequent reforms and staff mobility in enterprises, it influences businesses a lot. Furthermore, the frequent staff changes also influence the roles that key users play.

> "The main problem is the loss of a large number of key users. Because of loss of key users, some simple problems are easy to deal with, but some complicated problems cannot be solved." (N33 Manager IT)

> "When implementing SAP, there is the phrase 'key users', which means a group of people who are trained to use the system in its initial phase. And then after they returned to their respective positions, they became the key roles in system use. This type of person became problematic." (N20 Manager Function)

As reflected in the quotations, since there was no consequent training for the users in enterprises, when the key users' positions changed, IS use became problematic.

5.7.2.2 SOE characteristics

The operational problems reflect the low quality of staff in the SOE. SOE characteristics decide whether there will be this kind of human resources problem in enterprises. SOEs bear social responsibilities, therefore staff cannot be dismissed.

> "The fatal problem of SOE is employees are the owners of the enterprises. You can't fire them. No matter whether they work well or badly, they are just switched to another post or have their salaries reduced. It's not like in foreign or private enterprises where I can fire them whenever necessary… You can't understand a harmonious society. Including the staff, the productivity is so low and there are so many employees in SOEs. Why don't you fire them? If they did this, they wouldn't have any jobs. Society would become unstable. All the SOEs bear social responsibilities; in foreign enterprises, this can't be understood." (N5 Manager IT)

Thus, the employees cannot be dismissed because SOEs are responsible for social stability and a "harmonious society". Under this situation, there is a lack of necessary staff changes in enterprises and the qualities of employees are problematic. A number of interviewees mentioned their concerns regarding the human resources for IS use:

> "Not just in our branch, in the whole corporation, the employees are still the same ones that were here more than 20 years ago." (N7 Manager IT)

> "ERP implementation is actually not a small investment, I think. No matter what hardware, such as computers, the key point is the requirements of software. It means the staff should be skilful. Not necessarily major in IS, our qualities are higher than manufacturing staff. But most of us are at similar ages. For example, I am around 40 years old, and am regarded as a young person. The burden of workers in SOEs has been too heavy in recent years." (N6 Manager IT)

This comment explains that, since SOEs cannot dismiss any employees, the staff demographic ages. However, along with the technology and enterprise developments, the human resources requirements have changed in the past several years. IS implementation requires more skilful staff. When enterprises cannot change their staff, it indicates a lot of training is needed and the current employees need to learn a lot in order to improve their skills. But based on the SOE characteristics, employees in SOEs have lower motivation to learn.

> "In SOEs, the enthusiasm of staff is not like staff in private enterprises. Although we have been told repeatedly to restrict our behaviour according to market rules some have stayed in SOEs for a long time. You are the owner and I am also the owner." (N5 Manager IT)

> "Normally, many staff are not willing to learn, thus are not familiar with the systems. In addition, it depends on the enthusiasm of staff, and management ideas. They are used to higher levels of work, and lack motivation to find out the problems themselves." (N14 Manager Function)

As shown in the quotations, there is a thought that employees are also the owners of the enterprises, and they are not afraid of being dismissed, so the enthusiasm for learning is lower. Furthermore, as traditional management ideas are common in SOEs, people work according to the requirements given from above. There is a lack of self-motivation to make improvements. In addition, the current situation in the enterprises also has negative impacts on IS operations improvement.

> "The company now is in a very difficult situation indeed. Our salaries are not high, thus our motivation is low." (N14 Manager Function)

As reflected here, the business situations of enterprises are not strong, which results in relatively lower salaries, influencing the motivations of staff further.

5.7.2.3 Lack of unified IS operations manual

The lack of a unified IS operations manual in the enterprises is a further reason for the low capabilities of IS operations.

> "If you can appeal to the software provider when they launch the software in China, they should produce it according to Chinese characteristics. Make some things like textbooks, standard, configuration, introduction, or help. For example, help in Excel is very strong, from Microsoft... I look at the help, no need of others to tell me. I learn it myself. But this software, I can't understand. It is translated from German to English and then to Chinese. Some translations are not in line with China's national conditions." (N20 Manager Function)

> "Now actually what I just talked about is I want to make an operations manual from our financial systems in our branch… tell you what you must obey when you operate. Secondly, when any new members of staff take up their posts, they immediately knew how to operate using the manual." (N14 Manager Function)

As reflected in the quotations, people required two types of operations manual in the enterprise. Firstly, they needed a manual for the basic operations, which comply with Chinese characteristics. Secondly, they needed a detailed manual for each post to standardize their operations. Lack of such manuals is also a barrier for staff to improve their operational skills.

5.7.3 Consequences of low operational capabilities of staff

Some people were unable to operate the IS well; some useful information was also missing, which influenced their further management activities. Furthermore, some inconvenience was caused when there are frequent organizational changes.

5.7.3.1 Poor management information

As discussed in the previous section, there was a lack of standardized operations; therefore, some information was entered into the systems while some was not, which created problems in relation to further information created and resulted in useful information being missed.

> "This information is very useful but our people are used to the traditional ways that make a set of things outside the systems. This manual work can also fulfil the requirements. Now there is no need to deal with these things manually any more. As long as you input all the information, it will be created automatically in the systems. But because it referred to many departments, if there was one department that was not doing this, I couldn't get this information in the systems. So they would think about why I needed to do this, and the financial department would help me export it anyway. We had to make a set of instructions manually for them." (N14 Manager Function)

As we can see, there was no regulation to standardize the information input into the systems. For some types of information, when not all the departments uploaded their data, it was not further created in the systems. "The final data collected does not match with the reality" (N14 Manager Function). Finally more work was needed to manually obtain the information. Not only was important information missing in the systems but it also wasted time and resources.

5.7.3.2 Poor organizational dynamic capabilities

As mentioned in the previous section, there have been frequent reforms in the enterprises in recent years; thus there have been consequent frequent staff mobility issues. The low operational capabilities of staff also cause problems when there are a lot of position changes.

> "Now there are too frequent staff changes. Previously, people who were originally trained on the systems may have left, so people who know… the systems are lacking." (N20 Manager Function)

> "Currently there are many staff changes… because the enterprises reform frequently, so people frequently compete to be employed. For IS implementation, the easier the operations are, the better the enterprise is. The more complicated the operations are, the more likely it is for something to go wrong." (N15 Operation Function)

As reflected in the quotations above, the operational capacities were not equal among all staff. When people who "learnt the systems originally" changed their jobs, new staff or reallocated staff lacked the relevant skills. Furthermore, since staff were not skilful enough to carry out the operations, it was claimed that the operations should have been easier to facilitate in the enterprise business. It is perceived that the low capabilities of operational staff increased the risks in IS use and may have caused problems for the business operations.

5.7.4 Section summary

This section discusses the misalignment situation resulting from the low IS operational capabilities of staff. The quality of staff in the SOEs is not very high, since SOEs are not able to dismiss them. The enthusiasm of staff is relatively low under this situation. IS also lacks a unified manual to standardize the operations. Furthermore, there is not enough training. As a result, the operational capabilities of staff are low. This operational problem causes useful information to be missed and has brought problems to the organizational reforms.

5.8 Summary

Chapter 5 has presented the main research findings of the study. The core theory that has emerged is of IS strategic misalignment in Chinese SOEs. Five main categories were subsumed to the central theory including the low importance given to IS strategy, insufficient support by management in IS, IS not supporting core business

units well, misalignment of systems operations and business processes, and low IS operational capabilities of staff, with further discussion of the causes and consequences of these misalignment situation. Furthermore, there are six main categories, including 32 causes and five main categories including 13 consequences that emerged from the data analysis. A concept map is used to show the relationships among these misalignment situations, causes and consequences. Compared to the proposed IS strategic alignment model, the low importance given to IS strategy refers to strategic level misalignment; insufficient support by management in IS refers to structural level misalignment; IS not supporting core business unit well, misalignment of systems operations and business processes and low IS operational capabilities of staff refers to operational level misalignment. Six main categories of causes and five main categories of consequences are related to all these misalignment situations in the different levels. A further discussion of the links among misalignment situations, causes and consequences is carried out in Chapter 6 that follows.

Chapter 6 Discussion and conclusions

Chapter 5 presented the research findings and discussed the misalignment situations as well as the causes and consequences related to them. Chapter 6 discusses the causes and consequences identified in the findings and compares them to the influencing factors identified in the literature. Furthermore, based on the discussions, a strategic alignment process model related to the influencing factors is proposed. This model is then compared with the existing models. Moreover, based on the discussion of the findings, contributions and limitations of this research are further investigated. Finally, opportunities for further research and investigation are explored.

6.1 Summary of findings

The current research project has identified a low level of business-IT alignment in Chinese SOEs. Five main categories emerged which showed the current IS strategic misalignment situation in the strategic, structural and operational levels. More specifically, IS strategy is disregarded and not implemented well, which shows the misalignment in the strategic level. In the structural level, there is insufficient IS support to management. In the operational level, IS are not supporting core business units well in the branches. In addition, the operational level misalignment is also reflected in the situations of misalignment between systems operation and business processes; the low IS operational capabilities of staff in the company was also noted.

Low importance given to IS strategy: the research findings reveal the disregard of IS strategy and poor IS strategy implementation in the branches. To be specific, this situation reflects the non-awareness of IS strategy and lack of IS strategy implementation in the branches from two perspectives. People from both the operational level and the managerial level are not aware of the IS strategy content. The IS implementation is decided based on the business needs.

Insufficient IS support to management: the data collection reveals this situation from two aspects: the IS applications do not fulfil all the management requirements and

managers' problematic IS use. The current IS applications provide insufficient support to strategic level management, decision making and analysis, as well as management reporting. Managers are not willing to operate the systems and obtain the information in the traditional way.

IS are not supporting core business processes well in the branches: the data analysis identified weak connections between automatic control systems and management IS, which is revealed from the situations where information collected during production processes still requires manual work, as well as manually inputting production information into the management IS. The data analysis also identified ERP is not used well in the manufacturing units including poor materials management and poor inventory control.

Misalignment of operations systems and business processes: as shown in the findings, systems operations do not match with the business processes and structure and lack functions in the systems, which reflects the operational level misalignment.

Low IS operational capabilities of staff: the data collection shows the low IS operational capabilities of staff in four perspectives. The IS operational skills of staff are poor and this is partly attributed to a lack of standardized IS operations. Staff in the enterprises carry out unnecessary work due to lack of confidence in IS use. Furthermore, there is an imbalance of IS operational capabilities among departments in the current situation.

This research project identified six main categories explaining the causes of the IS strategic misalignment situation, including IS issues, organizational structure, managers' negative attitudes to IS use, business people's poor understanding of IS, training problems and environmental factors. These factors negatively influence the IS strategic alignment in the different levels.

IS issues: the research findings point out the non-strategic role of IS/IT, low IS/IT flexibility, IS use motivation, and IT governance problems negatively influencing the IS strategic alignment in Chinese SOEs. The non-strategic role of IS/IT and low IS/IT flexibility reflects the problems of IS/IT resources in the case study company.

IT governance problems refer to the sharing authority of decision making and sharing of resources between business departments and IT departments. The IT unit structure is also concerned with IT governance problems in this study. All these IS issues influence the IS strategic alignment.

Organizational structure: the case company was constructed in a typical Chinese way. The main characteristics of the structure that influence the IS strategic alignment include the centralization, conflicts between headquarters and branches, low level of formalization and diversity of the branches. These factors influence the IS strategic alignment in different levels.

Managers' negative attitudes to IS use: the research findings reveal that the managers in the case company are used to the traditional management ways. Furthermore, shortcut thinking and personal contacts influence the decision making of managers. Managers have few rights after using IS, which makes them even more resistant to the IS use. The weak support of managers to IS also negatively influences the IS strategic alignment situation.

Business people's poor understanding of IS: the research findings point out business people do not understand IS development in the case company, which leads to the IS strategic alignment in the operational level. Business managers' poor understanding of IS use further influences the managers' IS use.

Training problems: research findings reveal the training problems in the case company. It is found there is not enough training to improve the IS operational capabilities of staff. Especially, training for new staff and key users is problematic.

Environmental influences: research findings point out three environmental issues that influence the IS strategic alignment in the case company. The current enterprise situation concerns the poor business performance, poor production equipment and IT infrastructure, and frequent reforms in the company. It is also found that technology support to IS development in production is not sufficient in the company. Especially, some characteristics of SOE negatively influence the IS strategic alignment,

including less consideration on sales, the social responsibility burden and the lower enthusiasm of staff in the company.

As the consequences of IS strategic alignment, the research findings identified five main categories, including: inability to realize the IS/IT value; not seeking IS capabilities sustainably; problematic IS application portfolio; low IS business value; and low dynamic organizational capabilities. These consequences show the severe IS implementation, IS management and IS strategic alignment problems and further indicate the influence of IS strategic alignment on organizational capabilities.

Inability to realize strategic values of IS/IT investment: poor IS strategic alignment negatively influences staff and managers to realize the strategic value of IS/IT investment in the company. Furthermore, the support of managers to IS is weak.

Problematic IS application portfolio: the current poor IS strategic alignment situation results in a problematic IS application portfolio at a basic level. It is reflected in the findings that developed systems are disregarded and the phenomenon of islands of automation exists in the branches.

Low IS business value: the research findings reveal that poor IS strategic alignment negatively influences the IS business value. To be specific, there are four perspectives of low IS business value identified in this study. IS do not contribute to competitive advantages; IS contribution to operational effectiveness is low; IS do not regularize and integrate the business process and information transformation through all the business processes. Finally, at a basic level, the management information is not sufficient.

Not seeking IS capability sustainably: it is found in the study that the importance of IS/IT and the IT department are dependent on the business situation. They are not considered as essential to create effective IS capabilities and further enhance competitive advantage under the low level IS strategic alignment situation.

Poor organizational dynamic capabilities: poor IS strategic alignment has negative impact on the organizational dynamic capabilities. It is shown in the findings that

higher level IS strategic alignment could increase the organizational capability to respond to the changing environment.

These causes and consequences are related to the misalignment situations in the operational, structural and strategic levels. It is found that some influencing factors impact the alignment in different ways in the Chinese SOE context compared to the existing literature. Furthermore, these findings imply the understanding of how IS/IT contribute to the strategic values during the alignment processes.

To summarise, as the result of data analysis, five main categories are saturated in identifying the misalignment situations. Furthermore, six main categories and five main categories are saturated respectively in explaining the causes and consequences of these misalignment situations. In this section, these misalignment situations, causes and consequences are further integrated and discussed.

6.2 Discussion of findings

6.2.1 Discussion of causes and consequences of misalignment

Chapter 5 presented five main identified misalignment situations, including low importance given to IS strategy, insufficient support to management IS, IS are not supporting the core business process well in the branches, misalign of systems operations and business processes, and low IS operational capabilities of staff. Based on the proposed strategic alignment model, and concerning the identified misalignment situation, the low importance given to IS strategy refers to the strategic level misalignment; insufficient IS support to management refers to the structural level misalignment; IS not supporting the core business process well, the misalignment of systems operations and business processes, and low IS operational capabilities of staff refers to the operational level misalignment. This section discusses the linkages of causes and misalignment situations. A summary of these linkages is shown in table 6.1 (the IDs shown in the table stand for the causes or misalignment, which are explained in tables 6.2 and 6.3).

	C1				C2				C3		C4		C5		C6		
	C1.1	C1.2	C1.3	C1.4	C2.1	C2.2	C2.3	C2.4	C3.1	C3.2	C4.1	C4.2	C5.1	C5.2	C6.1	C6.2	C6.3
M1	X	X				X											
M2		X	X		X	X	X		X			X					
M3				X				X		X					X	X	X
M4		X	X								X				X		
M5							X						X	X			X

Table 6.1 Causes and misalignment matrix of IS strategic misalignment

ID	Misalignment situations
M1	Low importance given to IS strategy
M2	Insufficient support to management in IS
M3	IS do not support core business units well in branches
M4	Misalignment of systems operations and business processes
M5	Low IS operational capabilities of staff

Table 6.2 Misalignment situations

ID	Causes of misalignment
C1	IS issues
C1.1	Non-strategic role of IS/IT
C1.2	IT governance problems
C1.3	Low IS/IT flexibility
C1.4	IS use motivation
C2	Organisational structure
C2.1	Centralization
C2.2	Conflicts between headquarters and branches
C2.3	Low level of formalization
C2.4	Diversity of branches
C3	Managers' negative attitudes to IS use
C3.1	Managers' resistance of IS use
C3.2	Weak support of managers
C4	Business people's poor understanding of IS
C4.1	Business people do not understand IS development
C4.2	Business managers' poor understanding of IS use
C5	Training problems
C5.1	Not enough training
C5.2	Problematic training for new staff and key users
C6	Environmental influences
C6.1	Current enterprises situation
C6.2	Lack of technological support
C6.3	Special characteristic of SOE

Table 6.3 Causes of misalignment

There are five main categories identified as consequences of IS strategic misalignment in the study, including: inability to realize the strategic value of IS/IT investment; not seeking IS capabilities sustainably; problematic IS application portfolio; low IS business values; and poor organizational dynamics capabilities.

Their linkages to the misalignment situations are shown in table 6.4; the IDs shown in the table stand for the causes or misalignment, which are explained in tables 6.2 and 6.5.

	R1			R2		R3		R4				R5
	R1.1	R1.2	R1.3	R2.1	R2.2	R3.1	R3.2	R4.1	R4.2	R4.3	R4.4	
M1	x					x	x					
M2		x	x									
M3				x	x			x				
M4									x	x		
M5										x		x

Table 6.4 Consequences and misalignment matrix of IS strategic misalignment

ID	Consequences of misalignment
R1	Inability to realize strategic values of IS/IT investment
R1.1	Functional people do not realize strategic value of IS/IT
R1.2	Managers do not realize strategic values of IS/IT investment
R1.3	Weak support of managers to IS
R2	Not seeking IS capabilities sustainably
R2.1	The importance of IS/IT depends on the business situation
R2.2	The importance of IT department depends on business situation
R3	Problematic IS application portfolio
R3.1	Developed systems are disregarded
R3.2	Islands of automation in branches
R4	Low IS business value
R4.1	ISs do not contribute to the competitive advantages
R4.2	Low IS contribution to operation effectiveness
R4.3	ISs do not integrate the business process and information transformation
R4.4	Poor management information
R5	Poor organizational dynamic capabilities

Table 6.5 Consequences of misalignment

When IS/IT is not playing a strategic role, IS/IT is seen as the "cost of doing business" rather than a strategic investment as a source of competitive advantage (Mohdzain and Ward, 2007; Herderson and Venkatraman 1993). This study further confirms the cause and consequence link between IS/IT not being in a strategic position which leads to the inability to realize the IS/IT investment value. Furthermore, researchers suggest that IT investment returns rely on the system's strategic role (Floyd and Wooldridge, 1990). The positive impacts of IT investments on companies' performance are only expected when IT is used in the strategic level (Chao and Chandra, 2012; Floyd and Wooldridge, 1990). The categories identified in the organizational structure include centralization, formalization and IS structure. As shown in table 6.1, the organizational structure problems cause misalignment in all three levels. Research findings identify a centralized IS structure in the case SOE

group while the current organizational structure is decentralization. The centralized IS structure influences the IS strategy implementation in the branches, which further results in the inability to realize the IS/IT investment values and problematic application portfolios in the branches. Furthermore, the centralized IS structure decreases the enthusiasm and responsibilities of IT staff in the branches, which negatively influences the IS support to management requirements as well as IS management and planning in the branches leading to low IS contribution to management effectiveness and non-regularized business processes in the branches. It is found that misalignment between organizational structure and IS structure causes all levels of IS strategic misalignment, and further results in severe IS use problems in the branches. Firstly, managers and staff in the branches are not able to realize the IS/IT investment values. Secondly, the IS application portfolio is not decided based on overall planning resulting in wasting of resources. Thirdly, IS capabilities in the branches are negatively influenced including low IS contribution to management effectiveness and business process change. The low level of formalization impedes the standardized management activities and standardized IS operations, which cause the structural and operational levels misalignment that result in the low IS contribution to management effectiveness, poor management information and low organizational dynamic capabilities. This indicates that for IS to contributes to management improvement requires the formalization of the organization to some extent. Furthermore, the formalization of the organization would facilitate the organizational dynamic capabilities.

Low IT flexibility causes the IS strategic misalignment in the structural and operational levels when there are organizational structure and business process changes. In this study, low IT flexibility has no impact on the strategic level misalignment. However, in the structural and operational levels, low IT flexibility results in delay when IS applications change to reflect business changes. When there are organizational structure and business process changes in the organization, low IT flexibility leads to low IS contribution to management effectiveness and non-regularized business processes.

Internal environmental factors influence the operational level alignment. In this study, some internal environmental factors negatively influence the IS support to the

core business process and the IS operational capabilities of staff. To be specific, poor business performance, out-dated business equipment and insufficient technology support prohibit the IS development to support the core business process, which results in a low IS contribution to competitive advantage through not seeking IS capabilities sustainably. Poor business performance itself is not able to cause IS strategic misalignment at the operational level. Strategic level misalignment causes the situation where staff and managers are not able to realize the IS/IT investment value. Together with the factors of managers' poor understanding of IS use and weak support to IS, poor business performance causes the operational level misalignment and further results in a low IS contribution to competitive advantages through not seeking IS capabilities sustainably. Moreover, out-dated business equipment and insufficient technology support for these hardware issues also influence the organizations' attention to seek IS capabilities and IS contribution to gain competitive advantages.

Managers' issues including managers' negative attitudes to IS and poor understanding of IS causes the IS strategic misalignment in the structural and operational levels, which further results in a low IS contribution to management effectiveness and competitive advantages through not seeking IS capabilities sustainably. Managers' attitude and understanding of IS influence how IS contribute to the management effectiveness. Considering the large amount of literature that argues the IS capacities to support management and the impact of management effectiveness on business performance, it is important to promote managers' perception of IS. Managers' positive attitude and better knowledge of IS will improve the IS contribution to IS and assist the organization to seek IS capabilities.

6.2.2 Previous theoretical propositions confirmed by this research

The findings have identified six main categories including 32 causes and five main categories including 13 consequences of IS strategic misalignment in the case enterprises. It was found that some of these causes and consequences from a Chinese SOE context have confirmed the findings of previous studies. It means there are some common influencing factors identified in this study. The common causes

identified include: non-strategic role of IS/IT; insufficient sharing of authority in the IT department; low level of IT flexibility; and low level of formalization. The common consequences identified include: the inability to realize the strategic value of IS/IT investment; and low IS contribution to operational effectiveness and business process integration.

The cause of the non-strategic role of IS/IT identified in this research confirms the studies' findings. The fact that IS/IT is not in a strategic position shows the corporate company is still holding the traditional view that IS/IT is a kind of support function or utility. As shown in the findings, IS/IT are considered as services to production or tools for improving management. Herderson and Venkatraman (1993) argue that strategic alignment requires a fundamental change in thinking about the role of IT, to leverage IT from its traditional supportive role to a strategic role. In this study, when IS/IT are not playing a strategic role, the IS strategy is ignored; therefore the support of IS/IT and IS strategy to business strategy is weak, which results in the IS strategic misalignment. Top management commitment to the strategic use of IT is considered as the major factor that influences the alignment of business and IS plans (Teo and Ang, 1999). Tallen and Kraemer (2003) argue that strategic alignment may be less emphasized when IT is seen in a non-strategic role. This study further confirms that non-strategic use of IS/IT is one of the causes of IS strategic misalignment.

In terms of the perspective of sharing authority between the IT department and the business department, as has been presented in the findings of the study, the IT department in both the branches and headquarters is considered as service department without sufficient resources, decision making rights and organizational strategic management responsibilities, which results in the strategic misalignment. This point is consistent with the findings from Luftman *et al*. (1999), who argued that defining and supporting effective IT governance processes is one of the considerations in the second most important business-IT alignment enablers. Much of the literature has confirmed the business-IT partnership, with communication and sharing knowledge between business and IT executives as the antecedents of strategic alignment (Chan *et al*., 2006; Reich and Benbasat, 2000; Luftman *et al*., 1999). The fundamentals of equal communications between business and IT executives or departments are that they are of the same importance in the

organization. When the IT department is considered as a service department or even a technical support department without organizational strategic management responsibilities, it is not taken as seriously as the main business units and thus lacks a bureaucratic basis for equal communications or cooperation. Furthermore, as a corporate company consists of headquarters and branches, if the IT department in headquarters is in a support position and has insufficient responsibilities for organizational strategic management, it may negatively influence the attention paid to IS strategy made in headquarters and IS strategy implementation in the branches. As the findings of this study show, IS strategy is being ignored in the branches, which is the cause of the strategic level misalignment.

