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# **Critical Success Factors of ERP Implementation in Chinese State-owned Enterprises**

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## Abstract

As ERP implementation is complex and risky, there were many researchers discussed the critical success factors (CSFs) of it to achieve a more successful ERP implementation project. On the other hand, the ERP implementation in Chinese SOEs met some other obstacles. There were articles discussed what were the differences of ERP implementation between Chinese SOE and western countries, and some were directly about the CSFs among Chinese SOE implementing, there is still lack of a comprehensive study of what caused the difficulties and why, as well as possible solutions for it.

This study was based on both literature review and empirical study. Literature of brief ERP and ERP implementation introduction, general CSFs description, cultural features of Chinese SOE, and ERP implementation in Chinese context, were reviewed. In the empirical study, which was about the ERP implemented in a Chinese SOE, the project process was described and the perspectives from different project participants were obtained by interviews, surveys and documents.

Generated from the literature review and empirical study, suggestions of CSFs of ERP implemented in Chinese SOE are as follow: the legacy systems, existing data quality and IT infrastructure should be figured out to make proper plans and schedule; the top management should be mobilized to guarantee their sufficient support and commitment, as well as resource allocation; the employee cultural feature should be understood such as collectivist and uncertainty acceptance culture; and based on these understanding of the cultural characteristics of project relevant groups, then the appropriate and accurate plan and estimation can be done; during the project, the project team has to spend enough effort and patience to execute the plans, as well as guarantee the effective communications among implementing parties; after the implementation, a continuous attention should be paid by top management and relevant departments to obtain the continuous improvement which is one of the ERP benefits.

### *Keywords*

ERP implementation, critical success factor, Chinese state-owned enterprise

## Foreword

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## Abbreviations

BP	Business Process
BPR	Business Process Reengineering
CSF	Critical Success Factor
ERP	Enterprise Resource Planning
IS	Information System
IT	Information Technology
SOE	State-owned Enterprise

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# 1. Introduction

Enterprise resource planning (ERP) system stands an important role in the enterprise running no matter how large the scale of the enterprise is, as it creates the information pipe that can reach each functional department, which realizes various benefits such as high work efficiency, accurate sales forecast, and costs cut over.

Unfortunately, the ERP implementation is never an easy and low-risk task (Monk & Wagner, 2009). The rate of project cost and schedule overrun and project goals unreached did not decline a lot along the decades. In particular, some researchers found ERP projects in China met different problems than in western countries, and especially in Chinese SOEs.

SOE was an enterprise type of a wide range of Chinese enterprises at the beginning of the its establishing, that is to say, SOE is the organizational type with longest existing history in China, and generation by generation, most of the employees now in other types of Chinese organizations were ever be subordinates of the people with SOE work experiences. Compared with Chinese SOE, other types of enterprises in China would inherit its features of more or less. Therefore, as the objective of this study, Chinese SOE stands for the Chinese enterprises with strongest Chinese culture feature and history marks that the discussion of it can be applied to other Chinese enterprises in varying degrees.

Among the studies on ERP implementation in China context, some directly specified CSFs for the ERP project, while others discussed about topics such as the failure reasons of the projects, the comparisons about features observed during the project between Chinese and western case companies.

This study tried to elaborate the CSFs of ERP implementation in China by the joint of existing literature that directly discuss about CSFs in Chinese context, and about other related issues; the cultural characteristics of Chinese society and Chinese behavioural mode; and the case study from a Chinese SOE that just launched an ERP project and by nearly one year after the system went live, utilizing interview, survey, and document data collective methods.

The structure of the study is as follows: in chapter 2, literature review of basic concepts of ERP and ERP implementation, and the general introduction of various CSFs among ERP implementation projects is given, and then the Chinese SOE features are demonstrated in different dimensions, and next the literature about ERP implementation in Chinese context. Chapter 3 described how normal qualitative research is conducted and how it is conducted in this study. Chapter 4 gives the background information of the case studied, and chapter 5 describes the result of the case study. In chapter 6, the outcome of the study is given from the abovementioned three sources, and the limitations and implications are discussed. Lastly is the conclusion in chapter 7.

## 2. Literature review

The literature review section in the study generally has five categories: 1) a brief introduction to ERP, 2) a brief introduction to ERP implementation, 3) general reviews on ERP implementation CSFs, 4) features of Chinese SOEs in terms of culture aspects, and 5) literature related to both ERP implementation and in Chinese context.

It should be clarified that although literature about Chinese SOE and general Chinese enterprises are both reviewed in this study, there is no conflict against the theme of Chinese SOE object. There are two reasons of this. Due to the history factors, many of the current private enterprises or other types of enterprises in China were transformed from SOE in the economic reform (the source and detailed description will be given later in this chapter about economic reform). From another view, SOE is the enterprise type that has longest history in China, which means SOE is rooted deeply in Chinese national culture. So the discussion of its national culture could shed more light on it, while literature about general Chinese enterprises also covers the national culture factor as the different types of Chinese enterprises are in the same big social environment. Therefore, this study can be seen as to seek out ERP implementation solutions for the most featured Chinese enterprises that can also be applied in other types of Chinese enterprises.

### 2.1 ERP

Along with the economic growth, enterprises today are facing multiple challenges. They are trying to improve customer satisfaction, expand market share, to keep or even enhance their competition. It had been more and more realized that an efficient and accurate information sharing and communication can achieve the aforementioned goals by cutting down production and operation costs, reducing inventories, and other costs. (Umble, Haft, & Umble, 2003) The sharing and control of information should be both external and internal (Bingi, Sharma, & Godla, 1999). For external, how much information should be transparent to the partners or suppliers should be well considered, while for internals, the information visibility and edit-ability in different departments are different (Bingi et al., 1999). ERP is the information technology (IT) solution to realize these functions.