IT flexibility is defined as "the extent to which key IT resources can scale and adapt for different purpose" (Tallon and Pinsonneault, 2011; Byrd and Turner 2000). It is argued in the literature that one dimension of IT flexibility is modularity, which means the ability to easily reconfigure the technology components (Duncan, 1995; Chung, 2003). The deferred IS changing in the branches shows the low IT flexibility, which results in the misalignment. This finding in the study is consistent with prior research, which has confirmed the positive correlation between IT flexibility and strategic alignment (Ness, 2005; Tallon, 2003; Chung, 2003). Furthermore, it is also argued that increased IT flexibility can enable the strategic alignment and create a dynamic state of strategic alignment (Ness, 2005; Tallon, 2003). IT strategy needs to be tightly aligned with organizational strategy in order to facilitate the organizational responses to dynamic environments, which requires the IT flexibility (Chung, 2003). In this research, the deferred IS application change when business strategy and organizational change occurs causes the strategic misalignment both in the structural and operational levels. When there are business strategy and organizational changes, the management activities and business processes are different. IS applications are not flexible enough to change in parallel with these to fulfil the new requirements, which results in both structural and operational level strategic misalignment. In the structural level, a low IT flexibility leads to insufficient IS support to management when business strategy and management hierarchies change in headquarters and the branches. In the operational level, low IT flexibility results in misalignment of business processes and systems operations when there is organizational change. To summarise, IT flexibility is an important factor that influences the IS strategic

alignment in a changing environment. This study found that low IT flexibility causes the IS strategic misalignment.

The low level of formalization results in the IS strategic misalignment in the study. Formalization concerns the extent to which the organization uses written rules and procedures to prescribe actions of employees (Gibson, 2000; Fredrickson, 1986). Yayla and Hu (2009) found the positive effects of IS formalization on the connection between business and IS planning. In this study, the management procedures are not formalized; management activities are too flexible for the stable and strict IS processes, which results in the structural level IS strategic misalignment of insufficient IS support to management. In addition, there is the lack of a unified IS operations manual in the case company, which negatively influences the improvement of staff's IS operational capabilities and unified information transformation. More formalized organizations have more standardized procedures (Yayla and Hu, 2009), which facilitate the systems operations. Moreover, it is argued that a more formally outlined business strategy is easier and more effective to be integrated with IT strategy. Formalization would increase direct interaction and information sharing among executives which will enable IS strategic alignment (Yayla and Hu, 2009). Consistent with the prior literature, this study found that the low level of formalization results in IS strategic misalignment. Mehta and Hirschheim (2007) argued for higher centralization facilitates standardization of IS-enabled business processes. Furthermore they pointed out that IT-enabled standardization can be used to make sure that business processes are standardized based on one set of business rules. Standardization improves the efficiency of management practices and therefore leads to greater economies of scale.

Training problems also result in IS strategic misalignment. Henderson and Venkatraman (1993) argued that IS skills are one of the components of the strategic alignment model. To be specific, they point out the training of the knowledge and capabilities of the individuals to manage and operate the IS effectively is concerned with IS skills. Caker and Siverbo (2014) pointed out training processes may assist companies to build and sustain shared values and beliefs that keep the behaviour aligned with the strategy. This study found that problematic training has negative

impacts on the IS operational capacities of staff, which result in the IS strategic misalignment in the operational level.

Herderson and Venkatraman (1993) also argued that inability to realize the IT investment value is partly because of lack of alignment between business and IT strategies. Furthermore, low importance given to IS strategy leads to a problematic IS application portfolio. To be specific, when IS strategy is disregarded in the enterprise, some developed systems are not implemented well in the organization. In addition, the islands of automation phenomenon exists in the branches. Ward and Peppard (2002) summarise the severe consequences of not having an IS/IT strategy which includes systems which are not integrated and thus may further implicate inaccuracy and incoherent information resources, as well as duplication of effort. To summarise, this study found that poor IS strategy implementation leads to the inability to realize IS/IT investment strategic values and a problematic IS application portfolio, which is supported in the prior research.

Misalignment between business processes and systems operations leads to the consequence of low IS contribution to operational effectiveness, as well as the consequence that IS do not regularize and integrate the business process and information transformation through all the business processes. Chan *et al.,* (1997) confirmed the impact of IS strategic alignment on IS contribution to operational efficiency. Velcu (2007) argued that business process changes resulting from successful ERP implementation consist of streamlined processes and modified work processes, which further lead to internal process efficiency including improved management of cost centres, improvement in accounts receivable management and so on (Velcu, 2010). Furthermore, Velcu (2010) argued the alignment between ERP strategy and business strategy is considered as one of the determinant factors for the success of ERP implementation. This strategic alignment is positively associated with ERP project management which in turn is positively related to ERP induced business process changes and further influences the ERP internal process efficiency benefits (Velcu, 2010). To be consistent with the prior research, in this study it is found that misalignment between business processes and systems operations results in less efficient work and non-integrated business process and information transformation across the organization. Furthermore, as one type of IS business value,

the contribution of IS use to business process is considered to be connected with business performance in the literature. Powell and Dent-Micallef (1997) argued that IT produces sustainable performance advantages complementary with business resources. To further explain the business resources, they stated that process redesign means that to re-evaluate, reorient, and structure the traditional activities along the process lines is included in the `business resources. This argument indicates that IT contributes to business performance through combining closely with business processes. Dehning and Richardson (2002) propose a model to guide further research on IT investments evaluation. Based on this framework, the future research opportunities include the relationships between IT and business processes and their impacts on company performance.

To summarise, among 32 causes and 13 consequences identified in the study, there are 9 causes and 5 consequences confirming the study's significance. It shows that, in the special Chinese SOE context, there are some general management and organisational issues caused by IS strategic misalignment compared to other different contexts. More attention should be paid to these issues to improve IS strategic alignment and to further promote business performance.

6.2.3 New aspects brought to light by this research

Findings that emerged from data collection presented six main categories including 32 causes and five main categories including 13 consequences of IS strategic misalignment in the case enterprise. 23 out of 32 causes and 8 out of 13 consequences are found to be new factors causing or caused by IS strategic misalignment.

IT governance problems lead to a strategic misalignment in the study. As can be seen later in figure 6.1, IT governance problems result in all levels of misalignment, which indicates that IT governance problems are important to strategic misalignment. To be specific, IT governance problems cause low importance being given to IS strategy in the strategic level misalignment, insufficient IS support to management in the structural level misalignment, and misalignment of systems operations and

business processes in the operational level misalignment. Findings emerging from the data collected identified the concept of IT governance in a clearer and more comprehensive way compared to other research. Some of the studies consider that IT governance insists on leadership, organizational structure and processes to ensure the IT supports and extends the organization's strategy (Haes and Grembergen, 2008). Luftman *et al.* (1999) considers IT governance as a way of sharing authority for resources, risk and responsibility for IT among business partners, IT management, and service providers. In this study, IT governance is concerned with two issues as identified in the findings. Firstly, it is concerned with sharing the authority for resources, decision making rights and organizational strategic management responsibilities between the IT department and business departments, which is similar to the description of IT governance from Luftman *et al.* (1999). The second issue addressed is the responsibilities of IS management and IS decision making division between the IT department in headquarters and the branches, which is identified as the IT unit structure or IS structure in prior research (Yayla and Hu, 2009; Sabherwal *et al*., 2006; Brown and Magill, 1994). It is argued that when the responsibilities of IS management and decision making are taken in a corporate level or central unit, it is called centralization or the centralized governance mode (Yayla and Hu, 2009; Brown and Magill, 1994). In a decentralized governance structure, IS management and decision making responsibilities belong to a business unit or department and divisional managers bear authority (Yayla and Hu, 2009; Brown and Magill, 1994). Researchers consider IS structure and IT unit structure as organisational structural issues. However, the centralization of the IS structure may not be consistent with the organisational structure. Furthermore, considering IS structure issues from an IT governance perspective draws more attention and systematic thinking when managers make decisions on IT.

In the case of the Chinese SOE, the responsibilities for IS management are mainly with headquarters, which is considered as centralized IS management. In terms of centralized IS management, its impacts on IS strategic alignment are not consistent with some prior research. Some researchers argue that centralization of IS decision making facilitates a more strategic role for IT (Brown and Magill, 1994), which will enable strategic alignment. However, other researchers find insignificant effects of IS centralization on the drivers of alignment (Yayla and Hu, 2009; Chan *et al.,* 2006).

It is reflected in this study that centralized IS management causes the IS strategic misalignment. The centralized IS management in the corporate company studied has negative impacts on IS strategy implementation in the branches, which is influenced by having very few IS management responsibilities in the IT departments in the branches. Furthermore, when functional departments have difficulties with IS use, the services provided by the IT departments in the branches are very limited. As shown in the findings, the IT departments can only provide technical support to the branches.

The quality of services provided by the IT department influences the users' perception of the IT department (Teo and Ang, 1999). The IT department providing efficient and reliable services to user departments is one of the critical success factors of the alignment of business and ARE plans (Teo and Ang, 1999). Not only does it becomes more difficult for user departments to formulate and share business strategy with the IT department when they have a poor perception of the IT department (Teo and Ang, 1999), but also it is found in this study that it will influence the knowledge and implementation of IS strategy in the company. Therefore, IS centralized management results in the low importance given to IS strategy in the branches, which is the strategic level misalignment. Mohdzain and Ward (2007) argue that more decentralization of IS planning in companies leads to greater alignment between IS and business strategies. On the other hand, Mohdzain and Ward (2007) found that centralized IS planning reduces the levels of subsidiary initiatives and knowledge transfer. Furthermore, the degree of centralisation is inversely correlated to the level of satisfaction with IS in subsidiaries.

As compared to the IS planning stage, in this study centralized IS management not only leads to less involvement of executives in the branches in IS strategy implementation but also less awareness of them to implement IS strategy in the strategy implementation stage, which results in the structural and operational level misalignment. As shown in the findings, IS support to management is insufficient, and the operational systems and business processes are not aligned. To summarise, the results of the impact of IS centralized management on IS strategic alignment are not identical to the prior research. This found that IS centralized management may enable (Brown and Magill, 1994), inhibit (Mohdzain and Ward, 2007) or have no

effect (Yayla and Hu, 2009; Chan *et al.,* 2006) on IS strategic alignment. In this study, it is found that in corporations with headquarters and geographically dispersed branches, IS centralized management causes IS strategic misalignment. Luftman and Kempaiah (2007) proposed a federated IT structure, which means some parts of IT are centralized such as the IT infrastructure while other parts are decentralized such as IS application resources specific to the business units. Furthermore, they found that organizations with a federated IT structure had higher alignment maturity than those with decentralized or centralized IT structure, based on the maturity alignment model they produced, which was discussed in the literature review.

The characteristics of organizational structure in the case company are influenced to some extent by the way it was constructed in 2001, as presented in the findings: "branches existed first and then the Aluminium Corporation of China was built" (N33 Manager IT). Although there is prior research considering the relationships between IT unit structure and IS strategic alignment (Yayla and Hu, 2009; Luftman and Kempaiah, 2007; Mohdzain and Ward, 2007; Chan *et al.,* 2006; Brown and Magill, 1994), research on the impact of organizational structure on strategic alignment is rare. In this study, there are four issues that influence the IS strategic alignment addressed in terms of organizational structure, including centralization, conflicts between headquarters and branches, the diversity of branches, and low level of formalization.

Both centralization and decentralization have their own advantages and disadvantages. It is argued that economies of scale, standardized control and organizational integration are acquired through centralization, while the advantages of decentralization include greater local control and ownership of resources, greater influence of local information on decision making, and better responsiveness to subsidiaries' or business units' needs (Caker and Siverbo, 2014; Mehta and Hirschheim, 2007; Mohdzain and Ward, 2007; Brown and Magill, 1994). In prior research, it is found that strategic alignment could suffer from decentralization (Caker and Siverbo; 2014), while centralization facilitates the communications among decision makers, which enables IS strategic alignment (Yayla and Hu, 2009). The findings in this study, which claim centralization results in the IS strategic misalignment, seem contradictory with the prior studies. However, it is inferred that

centralization improves IS strategic alignment in the corporate level rather than in the branch level. Yayla and Hu (2009) argued that divisional managers focus more on their own objectives rather than the central objectives in decentralization; therefore centralizing decision making will enable the IS strategic alignment. In the study case company, IS strategic alignment should not mainly focus on the corporate level because of two aspects of the situation. Firstly, in the case company, the branches existed first and then merged to form one corporate. "There are only several hundreds of employees in headquarters" (N40 Manager IT H), but 110,000 employees in the whole corporation in 2010. Secondly, as the main business processes, all the production activities are in the branches. Headquarters are just in charge of management. Therefore, the IS strategic alignment in this typical type of SOE should focus more on the branches than on headquarters. Mohdzain and Ward (2007) found that when organizations in centralized mode focused on achieving economies of scale for IT, IS planning is largely dominated by the corporate level and little IS planning is undertaken at the subsidiary level. However, in the case SOE, the role of the branches should be emphasized. The special organisational structure of the case company causes the centralization influence of the IS strategic alignment to work in the opposite way.

On the other hand, strategic control is used instead of centralization in the current situation; as was discussed in section 5.1.2, all the branches self-manage the business and they need to face the market and competition. The impact of centralization on IS strategic alignment should be considered with two other factors, IS use motivation and low IT flexibility. In the case company, the main IS used are planned when organizations are in centralized mode and the IS are implemented to support centralized management in headquarters. Furthermore, IS implementation mainly considers the requirements of headquarters but ignores the objectives and business needs in the branches, which results in the IS strategic misalignment. Moreover, as has been discussed above, the IS unit structure in the case company is centralized while the organizational structure is decentralized, which is called strategic control from the data collected. Prior studies found that companies with centralized corporate governance tend to use a centralized IS unit structure while decentralized corporate governance is aligned with decentralized IS unit structure (Sambamurthy and Zmud, 1999; Brown and Magill, 1994). Misalignment between organizational

structures and IS unit structure negatively influenced the IS strategic alignment in this study.

The conflicts between headquarters and the branches cause the IS strategic misalignment both in the strategic and structural levels. In this study, there are two main issues addressed in the conflicts between headquarters and the branches. Firstly, poor communications between headquarters and the branches result in the strategic level misalignment. The IS strategy formulated in headquarters is not informed nor implemented well in the branches, which results in the low importance given to IS strategy in the branches. As shown in the findings, IT managers in the branches are not even aware of the new IS strategy formulated in headquarters. Therefore, the poor communication between headquarters and the branches causes IS strategic misalignment. Mehta and Hirschheim (2007) stated the extent to which geographic location in a corporate enterprise influences the IS reporting and decisions should be considered from the structural perspective when studying IS strategic alignment. This study points out that it is not about geographic location but rather the communication between headquarters and the branches that actually matters. Furthermore, different requirements between headquarters and the branches negatively influences the structural level IS strategic alignment. This is another unique organisational issue in the case SOE, which is caused through the organisational merger processes. The branches existed first and then the headquarters was created.

The diversity of the branches is also a characteristic of the organizational structure in the case company. Sambamurthy and Zmud (1999) argued a lack of harmony is often created when companies grow through mergers and acquisitions since they might discover the acquired units have different dependence on IT in their business strategies and value chain operations. However, after more than ten years, the post-merger SOE has not reached a harmonious situation. In this study, the diversity of IS development in the different branches creates the difficulties of manufacturing IS development in the corporate level, which results in operational level IS strategic misalignment. It is found in this study that homogeneous branches facilitate IS strategic alignment in the post-merger company.

Business people's poor understanding of IS and managers' negative attitudes to IS use causes the IS strategic misalignment in the study. The most influential research about the impact of mutual understanding between IS and business managers on IS strategic alignment is from Reich and Benbasat (2000, 1996). Reich and Benbasat (1996) define the social dimension of linkage between business and IT objectives as the business and IT executives' mutual understanding of business and IT plans, mission and objectives. Furthermore, it is pointed out the shared domain knowledge, which is defined as the ability of IT and business executives to understand each other's key processes, offers unique contributions and challenges at a deep level; also being able to participate in each other's key processes is a factor that influences the social dimension of linkage between business and IT objectives (Reich and Benbasat, 2000). To summarise, there are three major points from the view of Reich and Benbasat (2000, 1996) to explain the social dimension of linkages between business and IT strategies in IS strategic alignment, including: business and IT executives' mutual understanding of business and IT strategies; ability of business and IT executives to understand each other's key processes; contributions and challenges at a deep level; and participation of business and IT executives in each other's key processes. A number of studies confirm the influence of common understanding between business and IT executives of IS on the IS strategic alignment (Chao and Chandra, 2012; Preston and Karahanna, 2009; Campbell *et al.,* 2005; Chan *et. al,* 2006; Kearns and Sabherwal, 2006; Chan, 2002). Furthermore, the low level of common understanding between business and IT executives on the IS is recognized as a major obstacle to IS strategic alignment (Preston and Karahanna, 2009). This study further confirms that the business people's poor understanding of IS results in the IS strategic misalignment. However, there are three main differences.

Firstly, prior research emphasizes the importance of business and IT executives' understanding of each other's processes but does not pay attention to the point that business and IT executives should be able to participate in each other's process, as identified in the concept of shared domain knowledge (Reich and Benbasat, 2000). Even if some literature does point out the participation (Kearns and Sabherwal, 2006), it focuses on business and IT managers' participation in business and IT planning, which is a bit narrow. In this study, not only is the point of understanding confirmed, but also the participation of business managers in IT is identified as not

just about planning; the business managers need to be involved in the IS implementation processes. Managers' resistance to IS use results in IS strategic misalignment in this study. As shown in the findings, managers are not used to carrying out management activities with IS, which leads to the structural level IS strategic misalignment of insufficient IS support to management.

Secondly, the prior literature mainly focuses on the top business managers' understanding of IS (Chao and Chandra, 2012; Preston and Karahanna, 2009; Campbell *et al*., 2005; Chan *et al*., 2006; Kearns and Sabherwal, 2006; Chan, 2002). However, in this study, it is found that all levels of business managers and operational staff's understanding of IS influence the IS strategic alignment. As shown in the findings, managers' poor understanding of IS use leads to the IS strategic misalignment that IS are not supporting core business processes well. Business people's poor understanding of IS development leads to the IS strategic misalignment of business processes and systems operations. Similarly, Gutierrez *et al*. (2008) found that a number of research studies assessed alignment through modelling the organizations' strategies or through an instrument that considers top executives as the objective. They pointed out many IT projects were not successfully implemented even if they were planned and supported by the senior managers and more attentions should be paid to the implications of alignment across the organizational levels.

Thirdly, some previous research identified that business competence of the IS executives is more important than the IS competence of business executives (Teo and Ang, 1999; Teo and King, 1996). Armstrong and Sambamurthy (1996) even found there is no relationship between the IT knowledge of top management and the IT deployment extent in the firm. In this study the IS business competence of top management is not addressed while the IS competence of business managers is the main factor that influences IS strategic alignment. It is perceived the reason for this is that the lower levels of IS strategic alignment are emphasized in this study. Although not a lot of attention is paid to it, a few researchers have previously noted or investigated the importance of lower level IS strategic alignment (Chao and Chandra, 2012; Tallon, 2008). This is reasonable since all the business and IS strategy needs to be implemented in the lower levels of the organization. To

summarise, this study found that managers' negative attitude to IS use and business people's poor understanding of IS cause IS strategic misalignment.

This study also noted the environmental influences on the IS strategic alignment. Bergeron *et al.* (2004) argued that strategy is the force that aligns the organization with its environment in the strategic management perspective. Furthermore, they pointed out that when there are shifts in both the internal and external environments, changes must be assessed across business strategy, IT strategy, business structure and IT structure; they must also be inter-linked in order to decide on strategic choices and provide strategic opportunities, as well as responding to the changes in the environment. In this way, changes of environment influence the strategic alignment. Therefore, environmental uncertainty must be included in the domain of IS strategic alignment (Bergeron *et al*., 2004). Environmental factors include internal and external environmental factors. Internal environmental factors refer to the current enterprises' situation and special SOE characteristics. With a clear differentiation between IS and IT in the conceptual understanding of IS strategic alignment in this study, lack of IT support is concerned with both internal and external factors. IT support in the industry is considered as an external environment. The low level of IT adopted in the case company is considered as the result of internal environment influences. IT support in the industry is an external environmental factor that influences the IS strategic alignment. Identification of IT support as an influencing factor and classification of IT support into two different types of internal influencing factors and external influencing factors deepens the understanding of the IS strategic alignment concept developed from business-IT alignment. Burn and Szeto (2000) found significant differences of IS strategic alignment between industries. Furthermore, analysis revealed that IS strategic alignment is related to the nature of the industry and its reliance on IT (Burn and Szeto, 2000). In this study, it is found that the requirements of IT vary in different industries. The technical level inside the organization influences the IS strategic alignment. IT can be considered as either an internal environment factor or an external environmental factor. When organizations consider their IT position in the marketplace, it is the external factor that influences them. In this study, the low level of IT in the organization is not because of the technology capabilities in the market

but is caused by the out-dated IT used inside the organization. Therefore, it is considered as an internal environmental influencing factor.

In this study, in terms of the internal environment, the current enterprise's situation addresses three issues. Firstly, poor business performance is influencing IS investment capabilities in the organization. Secondly, poor production equipment and IT infrastructure is a barrier for further IS development. Both of these two environmental factors negatively influence the alignment between IS and the core business processes. Thirdly, frequent reforms in the organization caused the change of the business processes. The IS are not adapted to the frequent change of business processes, which results in misalignment of systems operations and business processes. Frequent reforms also lead to frequent staff mobility, which requires higher level IS operational capabilities from staff. Chan *et al.,* (2006) proposed a hypothesis that environmental uncertainty positively affects the IS strategic alignment in that managers are expected to invest more and rely more on IT in uncertain environments in order to increase information processing capabilities and relationships with customers and suppliers in organization. As the results of their empirical study show, the hypothesis is partly supported. The impact of an uncertain environment on IS strategic alignment is dependent on the organizational type as well as the business strategy adopted in the organization. In this study, frequent reforms cause IS strategic misalignment. In addition, it should be noted that special Chinese SOE characteristics also influence the IS strategic alignment.

This study found less consideration given to sales, the social responsibility of SOEs, and the lower enthusiasm of SOE staff as causes for the misalignment situation. These are special Chinese SOE features that negatively influence the IS strategic alignment. Some of the previous literature has investigated the outcomes of IS strategic alignment (Chan *et al.,* 2006; Kearns and Sabherwal, 2007; Kearns and Lederer, 2000). However, most of them focus on the direct relationships between IS strategic alignment and business performance on organizational success. They investigate how IT gives support to the business and business performance from internal and external perspectives (Rivard *et al*., 2006; Croteau and Raymond, 2004; Sabherwal and Chan 2001; Luftman *et al*., 1999). Few studies explore the impact of IS strategic alignment on IS issues, with the exception of Chan *et al.,* (1997) who

investigated the impact of IS strategic alignment on IS effectiveness. Chan *et al.,* (1997) summarise IS effectiveness in seven dimensions, including: satisfaction with IS staff and services; satisfaction with the information product; satisfaction with end user knowledge and involvement; IS contribution to operational efficiency; IS contribution to management effectiveness; IS contribution to the establishment of market linkages; IS contribution to the creation and enhancement of products and services; and investigate the relationships between IS strategic alignment and IS effectiveness. This study found that the consequences of IS strategic misalignment may mediate the IS strategic alignment and business performance.

Insufficient IS support to management leads to the managers' inability to realize the strategic value of IS/IT investment. As mentioned above, the prior research focused on the linkage of strategic level alignment and the ability to realize the IS/IT investment value. This study further found that the IS strategic misalignment in the structural level also negatively influences the managers' ability to realize the IS/IT investment value. As presented in the research findings, IS are not supporting the strategic level management. Managers are not able to realize IS/IT support in the strategic level. Furthermore, the managers' support to IS development is low since they are not able to realize the value of IS/IT investment. It is worthwhile to note that this weak support of managers to IS further causes the IS strategic misalignment in the operational level, which is the poor IS support to core business processes. It was found that the weak support of managers is both a cause and consequence of IS strategic misalignment. Campbell *et al.,* (2005) investigated a similar phenomenon in their research. They found that some researchers (Nelson and Cooprider, 1996) identified the antecedents of IS performance while others (Reich and Benbasat, 2000) claimed it is the inverse. Campbell *et al.,* (2005) further pointed out that all the relationships in the model of antecedents of IS strategic alignment developed by Reich and Benbasat (2000) could be recursive, which illustrates the complexity of the area. In this study, the causes and consequences loop between weak support of managers and IS strategic misalignment is shown. The weak support of managers is the consequence of IS strategic misalignment in the structural level and further causes the IS strategic alignment in the operational level; therefore the structural level misalignment and operational level misalignment could be linked.