An ERP system is the core software in an organization that used to coordinate information among every area of the business in the organization. It helps the organization manage organizational-wide business processes (BPs) by the one common database and shared management IT tools. The ERP nature of integrating organizational-wide information is important for efficiency of the company, because the horizontal information flow promotes flexibility and rapid decision making (Monk & Wagner, 2009). Also, automation changes the way companies deal with others like suppliers and customers (Bingi et al., 1999). In addition, ERP provides organization the best practices implementation (Hunton, Lippincott, & Reck, 2003).

A BP is a set of activities that takes one or more kinds of input and creates an output that valuable for the customer, always in form of a report or a business forecast.

ERP system covers the business functions in an organization. The four most basic business functions in an organization are marketing and sales, supply chain management,

accounting and finance, and human resources. Other business functions involved in an ERP can be, for example, customer relationship management, business intelligence.

There are many other benefits and significance generated from information integration, such as global integration in terms of currency management and others, achieve needed information at once, enable employees and managers to put efforts on core business, simplifies data storage, and management and usage (Monk & Wagner, 2009). A successful ERP project can enable more accurate business prediction, optimize customer services, cut down operation costs of the company through inventory reduction, improved cash management, reduction in HR management and overall IT management (Umble et al., 2003).

## 2.2 ERP implementation

In late 1990s, many companies rushed to implement ERP because of the year 2000 problem, which caused dramatic lack of experienced consultants and related experts, so that the quality and speed of ERP implementation in those years were slowed down for certain degree. Most of the Fortune 500 companies implemented ERP during the decade, thus the later market turned to small and medium enterprises. (Monk & Wagner, 2009.)

The aim of implementing ERP for a company can be various, despite cutting the running costs, some companies just want to integrate its multi business units, or integrate redundant information systems or databases, and the year 2000 problems as aforementioned (Umble et al., 2003).

An ERP implementation project costs a lot, it includes the fees for ERP package licensing firstly, and fees for consulting and project team members, user training also costs, as well as the business losses caused by productivity reduction and orders losing (Monk & Wagner, 2009).

ERP implementation is an ongoing process instead of a one-time project (Monk & Wagner, 2009). The ERP implementation project should be led by business needs and requirements instead of singly IT needs (Umble et al., 2003), and it is practically impossible to take all benefits from the system for an organization (Monk & Wagner, 2009).

The study by Hunto et al. (2003) examined the relation of ERP adoption with the financial performance of the organization. The study implied, the metrics of return on assets, return on investment, and return on sales showed the costs were controlled well in companies implemented ERP compared with the non-adopters in a three years performance tracing.

However, during the implementation period, the organizational culture even the productivity would be influenced by the project inevitably (Umble et al., 2003). Besides, ERP is an extremely complex information system (IS) (Monk & Wagner, 2009), despite those difficulties during implementation, the success rate of it is not so high all the time. In an electronic source cited by Umble et al. (2003), study by Zimmerman suggested 90% of the ERP projects ended up with postpone or over budget, while in an online report of the 2013 ERP research (Krigsman, 2013), still over 50% of the projects experienced cost overruns, over 60% of them experienced schedule overruns, and fully 60% of them received less than half of expected benefits from the implementation. In the 2013 study, the data collected from 2009 to 2013 showed fluctuation in those metrics but no observable increase or decrease.

## 2.3 CSF in ERP implementation

As ERP implementation is a quite high-risk activity, it is worthwhile to discuss the various critical factors that determine the success of the implementation (Umble et al., 2003). Based on these critical success factors (CSF), a framework can be built to describe the CSFs and the relationships between them. In this section, a couple of theories or frameworks in existing literature are given, and a new framework will be built based on the review of them in next chapter.

Regarding “critical success factors”, the definition or clarification of “success” is necessary here. Umble et al. (2003) defined a successful ERP project as the various implementation effects that can cut over millions of dollars in the long run for the company such as more accurate marketing forecast, accelerated product efficiency, improved customer service. However, there is not a consensus and clarity of definition of “success” both in practice and in academic (Markus & Tanis, 2000; Zhang, Lee, Huang, Zhang, & Huang, 2005). To be specific, in terms of practical measurement, success can be measured by the achievement of the project result (for example in terms of project budget and schedule), or by business results (for example the customer’s business goals), so it seems that success can be measured differently when examined at different time points on different dimensions, or from different viewpoints (Markus & Tanis, 2000). Based on this, Markus and Tanis (2000) tried to give a solution of the definition of success: firstly it is vital to get success measurements from *the perspective of the adopting organization’s executive leadership*; secondly, the success measure should be a set of success metrics addressing different dimensions (technical, financial, personnel) at different time points, instead of a single measurement of IS adoption success.

As to the selection of CSF categories, practically each ERP implementation CSF paper has their own sets of CSFs and thus has different CSF names depending on their different classify ways. There are two principles of selecting CSF names in this chapter: firstly it must be some features or actions that can be controlled and can be taken measures against during the implementation activities, secondly there are no CSF can be completely covered by another CSF in the list.

### 2.3.1 Top management support

Top management support was supposed by many articles to be one of the top critical factors in a successful ERP implementation, in other words, obtaining support from top management in the organization is extremely critical (Aladwani, 2001; Bingi et al., 1999; Finney & Corbett, 2007; Fui-Hoon Nah, Zuckweiler, & Lee-Shang Lau, 2003; Holland & Light, 1999; Hong & Kim, 2002; Nah, Lau, & Kuang, 2001; Somers & Nelson, 2001; Sumner, 1999; Sumner, 2000; Umble et al., 2003; Zhang et al., 2005).

The support, commitment, authority and leadership from top management are important to secure the employee acceptance of the changes brought by the project (Aladwani, 2001), and is related closely to the success of the whole project (Ifinedo, 2008). The support and commitment from top management are part of the social factors that can improve the ERP system usage of employees in the company, then achieve a more successful implementation (Chang, Cheung, Cheng, & Yeung, 2008), because the top management influences can facilitate the user acceptance of new system by broadcasting the system benefits to the employees (Aladwani, 2001). Another explanation is that the commitment from top management will percolate down to the whole organization and ultimately result in an overall organizational commitment (Bingi et al., 1999). Besides,

Nah et al. (2001) suggested the top management should set policies on new systems usage to guarantee its spread throughout the organization

The top management should actively move the project forward (Martinsons, 2004). In the beginning, top managers need to make the whole strategic business plan and goals, and initiate the project (Martinsons, 2004; Nah et al., 2001; Shanks et al., 2000). The support and commitment from top management should cover the implementation phase, to monitor and control the project progress (Bingi et al., 1999), and guarantee the sufficiency of ongoing human, time and other resources (Martinsons, 2004; Shanks et al., 2000). The top leaderships should also continuously support and pay attention to the project in post-implementation phases (Ifinedo, 2008).

The support of the top management also includes their involvement in the project, which is essential in the implementation as asserted by Akkermans and van Helden (2002). In their case study, the project met crisis because of the lack of collaboration between different parties and different departments. Later, they solved this crisis successfully. One of the critical solution they applied was the active involvement of senior management: in the workshop that employees from multi-department sorted out the BPs, if there was still no result after 5 to 10 minutes of discussion, the issue would be flagged and handed over to the senior management to make decision. Nevertheless, it still took much more time for the management to solve these issues than they expected. Having experienced these activities, the management became more aware of the project. (Akkermans & van Helden, 2002.)

However, in terms of authority control, it should be noticed that a centralized authority should be built for the project instead of a multi-authorities condition, which may cause complex issues and conflicts among commands requirements by different positions of leaders (Sumner, 1999).

### 2.3.2 Effective communication

The effective communication CSF in an ERP implementation includes the communication between departments in the organization (Al-Mashari, Al-Mudimigh, & Zairi, 2003) and between the implementation parties (Sumner, 1999). Chang et al. (2008) also suggested, close cooperation between different parties among the project and different departments within the company can effectively increase employees' system using, as the employees can receive expectations and pressures from those parties whom they are interacting with in daily work.

For the interdepartmental communication, Stefanou (1999) argued that creating collaborations among the departments and a close work relationship between them can be effective for some technical issue resolutions, and can further facilitate the overall project success. For the way to achieve such communication, the researcher considered the trust and willingness about information sharing is a matter of the organizational culture that cannot be resolved by any form of technologically support (Stefanou, 1999).

On the other hand, among the communication between implementation parties in the project, a case study by Sumner (1999) indicated the project team should let everyone in the enterprise be aware of the meaning of the project, as well as the scope and schedule of it (Sumner, 1999). For the difficult and tough issues that existed in one party or between a few parties in the preparation phase of the project, they should be addressed directly and in time, to prevent more issues emerged and even harder to resolved in later phases (Sumner, 1999).

Despite the meaning of communicating among social groups, the effective communication can also represent broadcasting the meanings and benefits of ERP adoption to employees, as suggested by Aladwani (2001). The researcher proposed that communication is an effective strategy to affect users' attitudes toward the new system and further improve the situation of user resistance. The researcher also believed the awareness of knowledge about ERP and how it operates can build anticipation and virtuous expectation for employees. To achieve this, management can play the role of explaining how ERP system will work, whereas reputable individuals and opinion leaders are also effective for spreading the spirit of supporting the project activities (Aladwani, 2001).

Under the setting of the project team members are representatives from business functional departments, Akkermans and van Helden (2002) concluded that the interdepartmental communication and collaboration is the core process for ERP project progress, while the key stakeholders (top management, project champion, and ERP vendor) were identified to be the root causes for the performance of this core process.

### 2.3.3 Project team competence

Concerning the implementation project team composition, as ERP system works across a wide range of functional departments, the company should dedicate some of the best internal employees from various functional departments to build up a cross-functional core team, in order to reach a successful implementation (Bingi et al., 1999; Nah et al., 2001). From another view, a mixed project composition of both IT and business members provides both professional ERP knowledge from IT perspective and deep understanding of organizational BPs from internal employee perspective (Shanks et al., 2000; Sumner, 1999). Involving internal personnel to the project team and work together intermittently with external consultant can effectively foster a solid system knowledge for the internal staff (Sumner, 1999).

The project team is important because it manages the project throughout the implementation, both material – the implementation plan and schedule making, and human resource related – to manage the user training issues and responsibilities appointment (Umble et al., 2003).

### 2.3.4 Project champion

The role of project champion in an ERP project is more critical than in other IS projects, because it requires the organizational overall commitment and balance (Fui-Hoon Nah et al., 2003). Also, the project champion is crucial to spread the importance and significance of the project throughout the organization (Sumner, 1999). Concerning the person selection, Fui-Hoon Nah et al. (2003) suggested the project champion to be a highly capable and powerful person and have a high position in the organization.