IS that do not support the core business processes well leads to the consequences that companies are not seeking IS capabilities sustainably, as well as IS are not contributing to competitive advantage. IS capability is "an enterprise-wide capability to leverage technology to differentiate from competition" (Bharadwaj, 2000). Khani *et al.,* (2011) state IS capability is the ability of organizations to use IT/IS to leverage and exploit business value continuously. The fundamental perspective of IS capability is that they are utilizing and combining mechanisms which are shaped by the organization's processes, roles and structure that produce the strategic benefit (Khani *et al.,* 2011; Peppard and Ward, 2004; Teo and Ranganathan, 2003). In this study, as shown in the findings, IS and core business processes are not combined closely; therefore, the IS development is not considered as essential in the case company. The importance and development of IS/IT and the IT department are reliant on the business performance. When companies experience poor business performance, IS/IT and the IT department are put aside. It is not considered that using IS/IT produces strategic benefits and further improves business performance. Competitive advantage is described as the objective of strategy, which is the unique position an organisation develops against its competitors through its resource deployments patterns (Reed and Defillippi, 1990; Porter, 1985; Hofer and Schendel, 1978). The agreement on the price, cost and differentiation of competitive advantage is substantial within the literature (Reed and Defillippi, 1990). In this study, the misalignment situation that IS are not supporting core business processes well results in IS not contributing to the competitive advantage in production. In the current situation, the contribution of IS to improve the quality of products and reduce the costs of production in order to strength the competitive abilities over its competitors are not obvious. Therefore, the business values of IS are not acquired sufficiently in the case company. To summarise, this study found that the IS strategic misalignment results in organizations not seeking IS capabilities continuously. In addition, this misalignment also leads to the situation that IS do not contribute to competitive advantage in production.

A low IS operational capability of staff leads to consequences including poor management information and low dynamic capabilities of organizations. As shown in the findings, the low IS operational capabilities result in unavailable, inconsistent and inaccurate information being transferred which negatively influences

management. Moreover, low IS operational capabilities influence the organizational dynamic capabilities. A number of research studies focus on the effects of IS strategic alignment on dynamic capabilities. There are two contradictory views of the results showing that both positive and negative associations between alignment and dynamic capabilities are supported in the literature. In the view that alignment impedes agility, alignment resulting in efforts to maintain a strong partnership between business and IT may delay their requests to each other; this protecting of alignment influences the companies' ability to respond to changes (Tallon and Pinsoneault, 2011; Reich and Benbasat, 2000). In a resource based view, the default response to change is likely to be protecting the current situation given the high sunk cost and low disposal value of IT resources after making investment to achieve alignment in the organization (Tallon and Pinsoneault, 2011; Bharadwaj 2000; Gupta *et al.,* 2006). In the view that alignment facilitates agility, knowledge sharing between business and IT executives as the antecedence of the IS strategic alignment (Reich and Benbasat, 2000, 1996; Luftman *et al*., 1999) facilitate the collaboration between them and further increases adaptive and innovative abilities (Tallon and Pinsoneault, 2011). From a resource based view, alignment-induced exploitation of existing resources increases the IT capabilities in a continuous improvement environment and alignment-induced exploration of opportunities for using new resources make companies more proactive to change; therefore both ways enable agility (He and Wong, 2004). Moreover, alignment resulting IT use facilitates the learning of users and helps them to explore new uses for existing IT resources, which promotes agility (Tallon and Pinsonneault, 2011; Tallon 2008). The findings in this study are consistent with this point in that the misalignment situation of low IS operational capabilities impedes the abilities of organizations to adapt to the changing environment. However, more factors need to be considered in a Chinese SOE context. Rather than considering learning, and the adaptive and innovative abilities created by alignment, the findings represent the basic IS operational capabilities of staff influencing the organisation's capability to adapt to the environment negatively. From an exploitation perspective, it is not only about learning but also the confidence and quality of users matters and may furthermore influence the organisational dynamic capabilities.

It is worthwhile to note that Tallon and Kraemer (1999) constructed a conceptual model considering IT business value as the consequence of strategic alignment and strategic alignment impact on the company's performance through IT business value. Tallon and Kraemer (2003) argued that little research focuses on the impacts of IS strategic alignment on IS business value which mediates the link between IS strategic alignment and business performance. IT business value, which also can be called IS performance, means the extent to which IS contribute to the improvements of operational, managerial and strategic performance in an organization (Cohen, 2008). In their research (Tallon and Kraemer, 2003), the relationships between IS strategic alignment and IS business value is empirically tested for the first time as they have claimed. In this research, the linkage between IS strategic alignment and IS business value has been investigated more deeply. However, there are no findings that show obvious relationships between IS business value and business performance in this study. Since this connection is claimed by (Tallon and Kraemer, 2003; Dehning and Richardson, 2002; Powell and Dent-Micallef, 1997), a dotted line is used to show the linkage, as shown in figure 6.1.

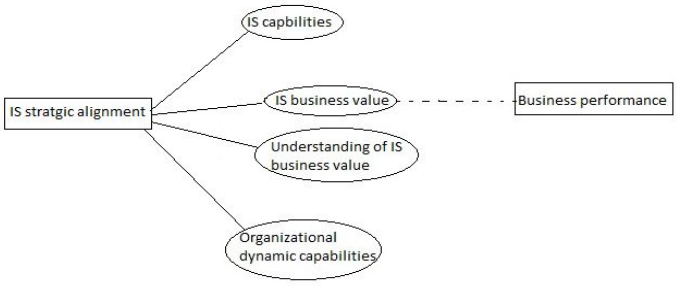

Figure 6.1 Consequences linking IS strategic alignment and business performance

6.2.4 Proposed causes and consequences IS strategic alignment model

Based on the discussion above, the integration of findings is shown in the causes and consequences of IS strategic alignment model in figure 6.2 below.

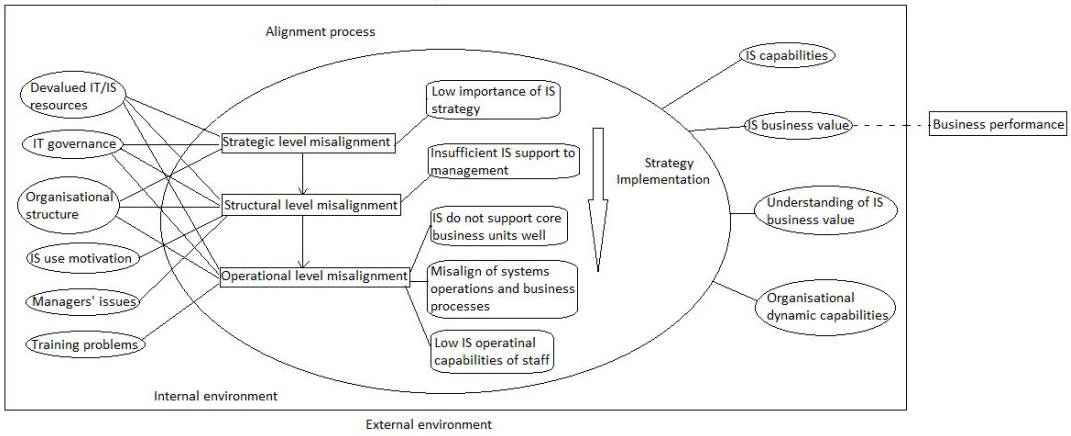

Figure 6.2 Proposed causes and consequences alignment model

As shown in the model, different types of factor are influencing different levels of alignment. Furthermore, the lower levels of alignment are emphasized. As shown in figure 6.2, the strategic level alignment influences the structural and operational level alignment and the structural level alignment has impacts on the operational level alignment. This study found the advantages and necessity of conceptualizing alignment at the process level in Chinese SOEs. In terms of lower level alignment, Gutierrez *et al*. (2008) argue the value chain model emphasizes the impact of IT projects for each business unit and its connections with business strategy. Furthermore, it is an important procedure to use tools for value chain analysis in order to realise IT value in strategic alignment (Gutierrez *et al*., 2008; Chowdhury *et al.,* 2001). This process can also be considered in the alignment process in this model. It is proved in the prior literature there is a relationship between IS business value and business performance. For other consequences of misalignment identified in this study, future work is needed to identify their impacts on business performance.

6.2.4.1 Analysis in perspective of resource-based view

As was discussed in the literature review, in the strategic information systems era, management are seeking to acquire competitive advantages through IT, with the approaches of aligning IS/IT investment with corporate strategy as well as formulating the IS strategy to support and shape the business strategy (Peppard and Ward, 2004; Henderson and Venkatraman, 1990). However, it is universally

accepted that IT has no inherent value and IT itself is unable to yield sustainable competitive advantages (Peppard and Ward, 2004; Mata *et al.,* 1995; Kettinger *et al.,* 1994; Senn, 1992; Clemons and Row, 1991). Very few organizations have managed to attain advantage from IT continuously since competitors are able to catch up or even overtake the organization very quickly through imitation or deploying innovative, newer and cheaper technology (Peppard and Ward, 2004; Prahalad and Krishnan, 1998; Mata *et al.,* 1995). Therefore, it is required to innovate with IS/IT adapted to business processes and practices as well as IS/IT to effect change and to respond to change. It is well understood in the organizations that IT business value is acquired through business change and innovation (Peppard and Ward, 2004).

As a development of the traditional view that IT contributes to competitive advantage through aligning IS/IT with corporate strategy and formulating the IS/IT strategy to support and shape the business strategy, there are two main important points of view on how IT contributes to sustainable competitive advantage. Firstly, it is argued that companies attain IT-based competitive advantages from IT contributing to management differences rather than technical differences (Khani, 2011; Dehning and Stratopoulos, 2003; Dvorak *et al.,* 1997; Mata *et al.,* 1995; Keen, 1993). For example, as one type of IT-enabled management differences identified in the early stage, Mata *et al.,* (1995) argued that instead of IT itself, sustained advantages are likely to be gained through IS management skills. They further describe these skills as the abilities of IS managers to understand business needs, cooperate with business managers, coordinate IS activities in order to support other business managers and to anticipate future requirements.

Secondly, it is argued that enterprises use IT to increase competitive advantages through the development of effective IS capability (Peppard and Ward, 2004; Bharadwaj, 2000; Ross *et al.,* 1996). The attention should be moved away from attainment of continuous value from IT. IS capability should be understood, developed and nurtured for the organizations that try to deliver value from IT investment on a continuous and ongoing basis (Peppard and Ward, 2004). Furthermore, they pointed out that competitive advantage is just an outcome but the organization should acquire the ability to deliver the explicit IS business value. It is the ability rather than the outcome that can be enduring (Peppard and Ward, 2004).

Bharadwaj (2000) argues that IT capability is acquired through the strengths of IT infrastructure, human IT resources and IT-enabled intangibles. Powell and Dent-Micallef (1997) concluded that some firms gained IT-enabled advantages through leveraging intangibles, complementary human and business resources and relationships. Therefore, it is inferred that management differences brought from IT/IS can be considered as IS capability.

To summarise, Henderson and Venkatraman (1990) proposed a very influential strategic alignment model to explain the transformation of the IT role in the organization. As shown in their model, the role of IT is leveraged from a traditional functional role to a strategic role through IT and IT strategy support and shapes the business strategy. Henderson and Venkatraman (1990) argued that the competitive advantage is acquired through the capability of organizations to exploit the function of IT to support and shape their business strategy on a continuous basis. This point of view is developed since it is realized IT itself is not able to yield sustainable competitive advantages (Khani *et al*., 2011; Peppard and Ward, 2004; Prahalad and Krishnan, 1998; Mata *et al.,* 1995). IT/IS contribute to the competitive advantage through the development of effective IS capability to improve IS business value, which is to improve the operational, managerial and strategic performance in an organization (Cohen, 2008).

The model proposed in this study shows this development of how IT/IS contribute to competitive advantage. This differs from the opinion that IT contributes to strategic value by aligning IT with corporate strategy and formulating IT/IS strategy to support and shape the business strategy; here it is argued that IT contributes to strategic value from the strategic, structural and operational levels of business-IT alignment. From the IS strategic alignment in the strategic, structural and operational levels, organizations adopt IS/IT to improve the operational, managerial and strategic performance in an organization. Furthermore, as concluded in the previous section, the influencing factors and alignment approach are different in practice in real life organizations. It is inferred that organizations may acquire unique advantages and IT/IS strategic value from their alignment process to support strategic objectives. For instance, organizations gain management differences, an organizational infrastructure that enables innovative actions and strategies, IT management skills,

and getting their people to embrace the right behaviours and values for working with information based on the characteristics of the organization (Marchand *et al.,* 2000; Dvorak *et al.,* 1997; Kettinger *et al.,* 1994; Keen, 1993). Moreover, the IS strategic alignment process shown in the proposed model connects all the strategic, structural and operational levels; these elements are interrelated and therefore influence each other.

6.2.4.2 Analysis in perspective of IS strategic alignment process and dynamics of alignment

Rather than treating alignment as a static construct or outcome, more and more research has started to focus on the IS strategic alignment process and the dynamics of alignment (Pelletier *et al.,* 2014; Baker *et al.,* 2011; Sabherwal *et al*., 2001). In this study, the research was conducted to investigate the state of IS strategic alignment at a particular point of time; however, considering there was a strategic change in 2010, the findings implicated the alignment process in the case company. It is argued that there is reconciliation between strategy formulation and strategy implementation for IS strategic alignment (Pelletier *et al.,* 2014; Gutierrez and Lycett, 2011). In the proposed IS strategic alignment model, it is shown that the IS strategic alignment process together with the implementation of the business strategy and IS strategy, as well as the causes and consequences, influences the process. The IS strategic alignment can be considered as a process that reconfigures IT/IS and business resources, competences and capabilities in the organization (Pelletier *et al.,* 2014). Furthermore, it is argued that alignment is likely to be different in various organizations and various industries or sectors when it is approached as a process (Bergeron *et al.,* 2001; Tallon, 2007). This point is consistent with the findings of this study, since it is found that the influencing factors of IS strategic alignment identified in the case company affected things differently compared to the prior research. It should be noted that although some researchers argued that the investigation of factors that promote or inhibit alignment is based on the understanding of the end-state perspective on alignment (Baker *et al.,* 2011), this is not the case in this study. This study investigated the state of IS strategic alignment at a point of time; however, the findings indicated some factors influence the alignment process together with the strategy implementation. The IS strategic

alignment process emerged from the data collected. The situation of IS strategic alignment investigated in this study is not considered as an end or a static situation but it is a point of time during the alignment process.

Although dynamic alignment and process-based approaches of IS strategic alignment are similarly conceptualized; for example, researchers assumed IS strategic alignment was a dynamic phenomenon and the alignment process conserves its dynamic nature (Sabherwal *et al.,* 2001); it was found that there can be a distinction made between dynamic alignment and the alignment process in this study. The process-based approach to IS strategic alignment can be considered as happening during strategy implementation; firms make an IT/IS investment and expend managerial effort in order to achieve a state of alignment. Keen (1993) argued that, in creating business-IT alignment, the "strategy" perspective focuses on the action while the lower level of alignment addresses the issues of what and why that enable the strategy. No matter whether the strategy is realized or not, companies may stay in a state of stable equilibrium until there are changes to any components in the IS strategic alignment or external factors disturb the equilibrium (Tallon and Pinsonneault, 2011). At this time, the state of IS strategic alignment changes is considered as the dynamism of IS strategic alignment. However, if it is considered from a long term view, there is no obvious difference between the IS strategic alignment process and dynamics alignment.

6.2.5 Comparison with existing models

This section compares the emerging theory with the IS strategic alignment model in the existing literature. Although there are many models investigating the IS strategic alignment from different perspectives, only strategic alignment model from Henderson and Venkatraman (1990) and Maes (1999) are selected. This is mainly because of two concerns. Firstly, the strategic alignment model from Henderson and Venkatraman (1990) is very important and influential; as Maes (2000) stated "almost all later models and consulting practices in alignment start from this original model". Secondly, the proposed conceptual understanding of IS strategic alignment is developed based on these two models in the literature review. Therefore, it is

meaningful to compare the emerged theory with these two models. Furthermore, it is worthwhile to note that the proposed conceptual understanding of IS strategic alignment in the literature review is used to enhance the theoretical sensitivity, which focused on the concept and components of IS strategic alignment. The emerged theory in this study illustrates the misalignment, as well as the causes and consequences of misalignment in Chinese SOEs. In the analysis of the proposed causes and consequences IS strategic alignment model, the alignment process and strategic value of IS/IT on the basis of IS strategic alignment are emphasized. The comparisons of causes and consequences with the factors identified in the existing literature were made in the previous sections. In this section, the comparisons with existing models mainly focus on the alignment process and strategic value of IS/IT on the basis of IS strategic alignment.

6.2.5.1 Comparing with the strategic alignment model from Henderson and Venkatraman (1990)

The components of the strategic alignment model from Henderson and Venkatraman (1990) have been described in the literature review section. This model aims to provide a way to align IT and business objectives so as to realize their IT investment value (Maes, 2000). Henderson and Venkatraman (1990) claimed an understanding of IT strategy and its role to support and shape business strategy in a continuous and adaptive process is required to attain strategic impact from IT. Furthermore, Vankatraman *et al.,* (1993) analysed the model, and argued the link between organizational infrastructure and processes and IT infrastructure and processes illustrates the need for coherence between organizational requirements and activities and skills within the internal IS function; this still reflects the traditional internal orientation view, while the external link between business and IT strategy reflects the capacity to leverage IT strategy from a functional strategy that responds to the business strategy to both shape and support the strategy. In this study, the view of how IT/IS create the strategic value is developed. As has been discussed, the way IS/IT contribute to competitive advantage is not only about aligning IS/IT investment with corporate strategy as well as formulating the IS strategy to support

and shape the business strategy, but is also about how IS contribute to the operational, managerial and strategic differences based on the different characteristics of various organizations.

In addition, Henderson and Vankatraman (1990) suggested that strategic alignment could be achieved through choosing an appropriate alignment approach from four alignment perspectives identified in the strategic alignment model, including strategy execution, technology transformation, competitive potential and service level; they further defined the driver of alignment and the roles of business and IT managers in each perspective, which has been illustrated in the literature review. Gutierrez *et al*. (2008) argued that it is not clear how to decide which approach is the appropriate one and how to achieve it. In this study, it is found that the strategy execution alignment approach did not work in the Chinese SOE context. As shown in the findings, without sufficient attention paid to IS strategy and good IS implementation, the IS/IT and IS strategy are not supporting and shaping business strategy in the case company. Therefore, it is concluded that the strategy execution alignment approach is not appropriate in the case Chinese SOE.

To summarise, compared to the strategic alignment model from Henderson and Venkatraman (1990), this study developed the view of IS contributing to strategic value. In terms of the alignment process, it is confirmed in the findings that there are interactions between strategic level alignment and structural and operational levels alignment, which is the same as Henderson and Venkatraman (1990) argued. However, it is also found that the strategy execution alignment approach proposed in the model from Henderson and Venkatraman (1990) is not appropriate in the case Chinese SOE.

6.2.5.2 Strategic alignment model from Maes (1999)

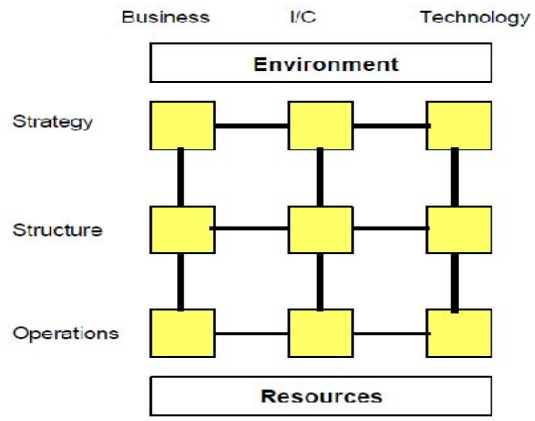

Figure 6.3 Alignment process model from Maes (1999)

The strategic alignment model from Maes (1999) has been illustrated in the literature review section, as shown in figure 6.3. Maes (1999) argued the generic framework is valuable for positioning and interrelating information management issues. Since the framework focuses on information management, the understanding on the strategic value of IS/IT is not emphasized and therefore not developed further in the model from Maes (1999).

In terms of the alignment process, Maes (1999) interpreted it in both the horizontal and vertical perspectives. In the horizontal perspective, Maes (1999) emphasized the role of information communication in aligning the business and IT. Maes (1999) added the central column to explain how information management manages the transformations in three levels. Furthermore, the central column is considered as playing a crucial role in interpreting the use of IC/T in the organization. For example, in the strategic level, the social dimension of the alignment of business strategy and IT strategy can be informal, formal, IT enabled or not. In this study, information communication is considered to be overemphasized since the emerged theory on the data collected did not show information communication as a central problem in the different levels of the strategic alignment process.

In the vertical perspective of the alignment process, Maes (1999) added environment to the top of the framework to assist organization-specific strategic choices and

added resources, which are to be used in business activities in the operational level at the bottom. Furthermore, Maes (1999) argued that the three levels of alignment can be interpreted as three resource-based learning loops. The routinization loop reflects the use of resources leading to efficient work practices. The capability learning loop combines work practices and organizational procedures to produce and improve the organizational capabilities. The strategic learning loop identifies core capabilities in the context of the organizational business mission and competitive environment. Maes (1999) further argued that IC/T is transformed from a resource into a strategic asset by following these three learning groups. However, in this study, it is found that the way IT/IS contributed to the strategic value not only follows a bottom-up or vertical process. As was discussed in the previous section, IT/IS could yield competitive advantage in all three levels, when IT/IS creates operational, managerial and strategic differences against their competitors through the IS strategic alignment process.

To summarise, compared to model from Maes (1999), in this study the information communication has not emerged as a core element of IS strategic alignment in the case company. Furthermore, the process of IT/IS contribution to strategic value through the IS strategic alignment process is developed.

6.3 Contributions of the research

This research project investigates the causes and consequences of IS strategic misalignment in the Chinese SOE group. In the literature review chapter, the conceptual understanding of IS strategic alignment is refined. This research project investigates the misalignment situation, as well as the causes and consequences of the misalignment situation in Chinese SOEs. This study produces a model integrating the findings and showing the causes and consequences that influence the alignment process. To be specific, there are three perspectives of the theoretical contribution of this study, including developed understanding of the strategic value of IT/IS investment on the basis of IS strategic alignment, identifying the causes factors of IS strategic misalignment in Chinese SOEs, and identifying the consequences of IS strategic misalignment in Chinese SOEs.

In addition, this project contributes to the body of knowledge by providing a theory which links the main factors that influence the IS strategic alignment process and the consequences of it.

In the literature review part, the conceptual understanding of IS strategic alignment is refined. IS strategic alignment is an important concept in the IS management area. However, there is no consensus on its conceptual understanding. This study conceptualizes the IS strategic alignment and identifies explicitly three levels of alignment. Furthermore, the different roles of IS and IT in IS strategic alignment are distinguished. The traditional view that IT contributes to competitive advantage through strategic alignment is developed in the current situation. In prior research, the IS/IT contribution to the strategic value focuses on aligning the IT/IS with corporate strategy or formulating IS strategy to support and shape the business strategy through IS strategic alignment. As a development of this, some researchers argued business strategy should support and shape the IS strategy; therefore business and IS strategy interact correspondingly. However, this development is already included in the IS strategic alignment thinking in the early stage. More and more researchers are starting to realize the IS contribution to competitive advantage through management differences or business differences brought by IT/IS. Ward and Peppard (2004) claimed these are part of IS capability and argued IS/IT contribute to competitive advantage through effective IS capability. However this point of view was not related to the IS strategic alignment. This study found that IS contributes to the strategic, managerial and operational differences through the IS strategic alignment processes, on the basis of the characteristics of the organization. Furthermore, IS strategic misalignment results in the low IS business value, as well as not seeking IS capabilities. To summarise, this study contributes to the understanding of the strategic value of IS/IT investment.

Apart from the conceptual understanding of IS strategic alignment, this study identifies the factors that influence the IS strategic alignment in the Chinese SOE context. From the analysis, the impacts of some factors identified influence the alignment in Chinese SOEs in different ways compared to prior research. It is found that the IS strategic alignment is context-dependent. The influencing factors and related management activities may be different in various contextual environments.

There are a number of studies investigating the influencing factors of IS strategic alignment, such as antecedents, enablers and inhibitors. However, most of them focused on influencing factors on the strategic level based on the conceptual understanding of IS strategic alignment. This study found the advantage and necessity of conceptualizing alignment at the process level in Chinese SOEs. The causes factors identified in this study covered the strategic, structural and operational levels of alignment. As has been discussed, some factors identified in the existing literature are confirmed while some factors influence the Chinese SOEs in different ways. Furthermore, some new factors are identified as influencing the IS strategic alignment in Chinese SOEs. It is further confirmed that the alignment approach is context-dependent and there is no one design of the alignment approach that fits all contexts (Maes, 2000; Brown and Magill, 1994). Therefore, it is more meaningful the find the particular influencing factors of IS strategic alignment in the Chinese SOE in this study.

The consequences of IS strategic alignment identified in this study are different from the majority of prior research which mainly investigated the impact of IS strategic alignment on business performance. Research focuses on business performance as the outcome of IS strategic alignment with very few exceptions. The quantitative approach is mainly adopted in those studies to prove the link between IS strategic alignment and business performance. The findings in this study show the impact of IS strategic alignment on IS capability, organizational dynamic capability, IS business value and the understanding of IS business value. The consequences identified in this study mediate the link of IS strategic alignment and business performance. With the qualitative approach, the consequences interpret how IS strategic alignment may influence the business performance in Chinese SOEs.

This study also distinguishes the understanding of IS strategic alignment as a process and dynamic IS strategic alignment. The IS strategic alignment process is the approach from when strategy starts to be implemented in the alignment as well as achieving a relative equilibrium. This equilibrium situation can be in a high or low level of alignment. When any components in IS strategic alignment or any influencing factors change, the long term IS strategic alignment changes show the characteristics of being dynamic.

From a resource-based view, the IS strategic alignment process can be considered as the way IT/IS contribute to the competitive advantages. The strategic value of IT/IS and the objectives of IS strategic alignment are not only, as the research identified, derived from aligning IT with corporate strategy or from IS/IT strategy support to shape business strategy, but also from the contribution of IT to management differences, business operations and processes. A combination of IS and organization in the special organizational contextual environment may create the competitive advantage.

To summarise, the theory developed in this study can be used by the SOE managers to improve the IS strategic alignment in the Chinese SOE and further improve the IS implementation and business management. Moreover, the theory provides useful indications and can be used as a theoretical foundation for further studies on IS strategic alignment in different contexts. It is worthwhile to note that the results of any case study in general and of grounded theory in particular are not generalizable. The findings may be of use or transferable to similar contexts, but there is no intention of generalisation.

6.4 Implication of findings for the reality of practice

The findings of this research have important implications for the practice of IS strategic alignment improvement in the case Chinese SOE company. This section discusses these implications from the following perspectives: strategy implementation control, IT governance process, IT/IS resource management, human capacity management and business infrastructure design.

The research findings show that the case SOE paid attention to IS strategy formulation but without sufficient efforts made to address the IS strategy implementation issues. In practice, to improve the IS strategic alignment situation, managers in headquarters and the branches need to cooperate and pay sufficient attention in order to implement the IS strategy. This is crucial work to ensure further alignment process.

The IT governance process refers to the sharing authority of resources, decision making rights and organizational strategic management responsibilities between the IT department and business departments, as well as the sharing responsibilities of IS management and IS decision making between the IT department in headquarters and the branches. The findings imply the IT governance process is not appropriate in the case SOE. The IT department currently is playing a functional role, or is even less important than other functional departments by not having strategic management responsibilities. This is also one of the reasons that IS strategy is not implemented well. More strategic management responsibilities need to be allocated to the IT department, both in headquarters and the branches. Furthermore, the centralized IS management, which allocates all the IS management responsibilities to the IT department in headquarters while the IT departments in the branches are just in charge of technical problems, has caused a lot of IS use problems in the case company. Mehta and Hirschheim (2007) proposed geographic influence on IS structure, which can also be considered in this research. The branches are geographically dispersed which influences the management from headquarters. Therefore, the design of the IS structure not only needs to consider corporate governance, but also the geographic influence needs to be considered. The IT departments in the branches need to be allocated management responsibilities to support IS strategy implementation and the IS management and alignment process.

IT/IS resource management refers to the organizational need to identify the strategic role of IT/IS, and further to specify and modify appropriate IT/IS products and services to support and shape the business from the strategic, managerial and operational perspectives. Especially, it was found that IS applications with low flexibility are not suitable for use in the Chinese SOE context. A combination of high level alignment and flexible IT infrastructure facilitates the organization to respond to the changing environment. This dynamic capability can also be a source of competitive advantage. Executives can consider alignment as a way to enable advantage and respond to change (Tallon and Pinsonneault, 2011). In the current situation, the case SOE is adopting the ERP from SAP, a standardized IS package. However, the research findings reflected that managers and staff consider it is not suitable for use in a Chinese context. This implies the executives in the case SOE

should justify and select carefully the types of IS application and vendor. Both the standardization and uniqueness of IS applications, infrastructure and processes should be considered.

Human capacity management refers to improving the understanding and skill of IS use in the organization. More attention must be paid to staff training in the organization, especially for new staff, staff in new positions and key users. The findings imply the managers' understanding of IS and IS use are extremely important. There needs to be a way to improve them; special training for managers could be considered. However, change of the thinking and ideas of managers may be a long term project.

At a basic level, business infrastructure design refers to making the management processes and operational processes standardized in the organization. The Chinese SOE has traditional ways of management and operations. However, standardized management processes and operational processes facilitate information integration and transformation throughout all the business processes; in this way, IS is contributing to effectiveness and efficiency. Apart from careful selection of IS applications and vendor to suit the unique Chinese characteristics, some traditional Chinese ways of working should be modified to respond to the IS use requirements.

IT resources and IS capability contribute to the IT business value and further business performance through an IS strategic alignment process. The study serves to inform business managers that enterprises should not only pay attention to IT investment but also emphasizes how to improve IS capability and improve IS management through IS strategic alignment in order to acquire IT business value and therefore realise the IT investment value. Through theoretical argument and empirical study, this study shows how to improve the IS strategic alignment. The way IT contributes to competitive advantage previously focused on technology, the use of technology to reduce the costs or increase the product's quality. The current way IT contributes to competitive advantage emphasizes the use of IT to improve the IS management through the strategic alignment processes. By implication the focus of the IT contribution should be on the information. The use of IT and IS to collect, organize and share information facilitates the management activities at all levels. To

be specific, Chinese SOEs should improve their IS strategic alignment from three perspectives. Firstly, the understanding of the importance of IS and IT in manufacturing companies should be improved in managers and staff in Chinese SOEs. Managers and staff should understand the contribution of IS and IT to competitive advantages in the company. Secondly, Chinese SOEs should pay attention to IT governance types. IS management authority sharing between the IT department and business department, as well as between headquarters and the branches should be reconsidered to fulfil the requirement both in headquarters and the branches. Thirdly, business people's understanding of IS use, especially the managers' understanding of IS use, should be improved. These can be realized through training processes. However, it is worthwhile to note that for managers, the improvement of their thinking and ideas are more important than IS use skills.

To summarise, to improve the IS strategic alignment in the case company in practice, not only does the interaction between business and IS strategy but also the portfolio of applications, people, and business and IT infrastructure to support the goals of business and IS strategy need to be considered for action.

6.5 Limitations of the study

One of the limitations of this research lies in the research method. This study adopted a combination of case study and grounded theory methods. This research explored the causes and consequences of misalignment in the Chinese SOE only with one case study and in one sector, the manufacturing sector. The single case design limits generalisation (Yin, 2003), as is the case for the use of grounded theory (Morse, 1999). The theory emerging from this study is limited to the case selected. Furthermore, the alignment approach taken in different organisations varies to a greater or lesser extent depending on the diversity of organisational structures, business processes and operations as well as the environments; therefore there is no one design of the alignment approach which fits all contexts (Maes, 2000; Brown and Magill, 1994). Therefore, while the context in this case is the specific investigation of IS strategic alignment in the Chinese SOE context, any generalization need to be gained through future work in other contexts.

Moreover, this study adopted interviews as the only instrument for data collection. This has limited the study from three perspectives. Firstly, documentation such as written IS strategy from these organisations is not included in the study. More sources of data will enrich the information embedded and improve the understanding of the current IS strategic alignment situation. Secondly, there are some disadvantages related to the interview instrument. Interviewees have different ages and backgrounds. It is difficult to tell how truthful an interviewee is and how much thought interviewees have put into their responses. Thirdly, this research was conducted solely by the researcher as required by the regulations of a PhD programme. The identification of misalignment situations, causes and consequences of misalignment is relying on the researcher's own interpretation and the data analysis is dependent on the researcher's theoretical and contextual sensitivities. Although the researcher has discussed this with her supervisors frequently during the data analysis, her own interpretation, evaluation and judgement of the data collection may not always have been the best.

The development and implementation of strategy are long term activities. Another limitation is the duration, as the research looked at IS strategic alignment in this cultural context at only one point in time rather than a long-term investigation of IS strategic alignment, which is by nature dynamic and changes over time.

6.6 Future work

This research points to four potential areas, which could be further explored by future work.

Firstly, the influencing factors identified in this research can be further verified and studied in terms of their importance. The link between the consequences identified in this research and business performance can be further investigated. This study has identified six main categories including 32 causes and five main categories including 13 consequences. From an inductive perspective, it is not easy or desirable to identify which causes or consequences are more important, as that was not the aim of data collection. However, it would be very useful to find out what the most

important causes and consequences are in order to improve the IS strategic alignment. This work can be done in a future study.

Secondly, the theory generated in this study can be expanded and generalised by investigating other Chinese SOEs, in other sectors in addition to the manufacturing sector. This study was carried out using a single case study in the manufacturing area. It would be interesting to find out if these causes and consequences can be generalised to other sectors. As has been discussed in section 1.2, the influence of IT may be different based on other studies. Further research on the differences of IS strategic alignment in different industries would be of interest. For this type of future work, the research findings of this project can be used as a theoretical foundation.

Thirdly, future work can be carried out to explore the IS strategic alignment situation in private companies and the causes and consequence of the situation. These private companies can be selected from the Chinese market or markets worldwide. The causes and consequences of IS strategic misalignment during the alignment process identified in this study are based on a Chinese SOE context. New influencing factors are identified in the case study. To explore the IS strategic alignment in private companies, different types of influencing factors on IS strategic alignment are expected to be identified through future work. These findings can be compared with the situation in Chinese SOEs to explore the influencing factors on IS strategic alignment in-depth. It would be interesting to find out the differences of IS strategic alignment between SOEs and private companies through these comparisons.

Fourthly, future work could aim at exploring the IS strategic alignment, as well as the causes and consequences of the situation in the long term. This study was carried out to investigate IS strategic alignment in one period of time. A long term investigation is expected to be able to identify more influencing factors during the strategy implementation process and alignment process. A long term investigation could explore the dynamic alignment and the causes and consequences of it; therefore it could provide richer and deeper implications to companies on how to improve the alignment and achieve alignment sustainably.

Studies have identified a large number of influencing factors of IS strategic alignment. However, these factors mainly focused on the understanding of IS strategic alignment at the strategic level. The consequences of IS strategic alignment emphasize the impact of alignment on business performance. This study has shed light on the conceptual understanding of IS strategic alignment at the strategic, structural and operational levels, with causes and consequences based on this understanding in a Chinese SOE context. It is clear that there is still much more we need to do in order to better understand the causes and consequences of IS strategic alignment in various contexts and in different time periods of the alignment process.

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Appendix 1 Business-IT alignment maturity assessment

Communication maturity
Degree of understanding of the business by the IT function
Degree of understanding of IT by the business
Degree of richness of methods used for organizational learning
Communication style used within the organization
Degree of knowledge sharing throughout the organization
Use of IT business liaisons
Competency and value maturity
Focus of the metrics and processes to measure IT's contribution
Focus of the metrics and processes to measure business contribution
Degree of and orientation of integrated IT and business measures
Degree of service level agreements
Frequency and formality of benchmarking practices
Frequency and formality of IT assessments and reviews
Degree of continuous improvement practices
Contribution of IT to strategic goals
Governance maturity
Degree of business strategic planning with IT involvement
Degree of IT strategic planning with business involvement
Basis of budgeting IT resources
Basis of IT investment decisions
Frequency formality, and effectiveness of IT steering committees
Integration of IT project prioritization
IT function's responsiveness to changing business needs
Partnership maturity
Business' perception of the role of IT
Role of IT in strategic business planning
Integrated sharing of risks and rewards
Formality and effectiveness of partnership programmes
Perception of trust and value
Reporting level of business sponsor/champion
Technology scope maturity
Technological and strategic sophistication of primary systems/applications
IT standards articulation and compliance
Degree of architectural integration
Degree of infrastructure transparency
Degree of infrastructure flexibility
Skills maturity
Degree of an innovation culture
Degree of integrated locus of power in IT-based decisions
Degree of a change readiness culture
Degree of opportunity for skills enrichment through job transfer
Degree of opportunity for skills enrichment through cross-training or job rotation
Degree of interpersonal interactions across IT and business
Ability to attract and retain IT staff with technical and business skills

Appendix 2: Research ethics approval

Information School Research Ethics Panel

Letter of Approval

Date: 4th July 2013

TO: Si Chen

The Information School Research Ethics Panel has examined the following application:

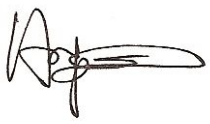
Title: Business-IT alignment in Chinese SOE group

Submitted by: Si Chen

And found the proposed research involving human participants to be in accordance with the University of Sheffield's policies and procedures, which include the University's '*Financial Regulations*', '*Good Research Practice Standards'* and the '*Ethics Policy Governing Research Involving Human Participants, Personal Data and Human Tissue'* (Ethics Policy).

This letter is the official record of ethics approval by the School, and should accompany any formal requests for evidence of research ethics approval.

Effective Date: 4th July 2013



Dr Angela Lin
Research Ethics Coordinator

Appendix 3 Details of interviewees

ID	Job position	Department	Branches
N1	Operational people	Functional department	Henan
N2	Manager	Functional department	Henan
N3	Manager	Functional department	Henan
N4	Manager	Functional department	Henan
N5	Manager	IT department	Henan
N6	Manager	IT department	Henan
N7	Manager	IT department	Henan
N8	Manager	IT department	Henan
N9	Operational people	IT department	Henan
N10	Operational people	IT department	Henan
N11	Manager	IT department	Henan
N12	Operational people	IT department	Henan
N13	Manager	Functional department	Henan
N14	Manager	Functional department	Henan
N15	Operational people	Functional department	Henan
N16	Manager	Functional department	Henan
N17	Manager	Functional department	Henan
N18	Operational people	IT department	Zhongzhou
N19	Operational people	IT department	Zhongzhou
N20	Manager	Functional department	Zhongzhou
N21	Operational people	IT department	Zhongzhou
N22	Manager	Functional department	Henan
N23	Manager	Functional department	Henan
N24	Manager	Functional department	Guangxi
N25	Manager	IT department	Guangxi
N26	Operational people	Functional department	Henan
N27	Manager	Functional department	Henan
N28	Manager	Functional department	Shandong
N29	Operational people	IT department	Shandong
N30	Operational people	Functional department	Shandong
N31	Manager	IT department	Shandong
N32	Manager	Functional department	Shanxi
N33	Manager	IT department	Shanxi
N34	Manager	Functional department	Qinghai
N35	Manager	IT department	Qinghai
N36	Manager	Functional department	Guizhou
N37	Manager	IT department	Guizhou
N38	Operational people	Functional department	Headquarters
N39	Manager	IT department	Headquarters
N40	Manager	IT department	Headquarters
N41	Manager	IT department	Headquarters

Appendix 4 Interview script

Interview script (for IT staff)

Hello, nice to meet you. My name is Si. I am PhD student in University of Sheffield. I am now doing research on business-IT alignment in Chinese SOEs. We are going to discuss the business-IT alignment issues in your company during the interview. Thank you.

Part A: Introduction

1. What is your position in the company? What are your main responsibilities in work?

2. Are your work related to anything about IS/IT strategy?

3. What are your understandings of business-IT alignment in the company?

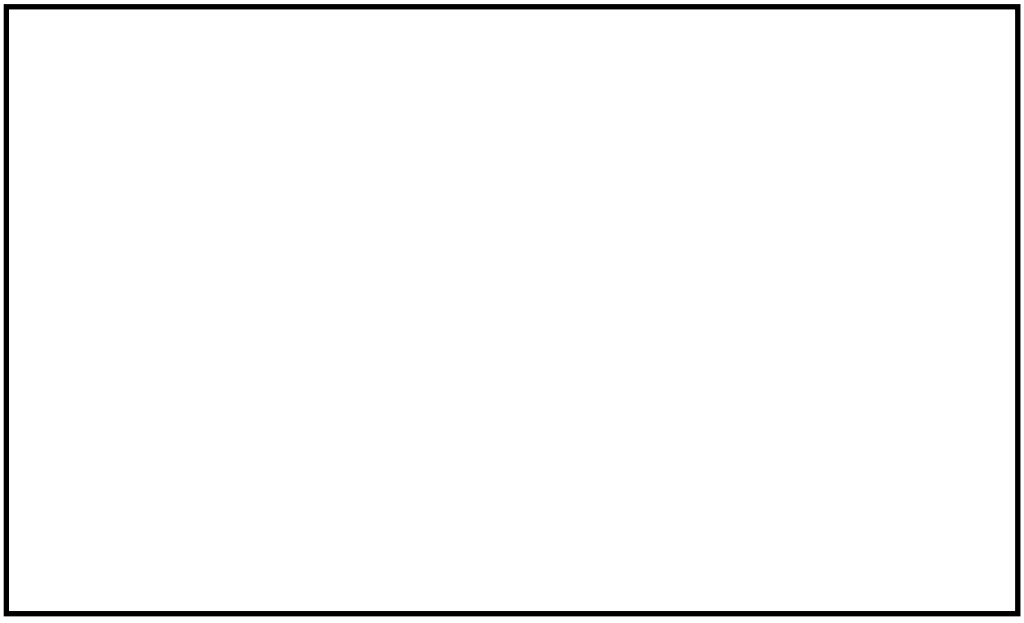
Part B

4. What do you think of the IT/IS development or implementation plans in the company?
   (a1)

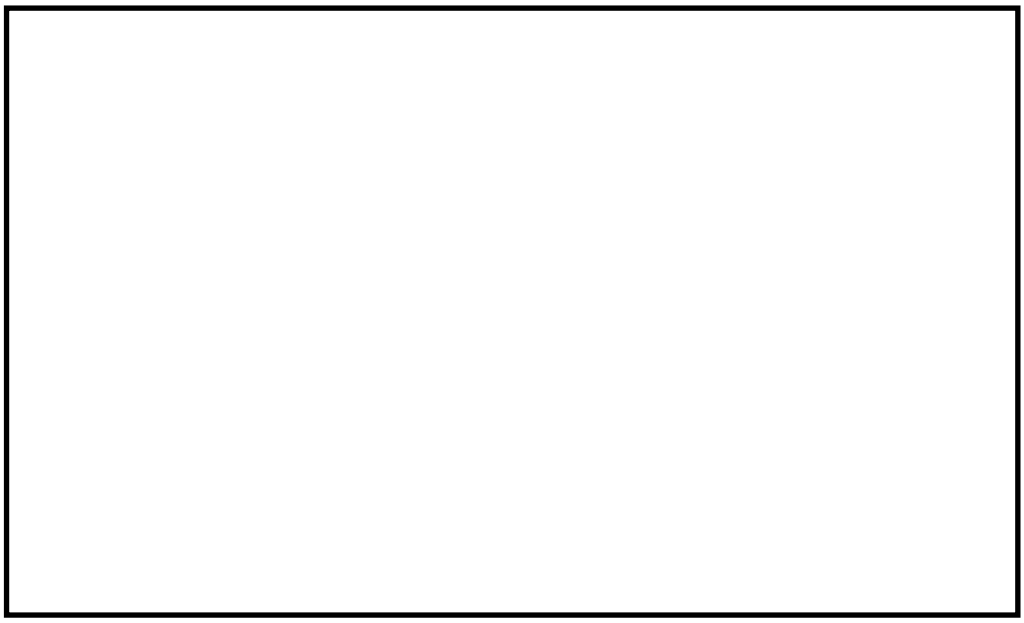
- Discuss about how did your company decide IT/IS plans?
- Have you developed these plans referring to business plans?
- Do you include the business plan in the IT/IS plans?

5. What do you think of business plans and business objectives in your company? (a2)
   Do you know the aims or the content of the business plans?
   Do you need to do any work or have you been involved in any meetings related to business plans?
   Do you have any plans or regulations of your work? Who decides it?

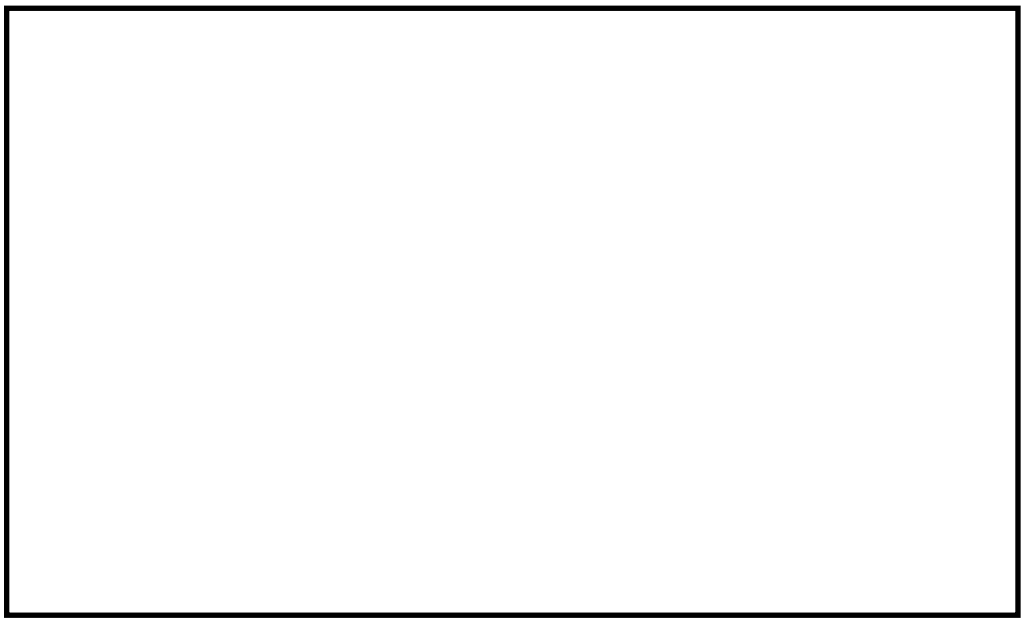
6. What are your expectations of IS implementations in the company in the future?
   How do you imagine the blueprint of IS implementation? (a3)
   (What do you need from IS implementation; any problems with that?)



7. Will you report the IS/IT needs to business executives? How do the business executives support the IS/IT needs? (a4)
   How does IT support your needs? What do you do when it does not?



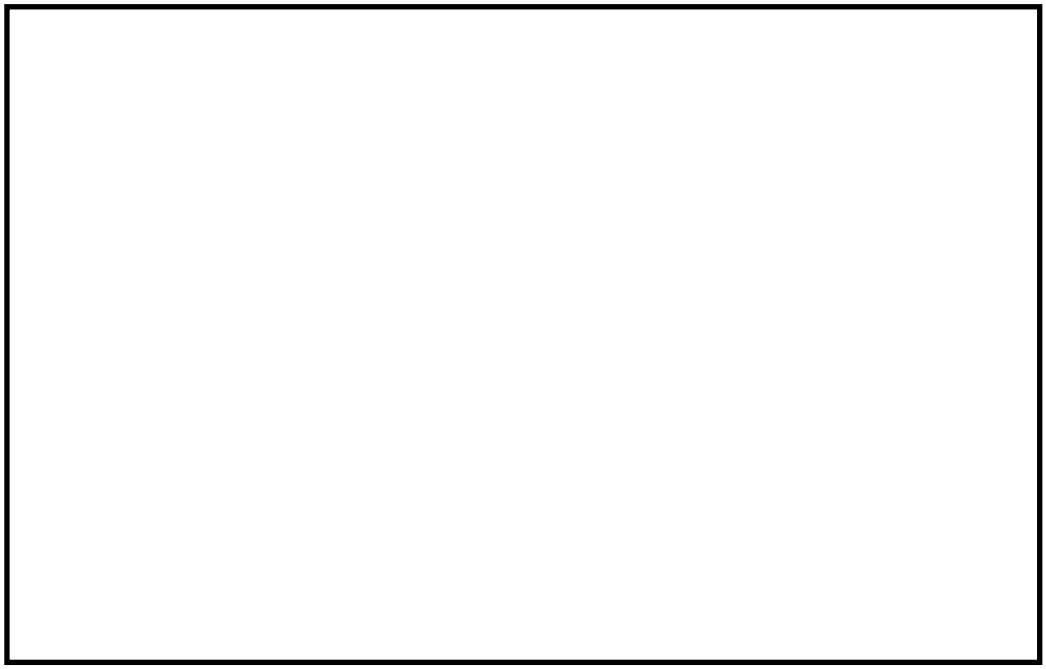
8. What do you think of the linkage of business and IT? Please rate it. (a4)
   How does IT support the operation of the company? How does it support your operational needs?