A business know-how of the project champion is important as argued in the case study of Sumner (1999) that appointing a business head to champion the project can effectively provide the project leadership a business perspective, and further drive to a more successful implementation.

### 2.3.5 Project management

ERP implementation is a complex project with large scope that could last averagely one to two years, so that it needs an effective management to prevent it from cost and time schedule overrun, and to ensure it is under control all the time (Zhang et al., 2005).

Schwalbe (2010) identified a triple constraint model for IT project management, because he believed every IT project is constrained somehow by its scope, time and cost goals. Specifically, scope constraint represents the work content, the unique product, service, and result that customer are expecting from the project, and potentially how the scope will be verified; time constraint includes the length and schedule of the project, the schedule track method, and the responsible person who can approves changes to the schedule; cost constraint identifies the sources of costs, the project budget, how costs will be tracked and the responsible person who is authoritative to modify the budget (Schwalbe, 2010). Additionally, Bingi et al. (1999) indicated that human resources can be a hidden cost that might be ignored by many managers.

There are primarily five components of project management according to Zhang et al. (2005): (1) a formal implementation plan, (2) a realistic time schedule, (3) periodic project meetings, (4) a capable and responsible project leader who is also referred as the project champion, and (5) have stakeholders of the project involved the project team as team members.

### 2.3.6 Organizational culture

If the whole members in the organization have a shared value and common vision, it would facilitate the success of the ERP implementation (Nah et al., 2001). To be specific, the “open to change” organizational culture would facilitate the project success a lot (Nah et al., 2001). Nevertheless, the pursuit of high quality, the widespread computer capability, and the strong willing to accept new IT tools are helpful for the implementation work (Nah et al., 2001).

As organizational culture is embedded within the national culture (Zhang et al., 2005), the culture topic will be discussed as national culture among the chapter 2.4.

### 2.3.7 Visioning and planning

There are basically three levels of visioning and planning should be built for an ERP project according to the existing literature: organizational business operation plan (Finney & Corbett, 2007; Umble et al., 2003), linking the business goal with ERP strategy (Finney & Corbett, 2007; Ifinedo, 2008; Roberts & Barrar, 1992), and the ERP implementation plan.

For the strategic business goal, Umble et al. (2003) suggested the key people in the organization should create a clear and compelling vision for the organization in the coming three to five years, to specify the operation rules to satisfy other stakeholders such as empower employees, customers and suppliers. Finney and Corbett (2007) also proposed an organization should build an organizational vision firstly in order to to identify the project goals afterwards.

The know-how of aligning ERP adoption with organizational goals will enhance the level of implementation success (Ifinedo, 2008). It is then important to translate the junction

between ERP adoption and organizational business goal into measurable targets (Al-Mashari et al., 2003).

From last view, the ERP implementation view, which viewed the activity only as a project, Somers and Nelson (2001) thought the “triple constraint” identified by Schwalbe (2010) (has been described in *Project management*) should be addressed in the visioning and planning activity. During the application of the triple constrain model a balance should be taken care of, for example, if the time constraint is the most important variable, then the during the planning building the cost and/or scope dimension have to be adjusted to meet the time schedule (Schwalbe, 2010).

Depends on the situations of the legacy system, the ERP strategy can be planned differently: if the legacy system has a quite high complexity, the amount of technical and organizational change requirement will be high and vice versa (Holland & Light, 1999). In a case study by Sumner (1999), the experience gave a lesson that installing a totally integrated package in one time, would save many efforts and prevent many problems from occurred during later integration process.

Top management stands an important role in this activity as stated by Bingi et al. (1999). They believed the top management must consider the ERP implementation implications from a strategy view, instead of just treating it as an enterprise system change. The researchers stated, having accepted the ERP implementation is also changing the people and culture in the company, they should consider many questions before the project launched, about how the system should strengthen the competitive position of the company, how it would influence the organizational structure and culture, the scope of the project, etc.

### 2.3.8 BPR and Minimum customization

During the implementation, reengineering the organization’s BP to fit the ERP is considered to be critical (Sumner, 1999). On the contrary, modifying the system to meet requirements of existing BP always received a failure result (Sumner, 1999). In practice, business process reengineering (BPR) can achieve significant improvement for organizational BPs (Al-Mashari & Al-Mudimigh, 2003)

It is believed that customization of the ERP system should be as little as possible (Bingi et al., 1999; Holland & Light, 1999). “Redesign BP to fit the organization” factor was ranked firstly in the case study of Sumner (2000), which studied seven companies that implemented ERP. Minimum customization is also referred as *vanilla ERP* in some studies (Akkermans & van Helden, 2002; Finney & Corbett, 2007). The companies should be willing to change their business processes to align to the processes in system (Holland & Light, 1999; Fui-Hoon Nah et al., 2003). The too much modification to program could lead to cost overruns and possibly project failure in the end (Sumner, 1999; Sumner, 2000).

For those necessary customizations, a successful experience can be referred was that making an agreement in the prior stage with ERP vendor to state it clearly that which parts are going to be customized (Sumner, 1999).