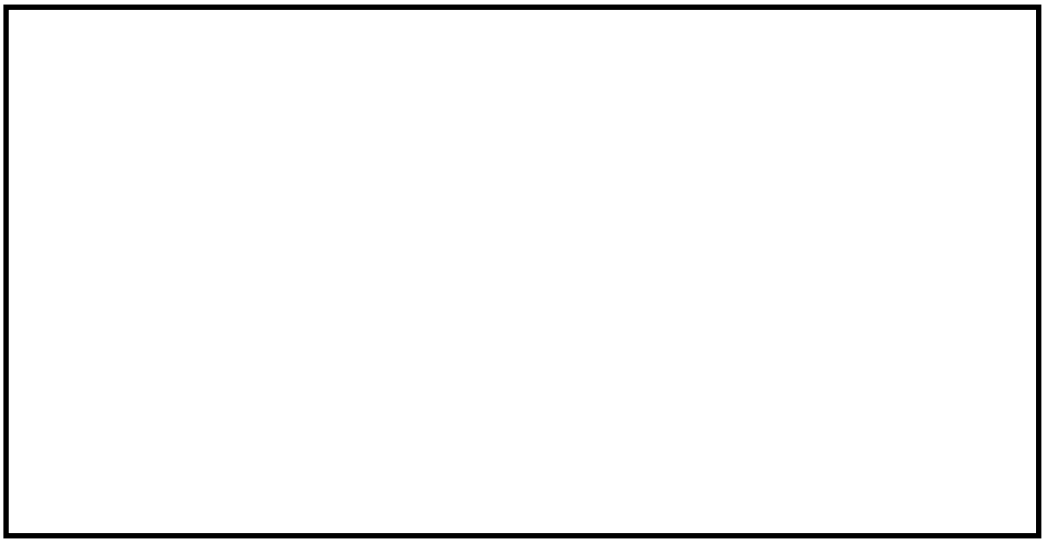
9. What parts of the applications in the company have been outsourced? (a5)
   How did you make decisions? Have you decided it according to any business plan?

10. How will you decide IT investment budget? Will business executives influence your decision? Are you satisfied with the investment and the decision making processes? (a6)

11. Please discuss your opinions on business managers understanding of the uses of the information systems? Do you think they can understand and operate* the systems well? (b1)

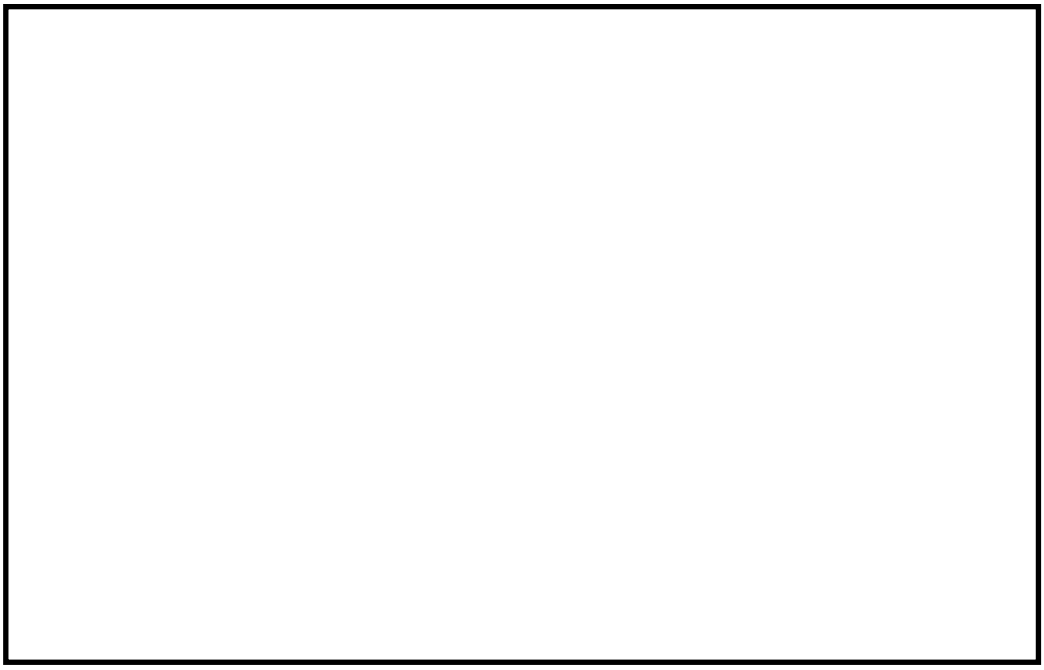


12. Does the IT system actually support management activities in different levels? Are you happy with the current situation of IT/IS support to business management? (b2)

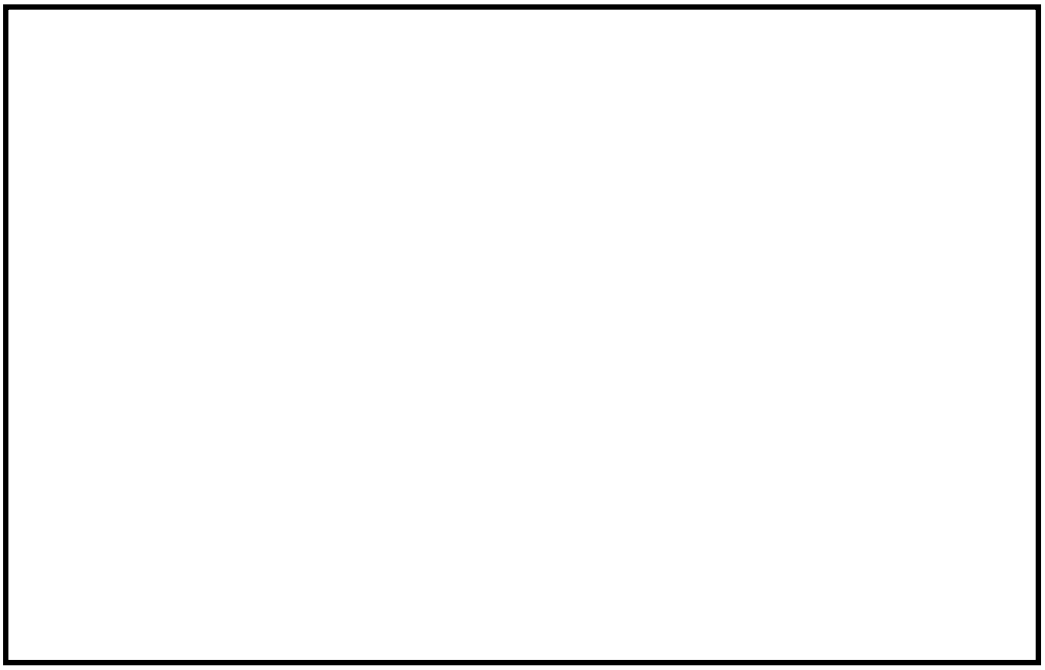


*Miguel and I decides to leave “operate” here to see the answers and further explanations from interviewees even we know managers are not actually operating the systems.

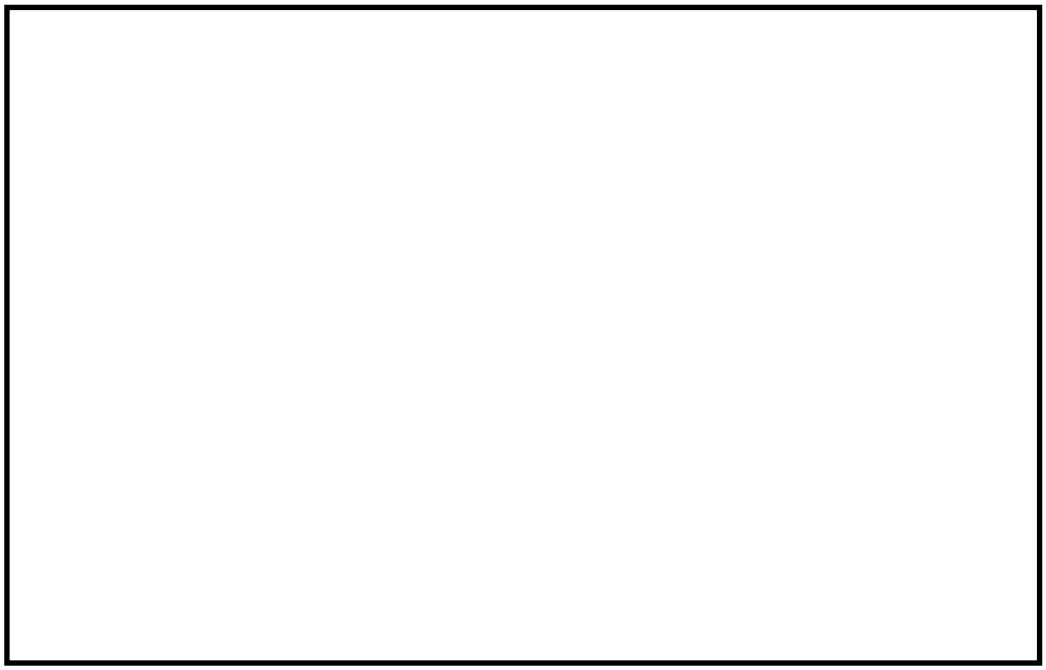
13. In your opinion, what is the importance of the IT department in the company? Do you feel that you have enough resources/ funding/influences in the company? (b3)



14. Do you support any information systems connections with other branches? How is it done? Are different functional information systems able to communicate with each other? Are you happy with the current situation? (b4)

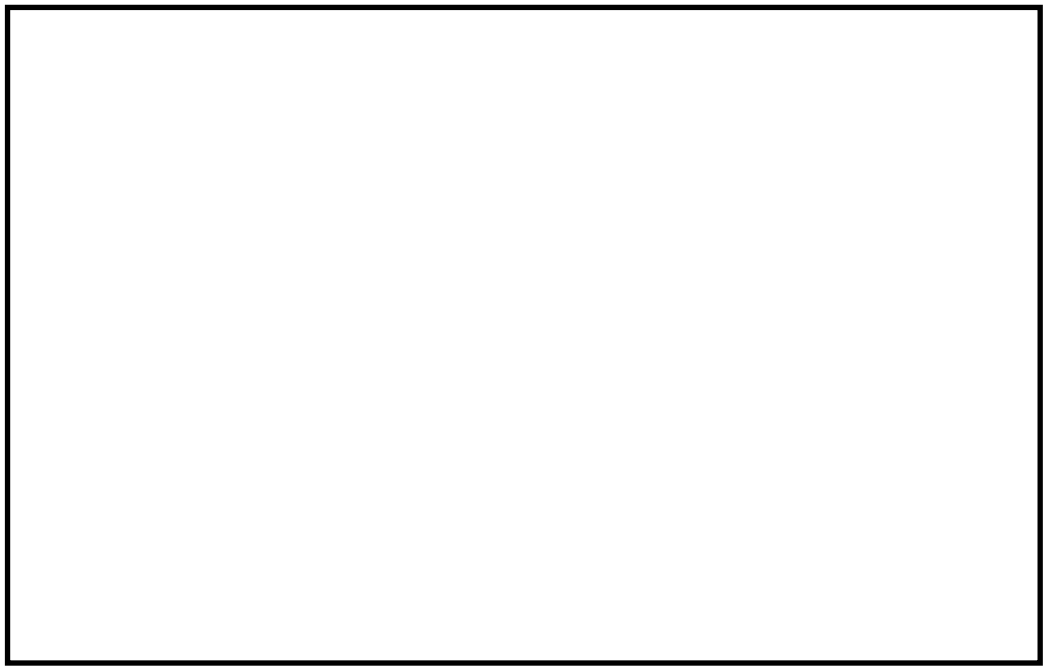


15. Do you think IS communication is used for management activities in the company? (b5)
    Do managers use emails/information systems to do communication in the work? For example, do they use emails/information systems to schedule work, communicate people, inform people of decision making, communicate with other managers?

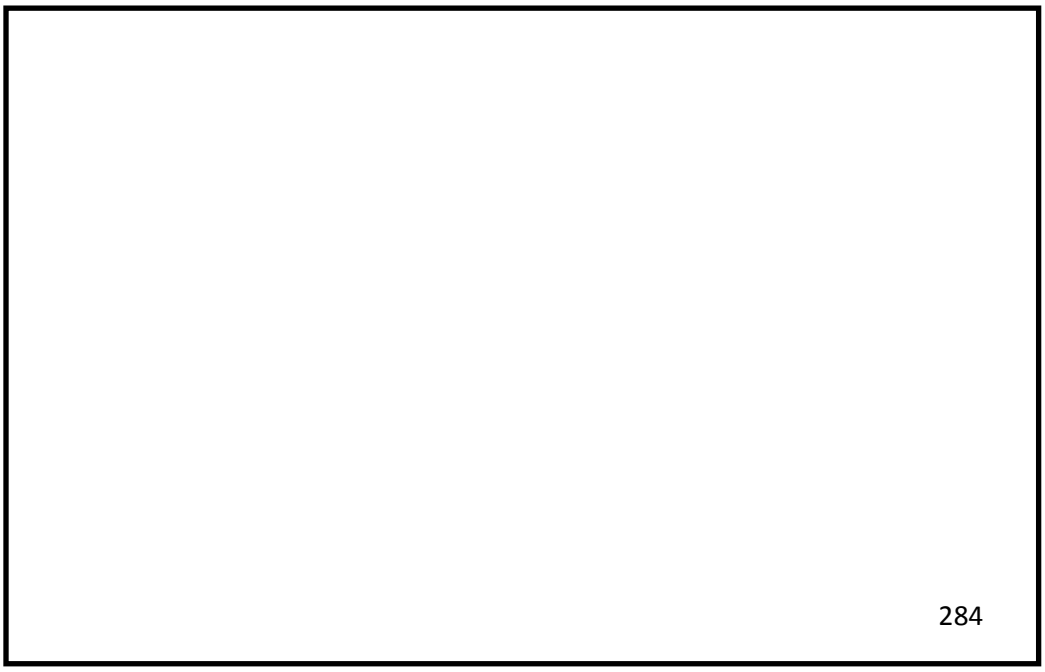


16. Please discuss your opinions on if IS functions support business functions well? Do you think IS communications actually help a lot with operational activities in the company? (d1 & d2)
    Do you have related systems support different business functions, such as human resources systems or ERP? Do you think any functional systems in the company are relatively better implemented? Do you think operational staff use emails or systems frequently to transfer operational information?

17. How do you provide IS services to different functional department in the company? (c1)
    Do you think IS support sales, manufacturing, accounting or human resources department? Do you think IS service facilitates the operations of these functional departments?



18. Are you happy with the managers or operational staff competencies of information systems implementation? (c2&c3)
    Do the operational staff ask for help from you frequently? Can you help in time? What types of problems do you usually solve? In your opinions, are there any problems with the staff's operations of information systems? Have they been involved in any trainings course?



Part C

1. Do you have anything to add in relation to business-IT alignment?

访问脚本 （对公司信息部人员）

您好，我是陈思。我是谢菲尔德大学的博士研究生。我现在在做关于企业与信息技术的价值连结的研究。接下来我们会讨论在您的公司关于企业与信息技术的价值连结的问题。谢谢您。

第一部分：导言

1. 请问您在公司的职位是什么？　您工作的职责是什么？

2. 你的工作与信息系统或者信息技术战略相关吗？

3. 请谈一下您对企业与信息技术的价值连结的看法？

第二部分　访谈

4. 请问您怎么评价您的公司的信息技术和信息系统的发展和应用战略？（a 1）
   - 请谈一下在您的公司，信息技术和信息系统战略是怎样决策的？
   - 请问在您的公司，信息技术和信息系统战略的决策过程中会参考公司的商业战略吗？
   - 请问在信息技术和信息系统战略中会包含商业战略的内容吗？

5. 请问您对公司的商业战略和商业目标有什么看法？（a2）

- 请问您知道关于商业战略的目标或者内容吗？
- 请问您需要做与商业战略或者目标相关的任何工作吗？请问您有参加过任何会议是商业战略或者目标相关的吗？
- 请问您有日常的工作目标或者计划吗，　是由谁决定的呢？

6. 请问您对公司信息系统应用的前景有什么期待？您能描述一下您对信息系统应用的规划蓝图吗？(a3)

（您对信息系统的应用有什么需求吗; 或者您有什么问题或者想法吗？）

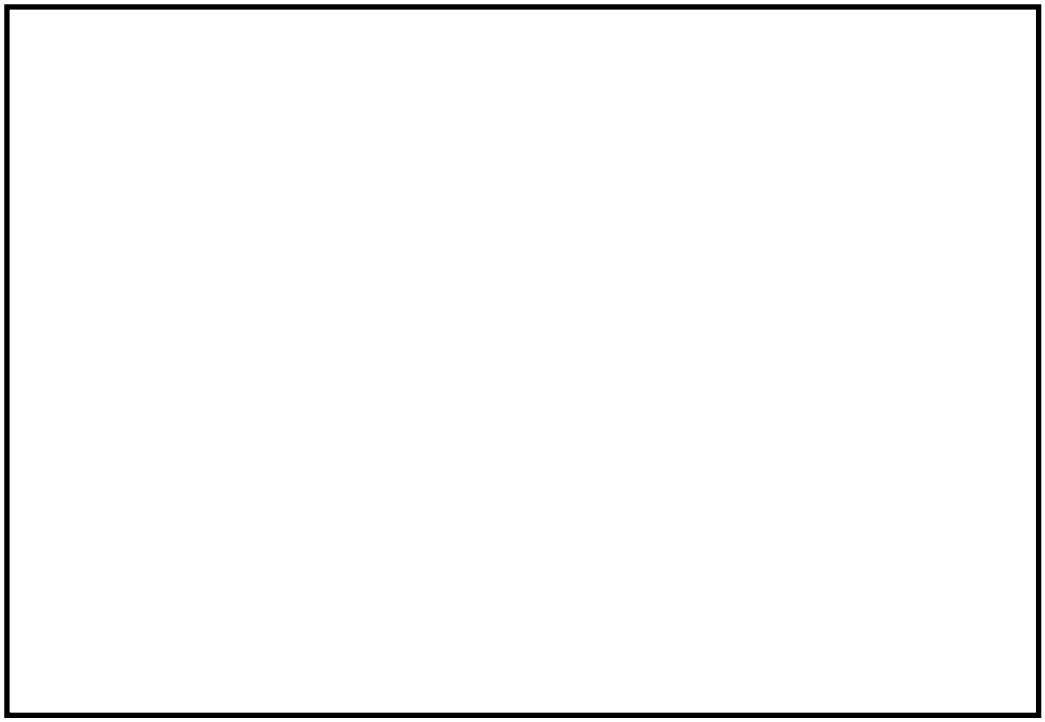
7. 请问您会把信息技术或者信息系统的需求报告给业务管理者吗？ 公司管理者是怎样对信系技术和信息系统的需求进行支持的？(a4)
请问信息系统和信息技术是怎样满足你的需求的？ 当他们不能满足你的需求的时候，你会采取什么措施？

8. 请问您怎样看待在公司里商业和信息技术的连结？ 请给连结的紧密程度打分。(a4)
请谈一下信息技术是怎样对公司运作进行支持的？ 信息技术是否支持了您的日常工作需求？

9. 请问您的公司有进行信息系统外包吗？ 请问您的公司外包了哪些信息系统？ (a5)

请问您的公司是怎样决定进行信息系统外包的？是根据商业战略或者信息技术战略决定的吗？

１０． 请问您的公司是怎样决定信息技术和信息系统投资预算的？商业管理者会影响预算决定吗？ 请问您对信息技术和信息系统投资的决策过程满意吗？(a6)

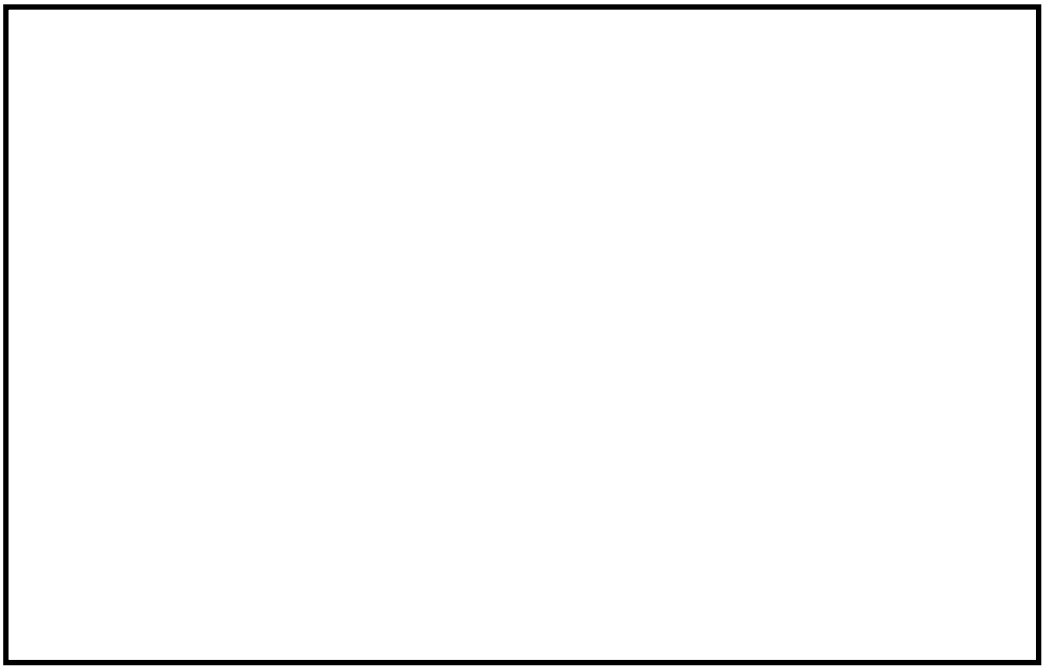


１１． 关于商业管理者对于信息系统使用的理解，您能谈一下您的看法吗？ 请问您认为商业管理者是否能够很好的理解和＊运作＊信息系统呢？(b1)

１２． 请问在您的公司，信息系统是否支持不同层次的管理活动？ 您对目前信息系统对商业管理的支持状况满意吗？(b2)

*Miguel 和我决定在这里使用运作这个词来看被访问者对这个问题的解释和看法即使我们知道管理者并没有真正操作系统。

13.请问您认为在公司中信息部门的重要性是怎样的？请问您觉得您的部门有足够的资源，资金，和在公司中有足够的影响力吗？(b3)

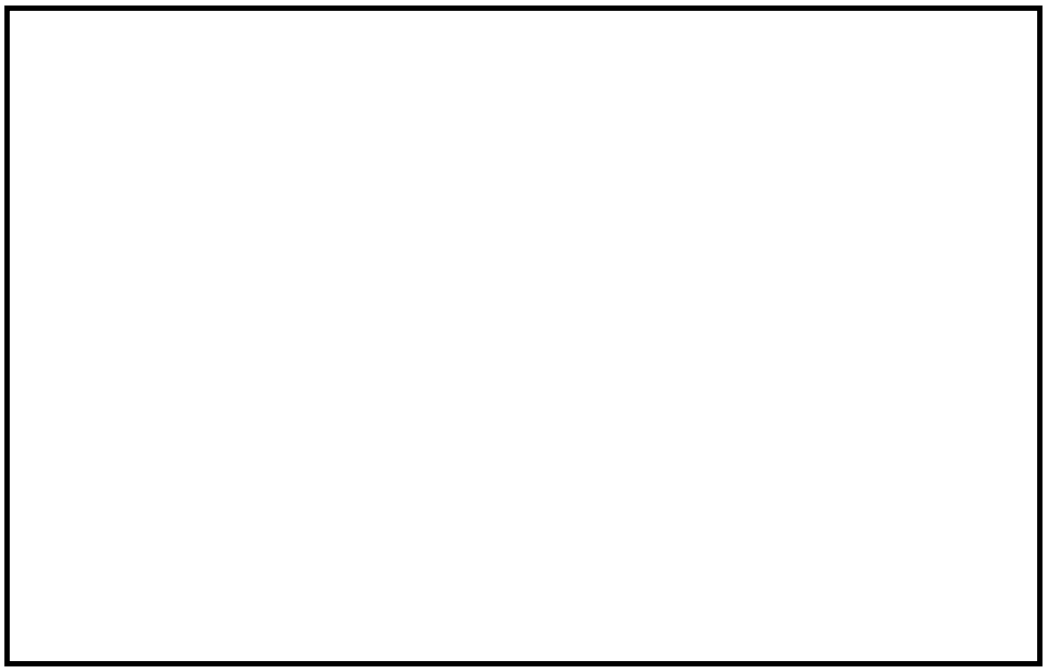


14.请问信息服务支持本公司信息系统与其他分公司信息系统的联系吗？这个联系是怎么实现的？请问不同功能信息系统可以相互通信吗，比如财会系统可以和生产信息系统互相通信吗？您对信息系统目前的联系通信状况满意吗？ (b4)

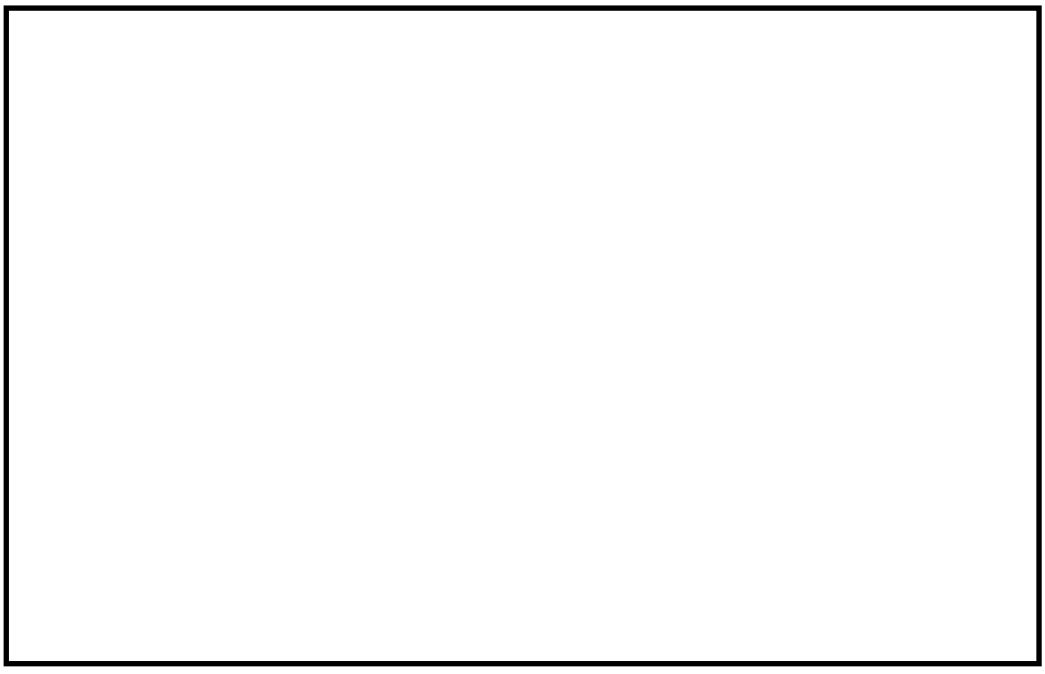
15. 您认为信息系统通信有用于公司管理活动吗？ 管理者们在工作中会用邮件或者信息系统进行通信吗？比如说，他们是否会用邮件或者信息系统规划工作，通知工作人员，告知工作人员管理决策，或者与其他管理者进行联系？(b5)

16. 关于信息系统功能是否很好的支持了公司的商业功能，请谈一下您的观点。您认为信息系统通信是否有利于公司的生产运营活动？ 您的公司是否拥有相关的信息系统对公司不同的功能部门进行支持，比如人力资源系统或者 ERP？您认为在公司中是否有些功能信息系统相对其他系统更好的被应用了呢？ 您认为生产运营人员是否经常使用邮件或者信息系统传递生产运营信息呢？(d1&d2)

17. 请问在公司中不同的功能部门都有使用信息系统服务吗？ 您认为信息系统很好的支持了销售，生产，财务，或者人力资源部门吗？ 您认为信息系统服务是否有利于这些功能部门的运营？(c1)

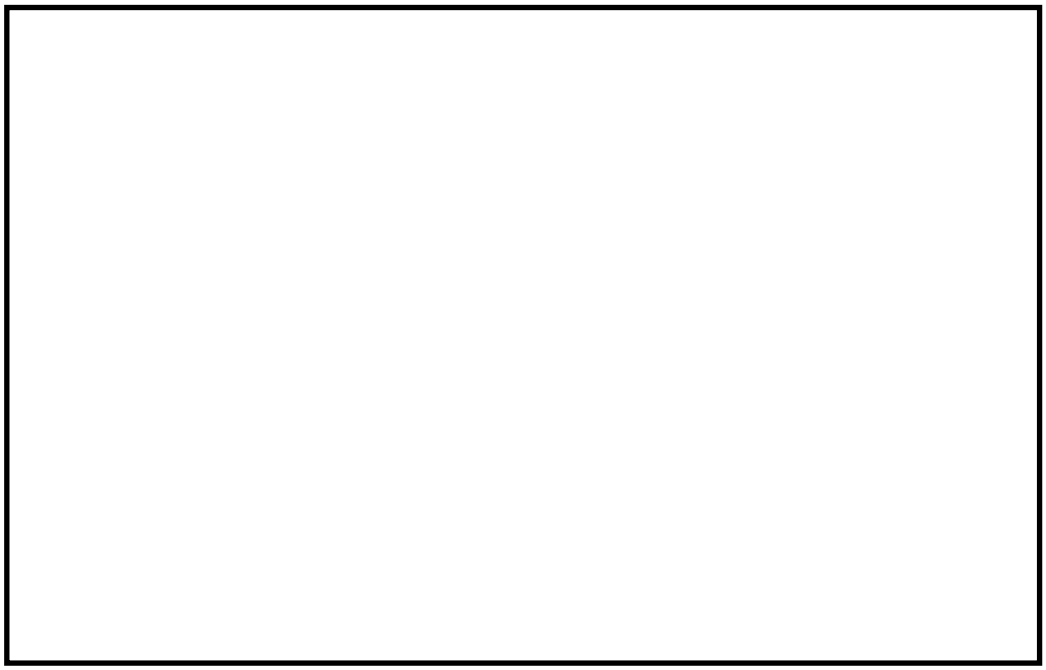


18. 您对目前管理者或者生产运营人员应用信息系统的能力满意吗？ 生产运营人员会经常因为信息系统或者相关问题向您求助吗？ 您能及时提供帮助吗？ 哪种类型的问题是您经常帮助解决的？ 您认为公司人员操作信息系统存在什么问题呢？ 他们有参加过相关培训课程吗？(c2&c3)



第三部分

您对于企业与信息系统价值的连结还有什么补充的看法要谈吗？



Interview script (For functional people)

Hello, nice to meet you. My name is Si. I am PhD student in University of Sheffield. I am now doing research on business-IT alignment in Chinese SOEs. We are going to discuss the business-IT alignment issues in your company during the interview. Thank you.

Part A: Introduction

1. What is your position in the company? What are your main responsibilities in work?

2. Are your work related to anything about IS/IT strategy?

3. What are your understandings of business-IT alignment in the company?

Part B

4. How did you develop business plans and IT/IS implementation plans? (a1)
   Will you refer to any IT/IS plans when you decide your business plans?

5. Do your business plans include IS plans or IS objectives? (a1)

- Yes. Explain if they are included in detail.
- No. When you develop your IS plans or objectives, what you will refer to?

6. What do you think of the IT/IS plans in your company? Are you satisfied with them? (a2)

   Do you know the aims or the content of IT/IS plans? Do you need to do any work related to IT/IS plans?

7. What are your expectations of IS implementations in the company in the future?
How do you imagine the blueprint of IS implementation? (a3)
(What do you need from IS implementation; any problems with that?)

8. Do you report any business requirements to IT/IS department?
To what extent are you satisfied with the linkage of business and IT? (a4)
Why?

9. What parts of the applications in the company have been outsourced? (a5)
How did you make decisions? Have you decided it according to any business plans or IS/IT plans?

10. What is your input in deciding IT/IS investment budget? Are IT/IS executives involved in the decision-making process, why? (a6)

１１．　Please discuss the information systems you are using now. What types of systems are you using? Do they help a lot with your work? (b1)

１２．　Do you use information systems a lot to support your management activities, such as use them to schedule work? Will information systems help with the decision making processes? (b2)

13. Do your managers use information systems a lot? Do you think they can use them well to help management activities? (b2)

14. Do you think information systems support your communications with other branches? If yes, are you using the systems frequently? Are you happy with how is it done? If no, will you communicate with other branches? How is it done? (b4)

15. What do you think of the information systems communication support to the management activities? Are they very helpful? Do you use emails/information systems to communicate people in upper/lower level of the organization, inform people of decision making or communicate with other managers? Will information systems facilitate these activities? If no, how do you usually transfer working requirements or operation requirements? (b5)

16. Do you think the use of IT/IS actually supports the business process in the company? Are these information systems able to communicate with each other? Are you happy with the implementation of IS in the operational work? (c1)

１７.　Do you use any functional information systems in your department? (c 2)

- Yes. What are your understandings of these systems? Are they friendly to be used?
- No. Which types of information systems are you using?

１８.　How these functional information systems facilitate your work? Do you think you or your colleagues can operate the systems well? Do you have any concerns or problems with systems operation? (c2)

19. If you have any problems with the systems operation, can you get help from IT department in time? Are happy with what they have done? Do you have any more requirements? (c3)

20. Have you been in any training courses for the information systems operation? (c3)

２１. Do information systems facilitate all of the operations in your work? Are you happy with the implementation of information systems? (d1)

２２. How is operational information shared between colleagues of your team? Are information systems helpful to these information sharing? (d2)

Part C

23. Do you have anything to add in relation to business-IT alignment?

访问脚本

您好，我是陈思。我是谢菲尔德大学的博士研究生。我现在在做关于企业与信息技术的价值连结的研究。接下来我们会讨论在您的公司关于企业与信息技术的衔接的问题。谢谢您。

第一部分：导言

1 请问您在公司的职位是什么？　您工作的职责是什么？

2 你的工作与信息系统或者信息技术战略相关吗？

3　请谈一下您对企业与信息技术的衔接的看法？

第二部分：访谈

4　您的公司是怎样制定商业战略和信息系统应用战略的呢？当您制定商业战略的时候会依据公司的信息系统 应用战略吗？ (a1)

5 您公司的商业战略包括信息系统计划和信息系统目标吗？如果是的话，请解释一下细节。如果不是的话您的公司制定信息系统计划或者目标时候的依据是什么呢？(a1)

6 您怎样评价公司的信息系统战略？您对公司的信息系统战略满意吗？ 您知道信息系统计划的目标或者内容吗？您会做与信息系统计划有关的工作吗？(a2)

7 请问您对公司信息系统应用的前景有什么期待？您能描述一下您对信息系统应用的规划蓝图吗？(a3)
（您对信息系统的应用有什么需求吗; 或者您有什么问题或者想法吗？）

8 您会报告商业需求给信息部门吗？ 您对商业部门和信息部门的联系程度满意吗？ 为什么？ （a4）

9 请问您的公司有进行信息系统外包吗？ 请问您的公司外包了哪些信息系统？(a5)

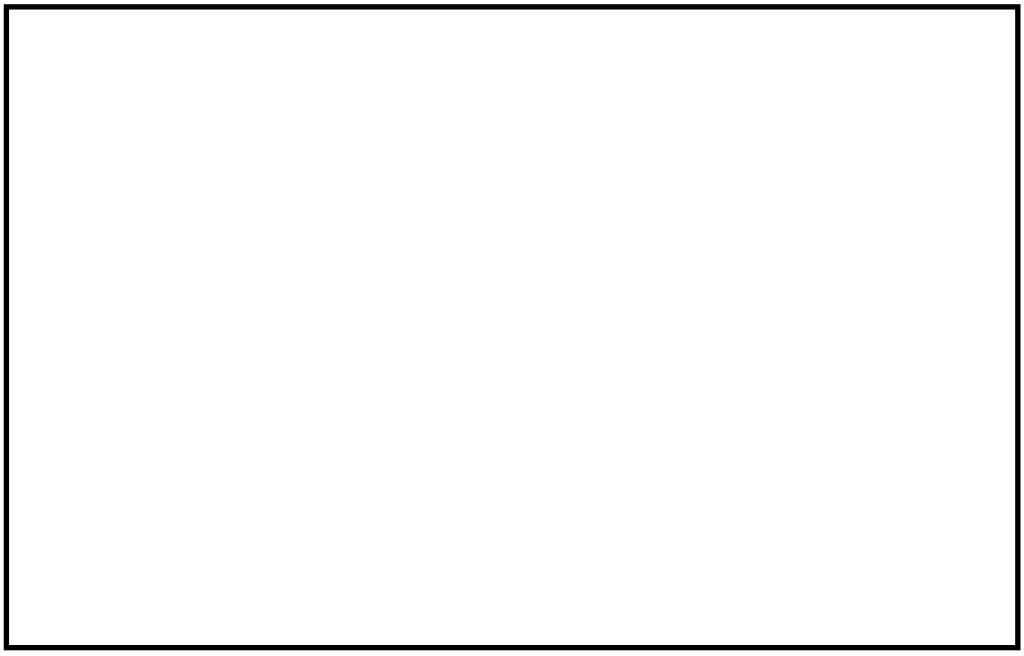
请问您的公司是怎样决定进行信息系统外包的？是根据商业战略或者信息技术战略决定的吗？

10 您会参与对信息系统投资预算的决定吗？ 信息部门的管理者会参与投资预算的决定吗？ （a6）

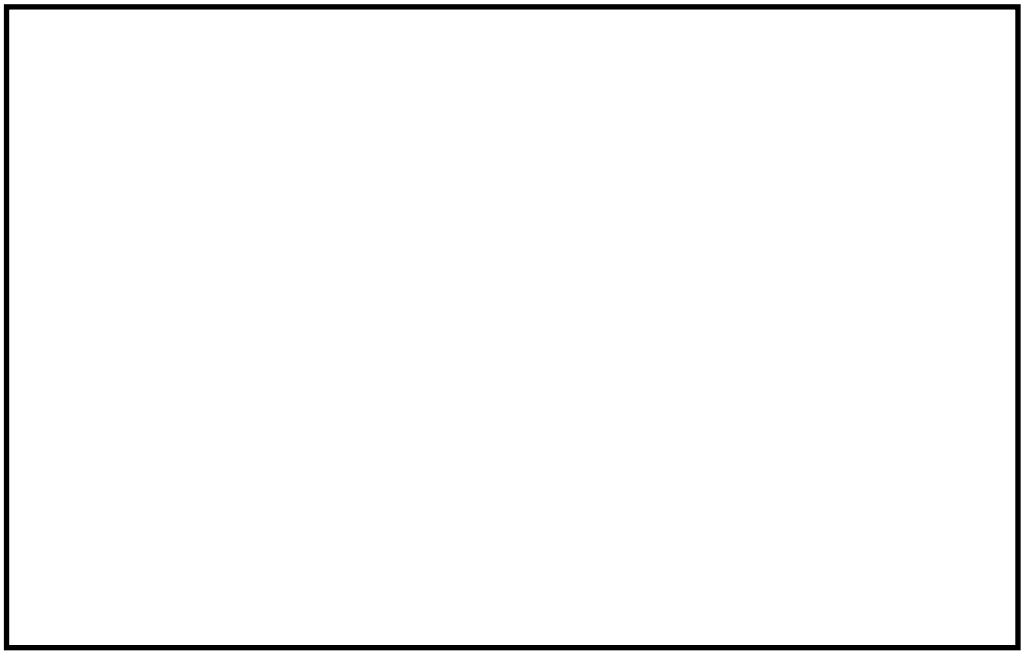
11 请谈谈您对您现在使用的信息系统的看法。您在使用哪种类型的信息系统？这些信息系统对您的工作帮助大吗？ (b1)

12 信息系统会支持您的管理活动吗，比如帮助制定工作计划？信息系统会帮助公司的决策过程吗？（b2）

13 请问您的上级或者管理者会经常使用信息系统吗？您认为他们很好的应用信息系统从事管理活动吗？（ｂ２）

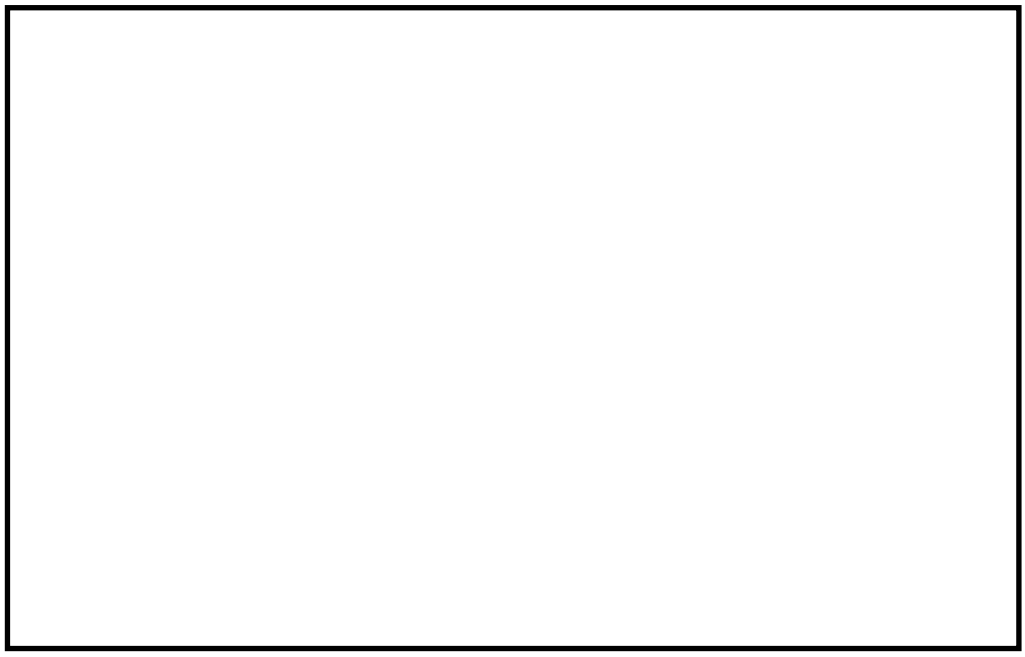


１４．　请问信息系统有没有帮助您与其他分公司的通信？ 如果是的话，您会经常使用信息系统进行通信吗？您对现在的通信状况满意吗？ 如果不是的话，您会与其他的分公司进行通信吗？是怎样通信的呢？(b4)



１５．　　请您评价一下信息系统通信对管理活动的支持，这个支持是对管理活动非常有帮助的吗？ 您会使用邮件或者信息系统与公司的上下级进行通信吗，比如通知决策或者与其他管理者联系？ 信息系统对这些活动是有益的吗？ 如果您没有使用信息系统进行通信，那么您是如何传递工作要求或者运营要求相关信息的呢？（b5）

１６．　　您认为信息系统支持了公司的运营运作吗？不同的信息系统可以相互通信吗？ 您对目前信息系统在公司运营方面的应用满意吗？(c1)

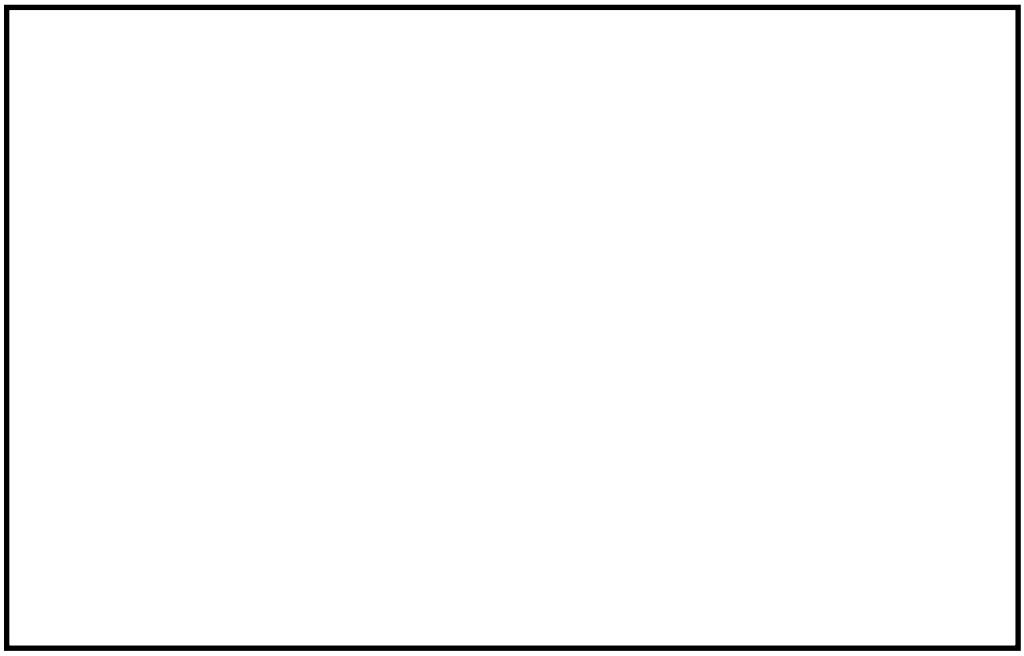


１７．　请问您的部门使用相关功能信息系统吗，比如财务信息系统，人力资源信息系统？如果是的话，请谈谈您对这个信息系统的评价？他们好用吗？如果没有的话，您使用哪种类型的信息系统？（ｃ２）

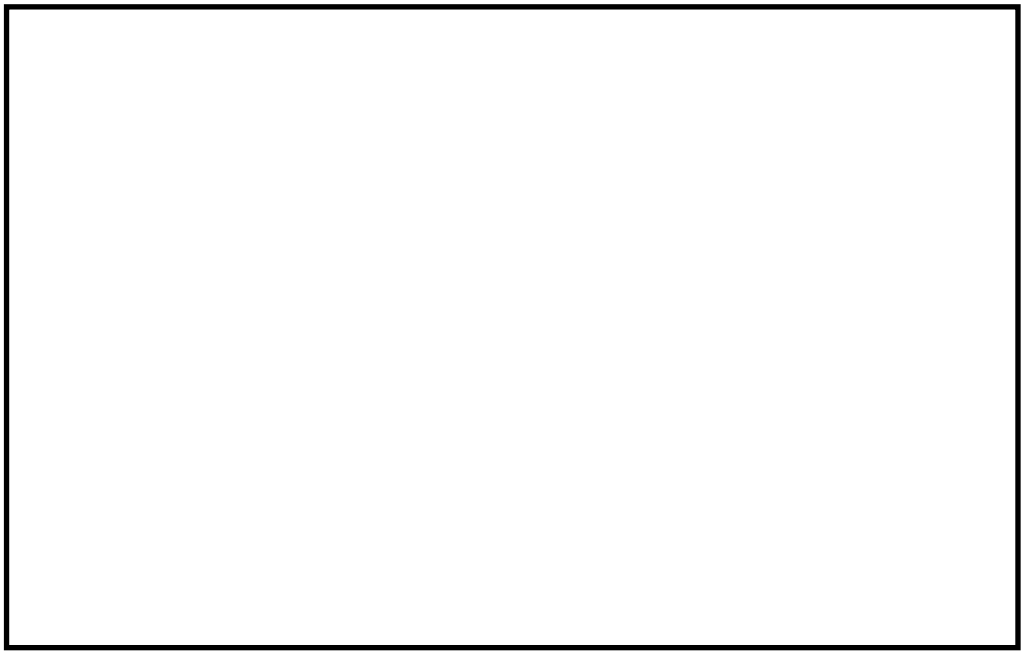
１８．　这些功能信息系统有帮助您的工作吗？您认为您个人或者您的同事能很好的操作这些信息系统吗？您对信息系统操作有任何想法或者问题吗？（ｃ２）