### 2.3.9 ERP consultants

As cited by Finney and Corbett (2007), the need of hiring an ERP consultant accepted a wide support by many researchers (Trimmer et al.; Bajwa et al.; Kraemmergaard & Rose;

Al-Mudimigh et al.; Bingi et al.; Skok & Legge; Kalling; Willcocks and Stykes; Motwani et al.). Even in research of Ifinedo (2008), the external expertise stood a stronger position than the other two CSFs studied in this research, top management support and business vision. Further, a high quality ERP consultant can be a good compensation where the organization has a poor business vision or has an inadequate support from top management (Ifinedo, 2008), as well as in condition of lack of internal expertise (Sumner, 1999). Nevertheless, a solid external expertise can always enhance the level of the implementation success on the basis of top management support and business vision (Ifinedo, 2008).

The profession of ERP consultant needs skills include technical knowledge, functional knowledge, interpersonal skills, as well as one or more particular industries knowledge (Bingi et al., 1999). Sumner (1999) also suggested hire consultants that were specialized in specific ERP modules.

The consultancy services involve handling requirements analysis of the business needs, selecting ERP vendor and suitable ERP package, leading the configurations, and managing the implementation (Monk & Wagner, 2009; Thong, Yap, & Raman, 1994).

Lastly, the organization should build a knowledge transfer mechanism, which defines the role and duties of consultants properly and clearly, and ensures their knowledge and skills are transferred to the organization personnel adequately (Al-Mashari et al., 2003).

### 2.3.10 Legacy system

Legacy system is an assembly of the existing BP, structure, culture, and IT infrastructure (including software and hardware) of the organization, so it is not something that can be managed or changed during the implementation as many other CSFs (Holland & Light, 1999). But still, the understanding of it will be useful to make the change plan, and will play a role in the initial process of the project (Holland & Light, 1999). Therefore, legacy system is not a separate factor in ERP implementation but it is a basis of the ERP system establishing and has many connections with the new system (Holland & Light, 1999).

The legacy system issue is related to the integration on legacy system with new system (Bingi et al., 1999). But this may bring big problems for the integration work and it will be even messy when one of the components needs to be upgraded or changed after the integration (Bingi et al., 1999).

Considering the data issue caused by legacy system, which refers data distributed and redundant in machines throughout the different departments, it is notable to make a careful and comprehensive plan for the legacy system treatment (Al-Mashari et al., 2003).

### 2.3.11 Data accuracy

As ERP is an integrated object, the inaccuracy data input in any end would result in a negative domino effect throughout the whole organization (Bingi et al., 1999; Umble et al., 2003; Zhang et al., 2005). Therefore the availability and timeliness of the accurate data is a prerequisite for an effective system, or the data problem would cause serious implementation delays (Somers & Nelson, 2001). It is a challenge for the organization to obtain the right data, and convert the data into uniform data structure or format, especially when the data was located in separated machines among dozens of functional departments and even different geographical offices (Al-Mashari et al., 2003; Somers & Nelson, 2001). Given the importance of the data accuracy and quality, the user training

and emphasize them the meaning of it should stand a top priority in the implementation (Stedman, as cited in Umble et al., 2003).

In addition, the employee excluded from the system is harmful for the data quality and system operation (Umble et al., 2003). Everyone in the organization should work within the system instead of around it (Umble et al., 2003). To achieve this, the organization must convince the employees that the use of the system is an unchangeable decision, and the legacy system should be retired to facilitate the user acceptance of the new system (Umble et al., 2003).

### 2.3.12 Change management

During the ERP implementation, the functional departments of the organization will receive impacts, to make all kinds of changes, as well as the social nature of the organization (Umble et al., 2003). Changes are inevitable for an ERP implementation thus the whole organization should be prepared for the coming changes (Sumner, 1999). Otherwise there would be resistance and chaos to the implementation (Umble et al., 2003).

Change management is important in ERP implementation, since it starts at the project phase and continues throughout the whole project (Nah et al., 2001). Among the change management activities, the core objective of ERP implementation should be kept that it is to improve the business of the organization instead of only its IT tools (Umble et al., 2003).

Top management should play an active role in the organizational change, to manage the change within the company, and their role is very effective when coping with conflicts (Bingi et al., 1999).

### 2.3.13 User training

User training is aimed to achieve a solid understanding of the system to apply their own knowledge of BP into using of the system (Umble et al., 2003). The ERP cannot play full power if the users are using it improperly (Umble et al., 2003). Also, the system knowledge obtaining is through the practical using of it, therefore Umble et al. (2003) suggested the post-implementation training is needed.

User training should be conducted in order to reduce the degree of user resistance from ERP using (Sumner, 1999), in such an involuntary situation of using (Chang et al., 2008; Zhang et al., 2005) that in the organization implemented ERP system, the users would have no choice but only use the system, except quit the job.

The project team should make a suitable training plan for users in order to let them understand BPs behind the ERP system (Al-Mashari et al., 2003; Gupta, 2000). The employee work content changes due to the implementation should also be noticed during user training (Finney & Corbett, 2007). Additionally, Sumner (1999) suggested reporting function should be emphasized during user training.

Some organizations found that efforts put in user training can have a higher payback than expected, as the internal staff immersed in system environment can efficiently enhance their system-related knowledge accumulation (Sumner, 2000).

### 2.3.14 Vendor quality

A high-quality ERP vendor can be a good basis for a successful ERP implementation in the long run (Ifinedo, 2008), and it shapes the final outcome of the implementation (Zhang et al., 2005). Zhang et al. (2005) proposed the organization figures out the basic information about the ERP vendor when making selection, such as its focus customer group, its visioning planning, etc.

A high-quality ERP vendor should have qualified consultants with strong knowledge basis both on BPs and IT aspects, interpersonal skills, as well as a constant availability during the project, which is also referred as a good collaboration with the organization party (Zhang et al., 2005).