１９． 如果您对信息系统操作有任何问题，您可以及时的从信息部门得到帮助吗？您对信息系统部门的工作满意吗？ 您有更多的要求吗？ （ｃ３）

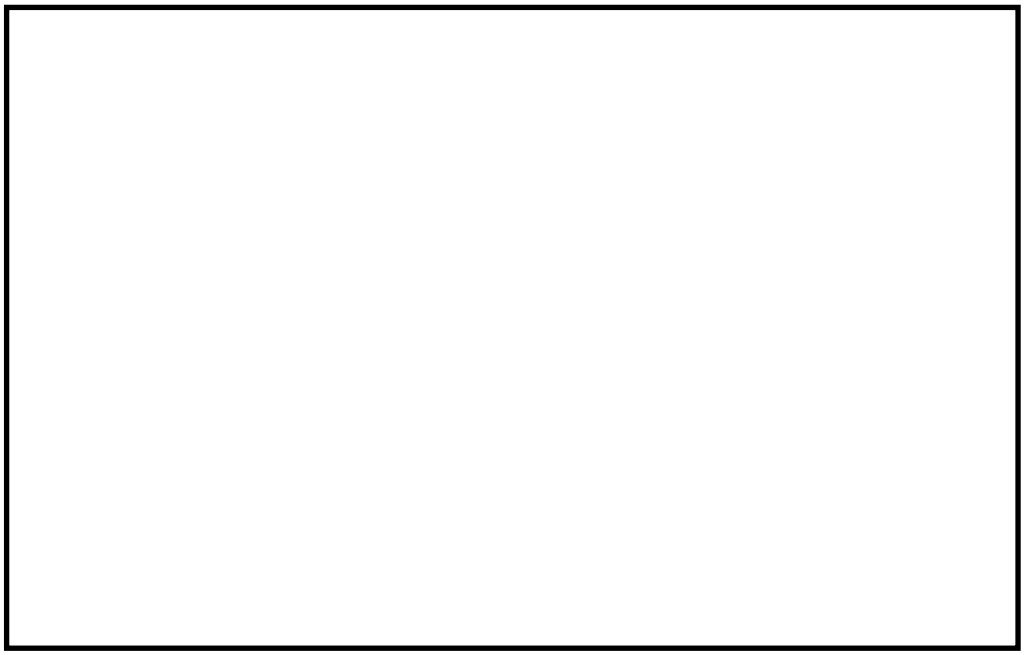
２０． 请问您有参加过关于信息系统操作的相关培训课程吗？（c3）



２１．　　信息系统对您的工作和业务有帮助吗？ 您对信息系统的应用满意吗？（d1）

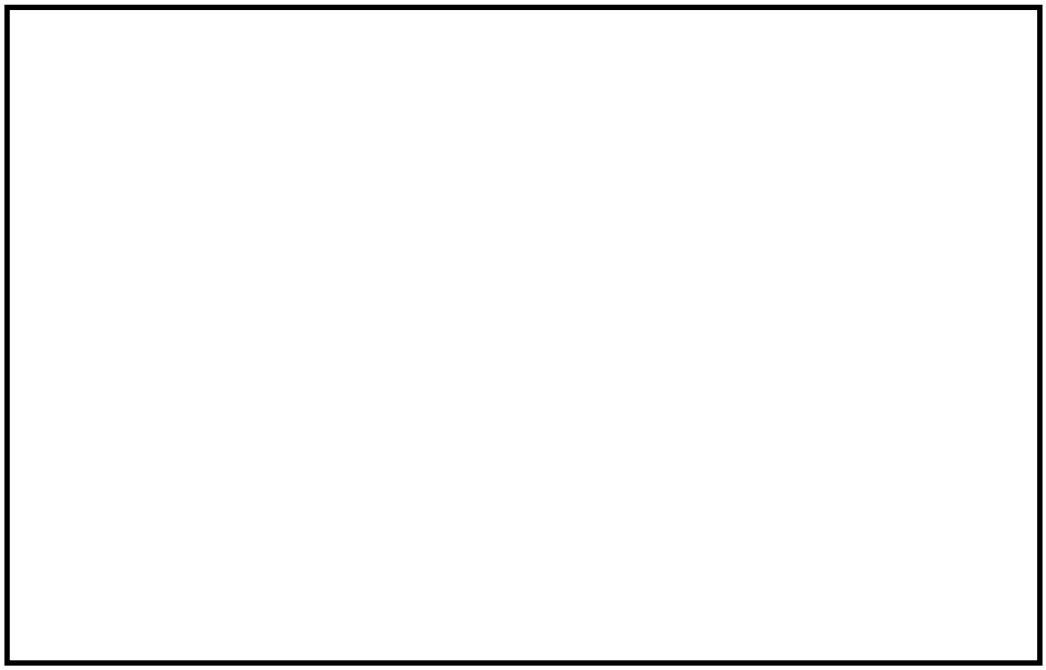


２２．　请问业务信息是如何在您的工作部门中共享的？ 信息系统对这些信息共享有帮助吗？ (d2)



第三部分

您对于企业与信息系统价值的连结还有什么补充的看法要谈吗?



Appendix 5 Information sheet

The University of Sheffield. Information School	*Business-IT alignment in Chinese SOE(State-Owned Enterprise)*

Researchers

Si Chen

Information School

University of Sheffield

Regent Court, Portobello Street, Sheffield S1 4DP, UK

Purpose of the research

This research aims to investigate the current situation of business-IT alignment in Chinese SOE (State-Owned Enterprise). The causes and consequences of this situation are explored further which are expected to help SOE improve the business-IT alignment.

Who will be participating?

We are inviting the managers and staffs in the case SOE group to participate the research project.

What will you be asked to do?

Your participation in this study entails engaging in a semi-structured interview to discuss different dimensions of business-IT alignment. The interview may last around 30 minutes and you will be asked to speak openly about the opinions or experiences of information systems implementation or business management in the company. All the questions will be in the field you are familiar with.

What are the potential risks of participating?

Your participation in this study does not imply any identifiable risks. As the identity and affiliation of participants will not be recorded, there is minimal risk that the study will constitute an invasion of your privacy. Questions were designed as not cause harm, anguish or discomfort. If you feel uncomfortable answering any of the questions, feel free to express your concerns. You are, of course, free to decline to answer such questions. You are moreover encouraged to refrain from disclosing any information that you may consider defamatory, incriminating, or otherwise sensitive.

What data will we collect?

Your interview will be digitally recorded. All of your audio responses during interview processes will be recorded. After the interview, the recording will be transcribed into word documents and be fully anonymous.

What will we do with the data?

The audio recordings of your activities made during this research will be subject to participants' informed consent and used only for transcription and analysis purposes. No other use will be made of them without the participant's written permission, and no one excluding the researcher and his supervisor will be allowed access to the original recordings. Audio recordings and all digital documentation will be stored in a password protected account accessible by a user account for the researcher. Back-ups will be onto removable storage located within a lockable cabinet or else onto password protected networks at the University. All electronic files will be stored in a password protected account for a period of 5 years.

Will my participation be confidential?

All the information that is collected about you, as well as any information that you give during the course of the research will be kept strictly confidential, as ensured to all participants in the consent form. You will not be able to be identified in any reports or

publications. During analysis, you will be assigned a number allowing complete anonymity. Your interview but not your name will be recorded and transcribed, with all records being kept for a period of 5 years with the researcher or the project supervisor in a secure place. After this period all transcripts will be destroyed.

What will happen to the results of the research project?

The results of this research will be published in a doctoral thesis. Information gained during the research project may additionally be published, in the form of interview transcripts, in academic journals, books and conference papers; and used for subsequent research. In all of the aforementioned circumstances, the participant's name, affiliation and position title will never be used in relation to any of the information provided.

Participants will be notified upon publication of results in the doctoral thesis, and copies will be forwarded upon request.

I confirm that I have read and understand the description of the research project, and that I have had an opportunity to ask questions about the project.

I understand that my participation is voluntary and that I am free to withdraw at any time without any negative consequences.

I understand that I may decline to answer any particular question or questions, or to do any of the activities. If I stop participating at all time, all of my data will be purged.

I understand that my responses will be kept strictly confidential, that my name or identity will not be linked to any research materials, and that I will not be identified or identifiable in any report or reports that result from the research.

I give permission for the research team members to have access to my anonymised responses.

I give permission for the research team to re-use my data for future research as specified above.

I agree to take part in the research project as described above.

Participant Name (Please print)	Participant Signature
Researcher Name (Please print)	Researcher Signature
Date	

Note: If you have any difficulties with, or wish to voice concern about, any aspect of your participation in this study, please contact Dr Angela Lin, Research Ethics Coordinator, Information School, The University of Sheffield (ischool_ethics@sheffield.ac.uk**), or to the University Registrar and Secretary.**

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Appendix 6: A Sample of Quotation list

M1 Low importance of IS strategy	M1.1 Non-awareness of IS strategy contents	M1.1.1 Business people are not aware of IS strategy contents	"I don't know. All the information systems are managed in a sector of the measurement and control department (the interviewee does not know this situation has changed). They are in charge of information, systems configuration. They made it." (N1 Operation Function) 不知道。所有的信息系统它是计控室一个单位，他们是搞全厂的信息啊，系统配置，归他们管的，他们制定的有。 "It is something like this. IS management is special work in enterprises. I remember after reforms in 2002, including following several IS updates, we were just asked about human resources management requirements in a survey from the IT department. Because I am always in charge of human resources management, I do not care about the IS plan, IS strategy concerns. Previously we have reported on it but I did not pay attention to it. It is difficult to find the report now." (N16 Manager Function) 这个事情是这样，作为信息管理，在企业里，是一个专项工作了，那个我记得在当初啊，02年重组以后，乃至后期几次信息系统升级，信息部门也在做这种调研的时候,我们只涉及到人力资源管理上的需求，因为我一直在主管这个人力资源管理里的工作。所以说信息系统上整体上的安排，它的战略要考虑什么问题，确实没有去过问过。原来有个什么报告，我也没太注意，现在这个东西也不太好找了。当时它建立这个东西的时候它有一个进行尽职调查的时候，它有一个战略上的考虑，那么说大话的话，肯定是也是服务企业发展，这是肯定的。但是在尽职调查的时候，它是一个部门一个部门走的。我所接触的几次，全部都是我和所有的信息部门打交道的这两三次，都是人力资源管理上，在信息化的发展，的需求，对信息，对内部网的需求。有什么改进，谈的是这一块。而整体上，我们没有涉及。

			具体你说战略的相关内容，具体的内容我不是很清楚。因为这个战略不是我们这个部门来制定的。因为这个整个这个大的战略要通过信息部门，这个是主导部门。(N2 Manager Function) 我没明白啥意思。 制定就是比如说总部给你一个框架，它设计这个信息系统的时候，它有个模板。它这个模板是宏观的组织架构或者管理模板，到不同的分子公司在这个模板下要进行细化，分解。我们是做这个层面的工作，就是细化分解，方面的。(N3 Manager Function) 这个不知道。 这个还真的不知道。 也不太清楚。(N4 Manager Function) 现在是总部来做这些东西。咱们只是使用。了解不是太多，就是他们有个五年规划，三年规划，下一步应该怎么弄，这个咱现在还不是很清楚。(N13 Manager Function) 那么您的工作会与信息系统的应用战略相关吗？会有一点关联吧。 能具体说一下吗？ 就是我们的工资发放这一块。(N15 Operation Function)

		M1.1.2 IT people are not aware of IS strategy contents	"There are no very clear objectives." "And overall [plan], we are not involved in. It is at the managers' level" (N21 Operation IT) "It is on the official document. I can't remember it now" (N8 Manager IT)
	M1.2 Poor IS strategy implementation in branches	M1.2.1 IS strategy is disregarded	"Now you mention strategy we are not familiar with it anymore. Now does the enterprise have any IS strategy? There is no IS strategy. To the current management situation, I think there should be a strategy, but it is not very clear." (N11 Manager IT)
		M1.2.2 IS implementation is decided based on the separated business requirements	"Now the IS are adopted to provide services to manufacturing. It is when there is a need from production or there are any inconveniences requiring IS use, that it is adopted." "It is something like when they feel something is wrong, they adopt something [IS project] to serve it. Lack of overall planning, it is this kind of problem" (N18 Operation IT).
M2 Insufficient support to management in IS	M2.1 IS applications do not fulfil all the management requirements	M2.1.1 Lack of support to strategic management	"In fact, when we develop the analysis of IS I feel like we need more extensive data. It should not be limited to the information inside SOE group and also should be more focused on the industry, and international data. It means we should have knowledge of what levels we are in, both in terms of domestic industry and the international area. I feel this is more important… I think this is more effective for strategic adjustment, strategy development in enterprises. Furthermore, in enterprises, to promote enterprises management, it will be more effective." (N14 Manager Function)

		M2.1.2 Lack of support to analysis and decision making	"It is important to say this, because there are information selections inside, for instance, in the distribution systems, there is a large amount of data. But for real, the data helps reduce the costs and improve efficiency, which should be controlled by the leaders. There is a need to select the data. It is possible that only five data are needed out of one hundred. Just key data needs to be in the system. Maybe they need to do further work on this part, I think." (N22 Manager Function)
		M2.1.3 Lack of support to management report	"They are not using (IS) directly. Just there will be someone exporting the data and then showing it to them." "It should be sent to the reports directly (in the system). But because headquarters are not able to keep up, we make them ourselves in branches." (N25 Manager IT)
	M2.2 Managers problematic IS use	M2.2.1 Managers do not operate the systems even when needed	"Sometimes it's the problem of method. For instance, when you do some analysis in the systems, there are no obvious advantages to deal with it inside the systems compared with outside the systems. Thus probably I would deal with it outside the systems." (N27 Manager Function)
		M2.2.2 Managers use the traditional ways to obtain information	"Managers always delegate to lower levels, for instance, when there are some demands, it's always you help me to do it. He almost never has a view of them in the systems… For example, there is a need for a report on the enterprises, and they never find them in the systems. They are all reported by us, in a paper copy or e-copy." (N28 Manager Function)
M3 IS are not	M3.1 Weak connections	M3.1.1 Information	"Now some of them are collected automatically. Some are manually

supporting core business units well in branches	between automatic control systems and management IS	collections during production processes still need manual work	collected, such as meter readings, collected from backstage supporters, because there are backstage supporters. The signals from backstage are transferred, data is transferred, different types of meters, such as measure meters are used… and then there are a set of collection methods, including manual management and automatic collection." (N22 Manager Function)
		M3.1.2 Manually input production information to management IS	"He can make them in ERP systems after looking at the reports. For example, how many spare parts or how many raw materials I need now, can be input to ERP. Basically this is the current situation." (N8 Manager IT)
	M3.2 ERP are not used well in manufacturing part	M3.2.1 Rough materials management	"When I was in scheduling meetings, we discussed how many raw materials, fuel, or materials are needed in the current situation, the current consuming situations, what kind of things lead to the main problem. It [ERP] just can roughly control, what is the approximate situation in this part. It is not able to achieve much detail, how many days these materials will serve, or how to solve the problems in some parts. It probably can't achieve such detail. It is just rough, or as a general plan, it can achieve, ERP can achieve." (N19 Operation IT)
		M3.2.2 Rough inventory control	"Our current inventory, whatever spare parts or materials exist, for instance, how much inventory every month is suitable, it is all decided by the managers for us. It does not have a scientific basis. For example, the inventory of the spare parts…, I need to refer to the importance of production, priorities, different materials, different backgrounds, the inventory is different. But now, stock management is all input manually."

			(N32 Manager Function)
M4 Misalign of systems operations and business processes	M4.1 Business processes are different from systems operations		"I think ERP is under the ideal processes… but different from reality. In real operations, it is not possible to be ideal." "In ERP, when you receive the products, you settle the account in the same month. But we can't make it like this now. We need a period for quality acceptance check… as delays in the pricing system means they don't reflect the real price". (N4 Manager Function)
	M4.2 Lack of functions in the systems		"I think there are differences between the IS and their requirements." "For example, I think for many people, when they need systems support, maybe there it is not available. For instance, previously I learnt contract approval… They need IS applications to facilitate the fast delivery and joint check and approval. These were not available and they have to do it by hand." (N11 Manager IT)
	M4.3 Systems operations do not match with organizational structure		"The production situation changes very quickly. This system is relatively fixed. It is not able to change whenever you change. It is very difficult to make changes on systems" "For instance, last year, at the beginning, there were two alumina producing plants, and then these two were merged together. After merging, the costing in the systems should have been modified. It was very difficult when we made changes. (N20 Manager Function)
M5 Low IS	M5.1 Poor IS operational	M5.1.1 Just use simple	"Not well means because some people they do not operate it well; so maybe

operational capabilities of staff	skills	functions	I arrange for them to use some simple functions. If they improve their skills they need to do some things in costing, some more complicated things…." (N36 Manager Function)
		M5.1.2 Just acquire the skill in their own responsibilities	"ERP is a system with very detailed job divisions. It means our staff can work very skilfully in their roles. But if there is a job adjustment, it is very difficult for them to adapt to it Because they usually work in the area they are familiar with, when they are given another post, they are not able to get very comprehensive knowledge." (N24 Manager Function)
	M5.2 Lack of standardized IS operations		"In fact all these functions are in the systems. But when making the purchase order, they do not fill in some elements in the contract, which results in a lack of this information in financial systems when verification is required. Because, without this information, some further information is not created neither. Some of them fill in the information, some do not. As a result, the final data collected does not match with the reality. But nobody is patient enough to find out the reason for the mismatch, to set a standard." (N14 Manager Function)
	M5.3 Redundancy of works due to lack of confidence in IS use		"Previously we have an account on the table because they needed to export, which meant an Excel table; then generating an account on the system. Afterwards, I would check the account manually to see if they were exactly the same… then operate the ERP system. Whatever the financial department did, such as making a payment and so on, they were consistent. The staff knew they could check the accuracy, at least." (N6 Manager IT)

	M5.4 Unbalanced IS operational capacities among departments		"I can just say the capabilities are different and there are huge differences. This financial department is very good indeed… But in many production units, the ability to use IS was really poor. If there is a difficult, they come to us." (N5 Manager IT)

C1 IS issues	C1.1 Non-strategic role of IS/IT	C1.1.1 IS/IT is in service position	"In this industry, the main business of the enterprise is manufacturing. No matter how important the IS are, they cannot reach that kind of level. They just provide services to production." (N12 Operation IT)
		C1.1.2 IS/IT is not playing strategic role	"We are now just going out to have a study. For example... I studied outside and found something was beneficial in our enterprise and then came back and wrote a report reflecting the benefits of implementing this. After this I talked with the manager. Now actually we are playing a guiding role. It is not something like we have strategic management, we have CIO, it (IS) is considered as the strategic level. We are not able to do this in our enterprise." (N31 Manager IT)
	C1.2 IT governance problems	C1.2.1 Insufficient decision making rights in IT department	"In branches we have just a few (investments). It means branches need to report to headquarters every cent they want to spend. After approval, you can spend it. IS should be applied in headquarters. They approve it if they agree. After approval, we can make it, otherwise we can't do anything." (N9 Operation IT)
		C1.2.2 Insufficient resources and financial support in IT	

		department	"IS means capital investment. Now the capital investment is small and the staff allocation is not much." (N29 Operation IT)
		C1.2.3 Improper IS unit structure	"IT department in branch mainly do maintenance. It means for the aim of maintaining the systems operation, they do the work in technical aspects, technical maintenance. Technical aspects inside the systems, hardware maintenance in the systems are responsibilities at branches level. For the software maintenance inside the systems, in fact there is an IT department at headquarters. They instruct, manage and complete directly. It means the IT department in branches are not authorised to do so. They are mainly doing hardware maintenance." (N27 Manager Function)
	C1.3 Low IS/IT flexibility	C1.3.1 IS applications are not changing with the organizational structure change	"But overall, there is a disadvantage to this information system. When some pervious strategies changed, such as when some previous internal management ideas changed, because the systems had been configured, a lot of trouble was involved in making changes. This system is also more trouble to change, not very flexible. For example, previously, centralized management had centralized purchasing and sales. Now we have market-oriented reforms…. Branches are given adequate purchasing power, marketing rights. The current IS makes it difficult to achieve these." (N28 Manager Function)
		C1.3.2 IS applications are not changing due to complicated process	"If [Managers] need reports from any perspectives not shown in the systems we make them by hand." "This is what I have told you that the IS development process is complicated, and there is a need for technical support… from headquarters in Beijing." "Now the reports are almost the same as the ones

			when the systems started to be implemented. There is not a lot of update and the development is very slow at branch level" (N15 Operation Function)
	C1.4 IS use motivation		"The reason is very simple. It is because branches existed first and then the Corporation of China was built. The Corporation of China cares about centralized management… through ERP. The corporation is not interested in the manufacturing system. It's very simple. The corporation does not make investment in it." (N33 Manager IT)
C2 Organizational structure	C2.1 Centralization		"When ERP was built there was only the aluminium business and at that time the management idea is centralized control." (N40 Manager IT H)
	C2.2 Conflicts between headquarters and branches	C2.2.1 Poor communications between headquarters and branches	"[In 2002], this IS strategy was made at headquarters. There was an IS strategy. We did plan information development. We had this kind of strategy. Because the strategy is related to the production and business in the enterprises, this strategy was not able to match with them when the business changed very quickly. When there was no further strategy applied in headquarters, we did not work in this area anymore." (N11 Manager IT)
		C2.2.2 Different business requirements between headquarters and branches	"If you want to form a report, you not only need to take out the data in financial department, but also in manufacturing, logistics, marketing, including the data in each package. The data is the report that has been unified at headquarters. But branches have their different management requirements themselves. If we want to customize a report, it is very troublesome, difficult to do. Moreover, many

			people have no ideas of how to define it and they can't do it." (N24 Manager Function)
	C2.3 Low level of formalization	C2.3.1 Management processes are not standardized	"In the enterprises in China, maybe the management is not standard, so not suitable to the foreign advantage management software ERP. If we were operated more formally, adjusted to systems more, or the systems were more flexible, it would be good." (N20 Manager Function)
		C2.3.2 Lack of unified IS operations manual	"Now actually what I just talked about is I want to make an operations manual from our financial systems in our branch… tell you what you must obey when you operate. Secondly, when any new members of staff take up their posts, they immediately knew how to operate with the manual." (N14 Manager Function)
	C2.4 Varieties of branches		"But when you achieve the aim concretely, each branch is different in development progress. Based on the fact that some of the organisation [produces] Aluminium… it means that, based on the development mode and development status, different branch have their own characteristics. Some have better IS development while for some IS development is primitive and slow." (N19 Operation IT)
C3 Managers' negative attitudes to IS use	C3.1 Managers' resistance of IS use	C3.1.1 Managers are not used to the new management way and management idea with IS	"I think more often the problem is they are used to the previous management ways but ignore the new management tool, new management method… For our management, many things are still done based on the traditional manual management idea, ignoring the value of system management. This is why I mentioned the concept of deepening the application. You should use the systems for real. It's not like you need a report when you use it. When you use the

			systems well, there is no need to form the report in the systems, you just need to have a view of some data every day." (N40 Manager IT H)
		C3.1.2 Managers are used to the flexible way influencing by the shortcuts and personal contacts	"This [IS] is good. I think it's good from a management perspective. Where is the most difficult part of IS development, the barrier of IS development. It is actually people's thinking. People always think of shortcuts, think about simplifying… .A simple example, I make a phone call, the problem is solved if we have a good contact. This number is wrong. There is no assessment and I made changes myself. Everyone thinks I own the rights to master the greatest. IS development precisely needs to deny their rights but you want him to like it. They are different from the foreigners. Germans consider it should be like that……Our product is from SAP, German. Why it does not work well in China? Everyone considers it's very difficult to use, very rigid. They all prefer Oracle from USA. You can have customization in Oracle. Americans are better than Germans, they are more flexible. But Chinese people are too flexible, excessively flexible." (N31 Manager IT)
		C3.1.3 Managers have less right after using IS	"Before ERP implementation, managers of branches were afraid that their rights would be impaired. Actually after ERP implementation the rights of managers did weaken… Every cent you spent is on the account. You can't avoid it. You should submit all of them and it's impossible to save any." (N35 Manager IT)
	C3.2 Weak support of managers		"I think it's related to the leadership attention in their department. One is the IS can fulfil their requirements and they are interested in using it. The other is the

			attention of functional managers." (N25 Manager IT)
C4 Business people's poor understanding of IS	C4.1 Business people do not understand IS development		"Thus we have talked about it, as a consultant company, what is his work, it works like a translator. I try to make your business process in the systems and make systems understand the business process… Its method is you propose the requirements, I won't talk with you about the systems, you just tell me what's your business work? At the beginning of the interviews, the requirements of all people are organized, but not carefully, in order to look at the logical thinking, to consider if things fulfil my requirements. It's an idea of key projects. Just give me the things to use. Why do I need to learn or look at whether things are right or not." "As users, they are not going to talk about these things very carefully. They hope the keys are ready for use. You give me the keys and then tell me how to use them. But the systems development is not in such a procedure now." (N41 Manager IT H)
	C4.2 Business managers' poor understanding of IS use	C4.2.1 Misunderstand IS use conditions	"The enterprises with good benefits implement this system to facilitate the management of the corporation, but once the enterprises have a poor performance, you still use this, it will pull your enterprise to down and destroy it." (N3 Manager Function)
		C4.2.2 Poor understanding of IS contribution to management effectiveness	"For example, when the manager needs the data for aluminium, he just needs to make a phone call. Why would I implement the IS? I have to spend money on IS implementation, development. Actually, he does not consider these issues: it's the short term. What is the long term? It is when you implement IS, it is

			standardized management. This is the biggest benefit. If it is able to regularize you management, eliminate management vulnerability, and then combine with the business, this way it brings benefits." (N11 Manager IT)
C5 Training problems	C5.1 Not enough training		"Principally, there should be more training for every level." (N27 Manager Function)
	C5.2 Problematic training for new staff and key users		"But now maybe there are a lot of staff changes, frequent staff mobility, because enterprises often make reforms." "Probably all of them have this problem, such as the financial department, production units. This software is designed very strictly and complicatedly. Maybe there was a lot of training when they first implemented it. Afterwards, maybe because the business situation of enterprises was just generally good, it was impossible to put on so much training. But when there are many staff changes, the business may become problematic." (N15 Operation Function) "The main problem is the loss of a large number of key users. Because of loss of key users, some simple problems are easy to deal with, but some complicated problems are cannot be solved." (N33 Manager IT)
C6 Environmental influences	C6.1 Current enterprises situation	C6.1.1 Poor business performance	"Now the business situation is not good, maybe the production is more important. IS development is being ignored. Ordinarily, it should be when the IS development is better, the production will be improved. The current situation is, the production does not proceed well and IS development maybe put aside." (N18 Operation IT)

		C6.1.2 Poor production equipment and IT infrastructure	"In addition, the equipment initially used on aluminium production line, the meters and instruments do not support digital information……When you want to reconstruct these meters, you need to pay a significant amount." (N19 Operation IT)
		C6.1.3 Frequent reforms	
	C6.2 Lack of technological support	C6.2.1 Special production process	"Because, as an enterprise, its production mode is this kind of mode, it's very similar in the petrochemical industry and metallurgy industry. During the production process it's not piecework, it's a process, such as pressure, flow, temperature, heat, water, when there are measured, it's not accurate as such. It needs a cumulative process." (N19 Operation IT)
		C6.2.2 Low technical level in the industry	"In the manufacturing department, these new technologies have just started. Previously we have data collection this part, but it's not stable… I want stable data which do not die after a period of time. It is a lack of data when you are urgent to use it. Maybe it is related to technological development." (N18 Operation IT)
		C6.2.3 Lack of IT knowledge sharing	"Update knowledge is required because the current IT industry is changing very fast, under the current situation in the manufacturing industry, there are changes of technology. There is a certain period of time for technology replacement. The new knowledge, I am afraid there is a need for a platform to learn and build. There is a lack of such a platform." (N7 Manager IT)
	C6.3 Special characteristics of	C4.3.1 Less considerations on sales	"You can have a look at the ERP itself, the package and functions ERP. Now we use ERP from SAP. Because in the current environment, it is to make decisions

	SOE		on sales based on production, or make decisions on production based on sales. This kind of management, this operation mode, such as in these kinds of companies, decides the sales based on the production. It means however many products are produced, you have to sell them. There is no need for order management. Or like a pure manufacturing industry, however many orders come I will take and then make a plan to guide the production according to the orders. This kind of enterprise is totally different now. Now what you need to understand is the current situation of our enterprises. It is in different production mode, process." (N31 Manager IT)
		C4.3.2 Social responsibility	"The fatal problem of SOE is employees are the owners of the enterprises. You can't fire them. No matter whether they work well or badly, they are just switched to another post or have their salaries reduced. It's not like in foreign or private enterprises where I can fire them whenever necessary." "You can't understand a harmonious society. Including the staff, the productivity is so low and there are so many employees in SOEs. Why you don't fire them? If they did this, they wouldn't have any jobs. Society would become unstable. All the SOEs bear social responsibilities; in foreign enterprises, this can't be understood." (N5 Manager IT)
		C4.3.3 Lower enthusiasm of staff	"In SOE, how to say it; the enthusiasm of staff is not like staff in private enterprises. Although we have been told repeatedly to restrict our behaviour according to market rules some have stayed in SOEs for a long time. You are the owner and I am also the owner." (N5 Manager IT)

Main Category	Sub-category		Consequences
R1 Inability to realize strategic values of IS/IT investment	R1.1 Functional people do not realize strategic value of IS/IT		"At the beginning the workers were not well educated. They didn't understand computers and stated it was not worthwhile to spend so much money. Now, after use the computer, from materials deployment, to sales, including our financial accounting, the staff has been reduced by a half. Saving large amounts of manual accounting, the computers are very convenient, they release a lot of labour." (N1 Operation Function)
	R1.2 Managers do not realize strategic value of IS/IT investment		"IS are just playing assisting roles. If you claim IS are able to improve profitability, this is not realistic, not playing such a big role." (N24 Manager Function)
	R1.3 Weak support of managers to IS		"Let's talk about investment. There are ten to two billions investments in the corporation. When you want to build an investment management system, they are not asking what is brought from this system, they asking about how much should be spent on it. You answer thirty million. They will respond too much. You said ten million, they still respond too much." (N41 Manager IT H)
R2 Not seeking IS capabilities sustainably	R2.1 The importance of IS/IT depends on the business situation	R2.1.1 IS have few influence on core business operations	"But without these IS projects, productions operates as usual. It is in this situation. IS, in another word, before IS implementation, the enterprises worked well, operated well, it means [IS had] no influence. But after implementation it will be better. In the current situation why would we implement IS? " (N18 Operation IT)

		R2.1.2 IS development is marginalized when profit loss.	"Actually, we have gradually understood over the last 20 years that when ISs in enterprises are developed to the final stage, if the IS development is not able to be combined with competitive advantage, which means with the main business, with the central issues, inevitably, it will be marginalized." (N11 Manager IT)
	R2.2 Importance of IT department depends on business situation		"Previously, when enterprises were in good business situation, there was a dependent department for IS… Now it is marginalized. The enterprises are not in good business situation." (N18 Operation IT)
R3 Problematic IS application portfolio	R3.1 Developed systems are disregarded		"Previously we developed [IS] also: for example, problems management systems." Last year, after development, we ended up with nothing definite. It means nobody use it, just leave it there." (N11 Manager IT)
	R3.2 Islands of automation in branches		"Because now many IS in enterprises seem not fully integrated. It means they are not creating the values there should be. I feel sad about this. Many things after developed which just some people are using, in a small area, not fully playing their roles." (N12 Operation IT)
R4 Low IS business value	R4.1 IS do not contribute to the competitive advantages		"To the manufacturing enterprises, there will also be this issue. When the IS development is made well, it will decrease the cost, strengthen management and control, reduce consumption and increase efficiency, thus it may be an important part of competitive advantage. At this time, it may become a very good, valuable, business value." "I think now we haven't reached this level yet, but it becomes an inevitable

			means for management in production. It aims to in the future, along with increased IS effects, IS development has become an important method of management control, reduction of costs, supporting management improvements and increasing competitive advantage. It will be in the future." (N39 Manager IT H)
	R4.2 Low IS contribution to operation effectiveness		"The inconvenience is that we need some hand-made ledger. For instance, when we make payments to the vendor, we need to create an Excel file… It is not allowed to be in this format in the systems. They are all accounts by the day." (N4 Manager Function)
	R4.3 IS do not regularize and integrate the business process and information transformation through all the business processes		"IS in enterprises should play a leading role, whether in the overseas or domestic area. As you just mentioned, we lead on how to integrate the requirements in each department. Each department considers the problem in terms of its own position rather than in a whole situation context. As for the IT department, its position is at the centre of the whole situation rather than considering the issues from an individual or departmental perspective… For IS, it putts the responsibility for departments onto the systems to execute. In this case, IS are able to regularize, in some Chinese enterprises, labour intensive enterprises… Basically it is led by the work of people. From an IS development perspective, it's actually not just the issue of information. It's about people operating the machine in the whole process. But now we can't reach this point, such as which types of data we can share, which types of data we can integrate through the systems…. The current function is just to replace, which means emancipation of labour. They are not playing a very good role." (N41 Manager IT H)

	R4.4 Poor management information		"This information is very useful but our people are used to the traditional ways that make a set of things outside the systems. These manual works can also fulfil the requirements. Now there is no need to deal with these things manually any more. As long as you input all the information, it will be created automatically in the systems. But because it referred to many departments, if there was one department which was not doing this, I couldn't get this information in the systems. So they would think about why I needed to do this, and the financial department would help me export it anyway. We had to make a set of instructions manually for them." (N14 Manager Function)
R5 Poor organizational dynamic capabilities	R5.1 Troubles when frequent staff changes		"Currently there are many staff changes… because the enterprises reform frequently, so people frequently compete to be employed. For IS implementation, the easier the operations are, the better the enterprise is. The more complicated the operations are, the more likely it is for something to go wrong." (N15 Operation Function)

M1 Low importance	M1.1 Non-awareness of	M1.1.1 Business people	"I don't know. All the information systems are managed in a sector of the measurement and control

of IS strategy	IS strategy contents	are not aware of IS strategy contents	department (the interviewee does not know this situation has changed). They are in charge of information, systems configuration. They made it." (N1 Operation Function) "It is something like this. IS management is special work in enterprises. I remember after reforms in 2002, including following several IS updates, we were just asked about human resources management requirements in a survey from the IT department. Because I am always in charge of human resources management, I do not care about the IS plan, IS strategy concerns. Previously we have reported on it but I did not pay attention to it. It is difficult to find the report now." (N16 Manager Function)
		M1.1.2 IT people are not aware of IS strategy contents	"There are no very clear objectives." "And overall [plan], we are not involved in. It is at the managers' level" (N21 Operation IT) "It is on the official document. I can't remember it now" (N8 Manager IT)
	M1.2 Poor IS strategy implementation in branches	M1.2.1 IS strategy is disregarded	"Now you mention strategy we are not familiar with it anymore. Now does the enterprise have any IS strategy? There is no IS strategy. To the current management situation, I think there should be a strategy, but it is not very clear." (N11 Manager IT)
		M1.2.2 IS implementation is decided based on the separated business requirements	"Now the IS are adopted to provide services to manufacturing. It is when there is a need from production or there are any inconveniences requiring IS use, that it is adopted." "It is something like when they feel something is wrong, they adopt something [IS project] to serve it. Lack of overall planning, it is this kind of problem" (N18 Operation IT).

M2 Insufficient support to management in IS	M2.1 IS applications do not fulfil all the management requirements	M2.1.1 Lack of support to strategic management	"In fact, when we develop the analysis of IS I feel like we need more extensive data. It should not be limited to the information inside SOE group and also should be more focused on the industry, and international data. It means we should have knowledge of what levels we are in, both in terms of domestic industry and the international area. I feel this is more important… I think this is more effective for strategic adjustment, strategy development in enterprises. Furthermore, in enterprises, to promote enterprises management, it will be more effective." (N14 Manager Function)
		M2.1.2 Lack of support to analysis and decision making	"It is important to say this, because there are information selections inside, for instance, in the distribution systems, there is a large amount of data. But for real, the data helps reduce the costs and improve efficiency, which should be controlled by the leaders. There is a need to select the data. It is possible that only five data are needed out of one hundred. Just key data needs to be in the system. Maybe they need to do further work on this part, I think." (N22 Manager Function)
		M2.1.3 Lack of support to management report	"They are not using (IS) directly. Just there will be someone exporting the data and then showing it to them." "It should be sent to the reports directly (in the system). But because headquarters are not able to keep up, we make them ourselves in branches." (N25 Manager IT)
	M2.2 Managers problematic IS use	M2.2.1 Managers do not operate the systems even when needed	"Sometimes it's the problem of method. For instance, when you do some analysis in the systems, there are no obvious advantages to deal with it

			inside the systems compared with outside the systems. Thus probably I would deal with it outside the systems." (N27 Manager Function)
		M2.2.2 Managers use the traditional ways to obtain information	"Managers always delegate to lower levels, for instance, when there are some demands, it's always you help me to do it. He almost never has a view of them in the systems… For example, there is a need for a report on the enterprises, and they never find them in the systems. They are all reported by us, in a paper copy or e-copy." (N28 Manager Function)
M3 IS are not supporting core business units well in branches	M3.1 Weak connections between automatic control systems and management IS	M3.1.1 Information collections during production processes still need manual work	"Now some of them are collected automatically. Some are manually collected, such as meter readings, collected from backstage supporters, because there are backstage supporters. The signals from backstage are transferred, data is transferred, different types of meters, such as measure meters are used… and then there are a set of collection methods, including manual management and automatic collection." (N22 Manager Function)
		M3.1.2 Manually input production information to management IS	"He can make them in ERP systems after looking at the reports. For example, how many spare parts or how many raw materials I need now, can be input to ERP. Basically this is the current situation." (N8 Manager IT)
	M3.2 ERP are not used well in manufacturing part	M3.2.1 Rough materials management	"When I was in scheduling meetings, we discussed how many raw materials, fuel, or materials are needed in the current situation, the current consuming situations, what kind of things lead to the main problem. It [ERP] just can roughly control, what is the approximate situation in this part. It is not able to achieve much detail, how many days these materials will serve, or how to solve the problems in some parts. It probably can't

			achieve such detail. It is just rough, or as a general plan, it can achieve, ERP can achieve." (N19 Operation IT)
		M3.2.2 Rough inventory control	"Our current inventory, whatever spare parts or materials exist, for instance, how much inventory every month is suitable, it is all decided by the managers for us. It does not have a scientific basis. For example, the inventory of the spare parts…, I need to refer to the importance of production, priorities, different materials, different backgrounds, the inventory is different. But now, stock management is all input manually." (N32 Manager Function)
M4 Misalign of systems operations and business processes	M4.1 Business processes are different from systems operations		"I think ERP is under the ideal processes… but different from reality. In real operations, it is not possible to be ideal." "In ERP, when you receive the products, you settle the account in the same month. But we can't make it like this now. We need a period for quality acceptance check… as delays in the pricing system means they don't reflect the real price". (N4 Manager Function)
	M4.2 Lack of functions in the systems		"I think there are differences between the IS and their requirements." "For example, I think for many people, when they need systems support, maybe there it is not available. For instance, previously I learnt contract approval… They need IS applications to facilitate the fast delivery and joint check and approval. These were not available and they have to do it by hand." (N11 Manager IT)

	M4.3 Systems operations do not match with organizational structure		"The production situation changes very quickly. This system is relatively fixed. It is not able to change whenever you change. It is very difficult to make changes on systems" "For instance, last year, at the beginning, there were two alumina producing plants, and then these two were merged together. After merging, the costing in the systems should have been modified. It was very difficult when we made changes. (N20 Manager Function)
M5 Low IS operational capabilities of staff	M5.1 Poor IS operational skills	M5.1.1 Just use simple functions	"Not well means because some people they do not operate it well; so maybe I arrange for them to use some simple functions. If they improve their skills they need to do some things in costing, some more complicated things…." (N36 Manager Function)
		M5.1.2 Just acquire the skill in their own responsibilities	"ERP is a system with very detailed job divisions. It means our staff can work very skilfully in their roles. But if there is a job adjustment, it is very difficult for them to adapt to it Because they usually work in the area they are familiar with, when they are given another post, they are not able to get very comprehensive knowledge." (N24 Manager Function)
	M5.2 Lack of standardized IS operations		"In fact all these functions are in the systems. But when making the purchase order, they do not fill in some elements in the contract, which results in a lack of this information in financial systems when verification is required. Because, without this information, some further information is not created neither. Some of them fill in the information, some do not. As a result, the final data collected does not match with the reality. But nobody is patient enough to find out the reason for the mismatch, to set a standard." (N14 Manager Function)

	M5.3 Redundancy of works due to lack of confidence in IS use		"Previously we have an account on the table because they needed to export, which meant an Excel table; then generating an account on the system. Afterwards, I would check the account manually to see if they were exactly the same… then operate the ERP system. Whatever the financial department did, such as making a payment and so on, they were consistent. The staff knew they could check the accuracy, at least." (N6 Manager IT)
	M5.4 Unbalanced IS operational capacities among departments		"I can just say the capabilities are different and there are huge differences. This financial department is very good indeed… But in many production units, the ability to use IS was really poor. If there is a difficult, they come to us." (N5 Manager IT)

Appendix 7 Sample of code definition table

Main Category		Sub-category	Codes	Definition
IS strategic misalignment in Chinese SOE	M1 Low importance of IS strategy	M1.1 Non-awareness of IS strategy contents	M1.1.1 Operational people are not aware of IS strategy contents	Operational people do not know the contents of IS strategy
			M1.1.2 Managers are not aware of IS strategy contents	Some managers do not know IS strategy contents
		M1.2 Poor IS strategy implementation in branches	M1.2.1 IS strategy is disregarded	IS strategy is being ignored in branches
			M1.2.2 IS implementation is decided based on the separated business requirements	Branches decide the IS adoption based on the different business requirements, lack of overall planning
	M2 Insufficient support to management in IS	M2.1 IS applications do not fulfil all the management requirements	M2.1.1 Lack of support for strategic management	IS do not support the requirements of strategic management
			M2.1.2 Lack of support for analysis and decision making	IS do not support the information selection and analysis
			M2.1.3 Lack of support for management report	IS do not provide some required management reports
		M2.2 Managers problematic IS use	M2.2.1 Managers do not operate the systems even when needed	Managers do not use the IS even in the situation IS have the functions they need
			M2.2.2 Managers use traditional ways to obtain information	Managers are used to ask the subordinate to provide information
	M3 IS do not support core business units well in branches	M3.1 Weak connections between automatic control systems and management IS	M3.1.1 Information collections during production processes still need manual work	Information collected from the production equipment needs manual work
			M3.1.2 Manually input production information to management IS	The information requires in management IS is input manually
		M3.2 ERPs are not used well in manufacturing	M3.2.1 Rough materials management	ERP can only show approximate situation of materials
			M3.2.2 Rough inventory control	The stock in input manually, no analysis
	M4 Misalign of systems operations and business processes	M4.1 Business processes are different from systems operations	M4.1.1 Systems operations do not match with the business reality	Systems operations processes are different from the business processes in reality

		M4.2 Lack of functions in the systems		Some business functions do not have IS support
		M4.3 Systems operations do not match with business structure		Systems operations do not match with the process formed from business structure
	M5 Low IS operational capabilities of staff	M5.1 Poor IS operational skills	M5.1.1 Just use simple functions	Operational staff can only use simple functions in IS
			M5.1.2 Just acquire the skill in their own responsibilities	Operational staff can only use the functions in the current post
		M5.2 Lack of standardized IS operations		Different people may input different types of information
		M5.3 Redundancy of work due to lack of confidence in IS use		Operational people are used to work in traditional in addition on IS for double checking
		M5.4 Unbalanced IS operational capacities among departments		Staff in some departments operate IS better than some in other departments

Main Category		**Sub-category**	**Codes**	**Definition**
IS strategic misalignment in Chinese SOE	C1 IS issues	C1.1 Non-strategic role of IS/IT	C1.1.1 IS/IT is in service position	IS/IT is considered as service tool
			C1.1.2 IS/IT is not playing strategic role	IS/IT is not supporting in strategic level or contributes to strategic value
		C1.2 IT governance problems	C1.2.1 Insufficient decision making rights in IT department	IT department does not have the rights to decide IS project implementation or more management functions
			C1.2.2 Insufficient resources and financial support in IT department	IT department does not have sufficient resources and financial support
			C1.2.3 Improper IS unit structure	The current IS unit structure does not match with corporate governance structure
		C1.3 Low IS/IT flexibility	C1.3.1 IS applications do not change with the organizational structure change	IS applications are not changing in time with the organizational structure change
			C1.3.2 IS applications do not change due to complicated process	IS applications do not change in branches because of complicated process
		C1.4 IS use motivation		The corporate applied IS for centralized control
	C2 Organizational structure	C2.1 Centralization		The corporate adopted centralized management when ERP was developed and implemented

		C2.2 Conflicts between headquarters and branches	C2.2.1 Poor communications between headquarters and branches	Important information is not transferred well between headquarters and branches
			C2.2.2 Different business requirements between headquarters and branches	Managers in headquarters and branches may requirement different information
		C2.3 Low level of formalization	C2.3.1 Management processes are not standardized	Management processes are not organized in a standardized way
			C2.3.2 Lack of unified IS operations manual	Unified IS operations manual is needed for standardized operations
		C2.4 Varieties of branches		Different branches are in different IS development situations
	C3 Managers' negative attitudes to IS use	C3.1 Managers' resistance of IS use	C3.1.1 Managers are not used to the new management way and management idea with IS	Managers are not used to carry out management activities with IS
			C3.1.2 Managers are used to the flexible way influencing by the shortcuts and personal contacts	Managers prefer flexible way of doing things, which is influenced by shortcuts and personal contacts
			C3.1.3 Managers have less right after using IS	Managers' rights are impairs after using IS
		C3.2 Weak support of managers		Managers do not support IS use strongly
	C4 Business people's poor understanding of IS	C4.1 Business people do not understand IS development		Business people do not understand they are involved in IS development process
		C4.2 Business managers' poor understanding of IS use	C4.2.1 Misunderstand IS use conditions	Managers do not understand IS use conditions
			C4.2.2 Poor understanding of IS contribution to management effectiveness	IS do not understand using IS to improve the management effectiveness
	C5 Training problems	C5.1 Not enough training		Staff do not have enough training or regular training
		C5.2 Problematic training for new staff and key users		Lack of training for new users and key users specially
	C6 Environmental influences	C6.1 Current enterprises situation	C6.1.1 Poor business performance	The organizations are losing profits
			C6.1.2 Poor production equipment and IT infrastructure	There are outdated production equipment and IT infrastructure
			C6.1.3 Frequent reforms	Corporate is experiencing frequent reforms now
		C6.2 Lack of technological support	C6.2.1 Special production process	The production process requires different IT support

			C6.2.2 Low technical levels in the industry	The technical level in the company is low.
			C6.2.3 Lack of IT knowledge sharing	Lack of IT knowledge sharing in the company
		C6.3 Special characteristics of SOE	C6.3.1 Less consideration of sales	SOEs do not need to consider too much about sales
			C6.3.2 Social responsibility	SOEs bear social responsibilities
			C6.3.3 Lower enthusiasm of staff	Staff in SOE have lower enthusiasm than those in private sectors

	Main Category	**Sub-category**	**Codes**	**Definition**
IS strategic misalignment in Chinese SOE	R1 Inability to realize strategic values of IS/IT investment	R1.1 Functional people do not realize strategic value of IS/IT		Functional people do not understand the IS/IT value
		R1.2 Managers do not realize strategic value of IS/IT investment		Managers do not understand IS/IT value
		R1.3 Weak support of managers to IS		Managers do not support IS implementation strongly
	R2 Not seeking IS capabilities sustainably	R2.1 The importance of IS/IT depends on the business situation	R2.1.1 IS has less influence on core business operations	People do not consider IS as essential in production
			R2.1.2 IS development is marginalized when profit loss	When companies are losing profits, IS development is stopped
		R2.2 Importance of IT department depends on business situation		IT department is put aside when companies are losing money
	R3 Problematic IS application portfolio	R3.1 Developed systems are disregarded		Some developed systems are not used
		R3.2 Islands of automation in branches		Different systems are not integrated
	R4 Low IS business value	R4.1 ISs do not contribute to the competitive advantages		ISs do not help enhance the competitive advantage
		R4.2 Low IS contribution to operation effectiveness		Operation effectiveness is not improved sufficiently with IS
		R4.3 ISs do not regularize and integrate the business process and information transformation through all the business processes		ISs do not help regularise the business processes therefore facilitate the information transformation
		R4.4 Poor management information		Information support management is not sufficient
	R5 Poor organizational dynamic capabilities	R5.1 Troubles due to frequent staff changes		Frequent staff change bring troubles to company because of IS use