In conclude, the ERP vendor should provide continuous support throughout the whole implementation lifecycle to guarantee its success (Zhang et al., 2005).

### 2.3.15 Others

The cooperation and communication between implementation parties is a key factor for a successful implementation, in other words, a good teamwork between internal organization internal project team, ERP vendor and external consultant is beneficial for a successful implementation (Nah et al., 2001).

There were researchers discussed ERP implementation CSFs not just list them parallel, but seek for the interrelationships between them (Akkermans & van Helden, 2002) or put them in a hierarchical framework (Fui-Hoon Nah et al., 2003).

Akkermans and van Helden (2002) discovered the interrelations among the 10 CSFs (from Somers and Nelson's (2001) ranked list) in their case study. In the case study, the company experienced crisis during ERP implementation but the situation was reversed by attitude changes of the key stakeholders. The reversal effects between the 10 CSFs after the crisis indicated that a change in one CSFs can work for many other CSFs. More notable is there are two CSFs are evaluated as the core reinforcing loop in the case by the researchers, that in the first stage the bad interdepartmental communication and collaboration turned to be a downward spiral until the reversal, which turn this reinforcing loop into a virtuous cycle (Akkermans & van Helden, 2002). To achieve the reversal effect, key stakeholders took several strong means to turn the situation into a virtuous cycle.

Akkermans and van Helden (2002) believed that the CSFs are related with the sense that a change in one can cause changes in all others directly or indirectly. Furthermore, the change trends of them are in one direction, which means, the changes are either all positive or all negative.

Fui-Hoon Nah et al. (2003) categorized for example the factor communication involves subfactors targeted and effective communication, communication among stakeholders, expectations communicated at all levels, project progress communication, and user input

## 2.4 Cultural features of Chinese SOE

This subchapter tries to provide an basic understanding of the Chinese SOE by firstly put the Chinese national culture characteristics by the four dimensional model of Geert and

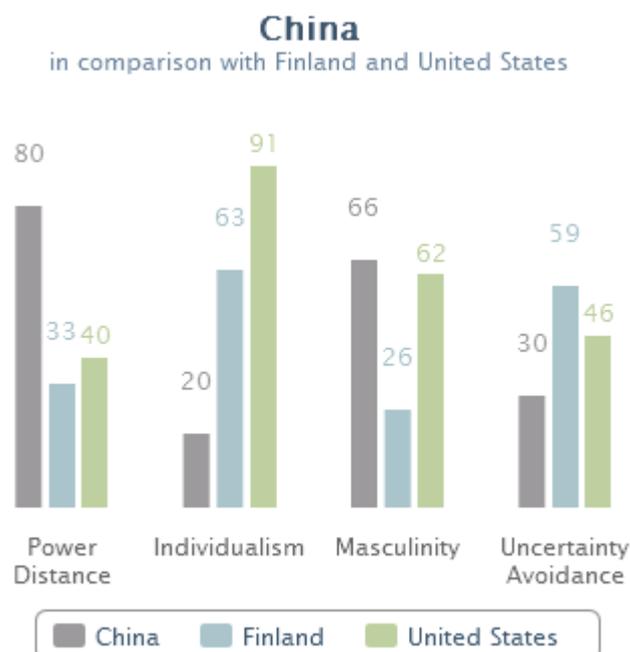
Jan (1991), and then the Chinese featured relation-based government as its social philosophy, and lastly introduce what Chinese SOE is and some general features of it.

### 2.4.1 The four national culture dimensions

In the book written by Geert and Jan (1991) that about culture and its relations with organizations, four dimensions about national culture were identified, as well as a set of dimensions about organizational culture.

Firstly, to understand culture, it is necessary to specify it from some relevant and similar concepts, human nature and personality, in order to clear the scope of the discussion. Culture is an artifact between human nature and personality. It is learned from one's social environment instead of by inherited like human nature. Human nature stands for the traits that commonly existed in all human nature. Human nature is inherited from one's genes, for example the human feeling of love, fear, sadness. However, the ways one expresses those feelings are influenced by their own culture. Personality, on the other hand, is a set of unique traits that only belong to one specific person. Personality is sourced partly from gene and partly by influences of culture and personal experiences. (Geert & Jan, 1991)

In the contemporary situation that globalization has already been existing everywhere, the differences between eastern and western culture have no way to be kept distinct and should be well studied and understood. Therefore, Geert and Jan developed his four dimensional model of differences among national cultures, derived from a survey by IBM group corporation conducted in around 1970s. The survey data was from subsidiaries of IBM in over 50 countries. This nature provided a perfect condition for the national culture study – participants from various countries showed much similarity only expect nationality. The four dimensions are: power distance (from small to large), collectivism versus individualism, femininity versus masculinity, and uncertainty avoidance (from weak to strong). Each dimension stands one aspect of a culture that can be measured relative to other cultures, and each country among the IBM survey got a score (from 1 for the lowest to 120 for the highest) on each dimension. Figure 1 shows the scores on four dimensions of China, Finland and United States respectively (“The Hofstede centre”, 2014).



**Figure 1.** Cultural dimensions of China, Finland and United States (“The Hofstede centre”, 2014).

**Power distance** reflects how the people in a country treat with unequal. There is unequal in every society, but citizens treat them in different degree of tolerance. China got a quite high score for this dimension, 80, which implies China has a high tolerance culture of the power gaps between the high-power holders and the low ones compared with some western countries, such as American (40).

Reflected in workplace, corresponding to the topic in this thesis, a high score of power distance signifies the superiors and subordinates consider each other as existentially unequal, while the hierarchical system is viewed to be based on this existentially unequal reality; the subordinates are viewed as the group that should be allocated work and be taught how to do it by the superiors, etc. In short, in such values, the powerful people should have privileges and should have the rights to dominate the less powerful people.

**Individualism versus collectivism** is the second cultural dimension in Geert and Jan (1991)’s study. Opposite to an individual society, a collective society, such as China, who got only 20 on this dimension, considers the interests of the group prevails over the interest of the individual, while the United State sample, which had a high score as 91, implies the American views individual interest overweigh than group interests.

In the working aspect, a company prefers to hire an employee that will act according to the interest of the familiar person and the relatives will be given priorities as people from one family are considered to be familiar to each other and reduce risks. During the work, the relationship between employees is more to be seen in a moral respect. Moreover, the collectivism people will have better performance when working in group and with bad outcome when working individually. Management in collectivist society is management of groups while in individual society is to individuals. Another feature in collectivist society is that it is natural to treat people with different attitudes when one is with closer relationship, and this is a kind of business practice, which is called particularism by sociologists. A result of particularism is that a good relationship should be built before a business is done. This feature will be discussed more detailed in next section, relation-based governance.

Thirdly the **femininity versus masculinity** does not only mean which gender has a relatively higher position in a society, but other emotional features in the society. According to the survey result, China had 66, is a more masculinity-biased society. In such society, people tend to be more assertive, seek for material success rather than in a feminine society, such as Finland (26) and other Nordic countries (Denmark 16, Norway 8, and Sweden 5), people are more modesty and care for others.

In the work, the people in masculine society will resolve a conflict in work by a fight, rather than by compromise and negotiation in feminine society. The attitude to work is also completely different between the two types of society. Masculinity person views it “live for work” while femininity person thinks “work is for life”. The author suggested masculinity group were suitable for industrial business as they can do the manufacturing efficiently, fast, and well, while femininity people can finish service type work, for instance consultant and transport.

**Uncertainty avoidance** is the fourth cultural dimension in the study, which indicates the tolerance of uncertainty and unpredictable in a society. Uncertainties can cause the anxiety of human being. Different from fear, anxiety has no object. It is a state of being

uneasy and worried about what may happen. For these uncertainties, human societies have methods to cope with them in terms of technology, law and religion.

As laws and rules are ways to avoid uncertainty in human being society, in the workplace, strong uncertainty avoidance society (for example Greece with 112) will formulate formal rules and regulations to specify and control behaviors of the employees, while weak uncertainty avoidance countries like China, with a score of 30, are horrible of formal rules, and rules are only established when they are really necessary. Also, in former type of society people always work hard because they think life is hurried, time is money, whereas the latter group only work hard when necessary, they will relax when there is a chance.

## 2.4.2 Relation-based governance

Relation-based governance, opposite to rule-based governance, referred to the society style that transactions are made based on personal and implicit agreement, rather than formal and impartial contracts (J. S. Li, 2003; S. Li, 2002). Relation-based governance is currently existed more in eastern countries such as China, while the western developed countries are mostly under rule-based governance (S. Li, 2002).

In a rule-based governance system, people activities and decision making are basically rely on public information that are explicit and standardized to everybody, while relation-based governance relies on local information that only visible by the parties involved. (J. S. Li, 2003.)

In a relation-based society, exiting from an existing relation is risky costly. Because the judgement and maintenance of the relationship with current partners have been done for a period of time, then stepping into a new relationship with a new partner asks for another round of testing of the new partner. Another consequence of this is that the members in such relation-based organization have little right to speak and would be hard to quit. To sum up, the boss in relation-based organization holds mass of rights and critical information, which makes the society to be authority centralized, and the subordinates are loyal. (J. S. Li, 2003.)

However, S. Li (2002) stated that the relation-based or rule-based governance is more related to the historic factors rather than the national cultural factors. The author proved it by showing the American history that it was under relation-based governance during the early decades it was established, until the fair and transparent legal system was established. Thus, the author concluded that from the view of the transaction governance, relation-base society mechanism is somehow a necessary stage that a society has to experience before the economic and social system is mature, to transform into the rule-based governance. (S. Li, 2002.)

## 2.4.3 Chinese SOE

There were researchers seeking for answers why western countries developed ERP systems cannot achieve success in Chinese market as in the international market (Liang, Xue, Boulton, & Byrd, 2004; Martinsons, 2004; Xue, Liang, Boulton, & Snyder, 2005; Zhang et al., 2005). It suggests the issue deserved to be researched is more on the national differences rather than one or more single organizational features. Shanks et al. (2000) also supported this argument. They suggested when discussing differences of ERP implementation CSFs in their two case studies in China and Australia respectively, a

general social level view can provide more integral picture for the analysis, i.e. to study the national characteristics embedded in the organizational culture.

The way that people accept and use information is shaped by the social culture and assumptions among which people are involved and behaviour (Shanks et al., 2000). On the other hand, ERP systems have built-in values and assumptions of the western society, as the systems are designed and developed under the shape of western culture (Xue et al., 2005; Zhang et al., 2005). Therefore the culture is an important unique factor when ERP is implemented in Chinese enterprises (Zhang et al., 2005).

Firstly, the SOE in China refers:

*In the international practices, the state-owned enterprise refers only to the central government or a state or federal government invests or is involved in the control of the enterprise; while in China, state-owned enterprises also include the local governments invest or are involved in the control of the enterprise. The behavior of state-owned enterprises is determined by the will and interests of the government. (Baidupedia, 2014.<sup>1</sup>)*

The Chinese government launched the economy reform from 1978, which aims to transform the form of the country economy from planned economy to market economy (Gao, 2008). Before the reform, the output of such type of national and collective enterprises accounted for 98% of the total industrial output value (Gao, 2008). The Chinese SOE not only received the price set by the government but also accepted allocated staff and product quotas (Martinsons, 2004). In that time, the sales, procurement, production, price, salary of employees, investment, etc. were all based on the planned management (Gao, 2008). The stiff system, distorted price limited the motivation and incentive of the enterprises and also the employees, and resulted in many problems, for example irrational structure, repetitive construction and the lack of motivation of technical progress of the enterprises (Gao, 2008). In the reform, Chinese SOE experienced big transformation, such as more autonomy and incentives were given to the enterprises and the enterprise ownership shifts (Benson & Zhu, 1999; Groves, Hong, McMillan, & Naughton, 1994). These changes resulted in some good SOE changes such as the improved productivity and increased employee motivation (Groves et al., 1994).

The traditional values and antiquated ideology are obstacles of Chinese SOE reform (Gu & Xie, 2002), and it was always discussed that the reform was only partial effective (Groves et al., 1994). Therefore, still the Chinese SOEs have quite many characteristics different from typical western enterprises.

As in its definition, Chinese SOE has its own specialities. Its capital is wholly or mainly invested by the state, and its entire capital or primary stock is owned by the state. Moreover, not all the Chinese SOEs are for commercial purposes. They also play the role for executing national policy of planned economic, and adjusting the social economy. (Baidupedia, 2014.)

As for the weaknesses of Chinese SOE, the government support of the long run leads to the lack of spirit of competitiveness and innovation (Baidupedia, 2014). Also, the employees are generally lack of motivation of working (Groves et al., 1994)...

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<sup>1</sup> <http://baike.baidu.com/view/191098.htm> retrieved 9<sup>th</sup> May, 2014.

## 2.5 ERP implementation in Chinese SOE

There are already a couple of prior researches noticed the necessity of researching the features and experiences of ERP implementation in the Chinese context, and conducted study about it. Among these researches, some of them set the scope at CSFs of the context, while others discussed about topic that related to ERP implementation in China. The two categories literature are reviewed below.

Among the prior literature that about ERP implementation in Chin

### 2.5.1 Literature directly about ERP implementation CSF

Among the ERP implementation CSFs that have been reviewed in previous section, some of them were strengthened by researchers to be especially useful or need more attention to be paid in Chinese context (Shanks et al., 2000; Zhang et al., 2005).

Zhang et al. (2005) remarked culture as the unique CSF for Chinese context. Specifically, Chinese were more tolerant to unclear information, meanwhile prefer to trust their own experiences and judgements, and would like to keep information inside a small group instead of sharing it. Other general CSFs examined by them to be also critical in Chinese context are, existing IT infrastructure, organization type (SOE or private enterprise), objective of the ERP implementation, and vendor quality. The researchers suggested a company with no complex legacy system should be paid more attention; SOE type tends to be more likely to fail; and a top-down command of implementing ERP could be passive for the project.

In Shanks et al. (2005)'s study that set a comparison of ERP implementation CSFs in two case companies in China and Australia respectively implementing the same ERP package. Table 1 shows CSF importance rankings in different implementation phases, and the item that unlisted in Australian case in the same phase is shadowed in Table 1. Due to the study of Shanks et al. (2000) was conducted before the Chinese case company reached its improvement phase, the improvement column is blank in Table 1.

**Table 1.** Chinese ERP implementation CSFs in case study of Shanks et al. (2000).

	Planning	Implementation	Stabilisation	Improvement
Top management support	1	5	4	
Balanced project team	2	1	1	
External expertise	3	3		
Project management <sup>a</sup>	4	2		
Clear goals	5			
Data accuracy		4	2	
Education and training			3	

<sup>a</sup> The description of this item was “a detailed and stable project plan should be established early in the project”. Therefore in the study, “visioning and planning” is more proper for this item, which refers to the initial ERP implementing strategy and planning making in the beginning of the project, as has been reviewed in the second chapter.

In case study of Shanks et al. (2000), the data quality in Chinese system was poorer than in the Australian case company so that the authors pointed out data accuracy is a crucial issue in Chinese context.

The authors also discovered, in the CSF comparison, the importance of top management support throughout the project is quite similar in two cases. However, the role of project champion is different in the Chinese and Australian case companies: in the Australian case, the champion was often a subordinate in the organization, while in the Chinese case, the champion was not so critical because the top manager was always perceived as a control. Thus the authors proposed to appoint a high position person as the project champion, or it would be hard to handle the authority issue with top management.

## 2.5.2 Literature indirectly about ERP implementation CSF

Firstly, regarding the objective phenomena occurred in the ERP implementation in China, there were researchers observed them and gave the analysis of them as subsequence. There were two articles sought for the reason why western ERP vendors could not dominate the Chinese ERP market (Liang et al., 2004; Xue et al., 2005).

In the study of Liang et al. (2004), the causes of western vendor's failure are: language, reporting format and content differences due to the different accounting and financial standards, cost control module (in purchasing plan), BP redesign issues (because of the SOEs were experiencing the Chinese economy reform), inadequate customer support, immature local consulting partners.

Similarly, in Xue et al. (2005)'s research, the causes of foreign ERP implementation failures in China were divided into three categories, culture, environment and technical issues. Specifically, five cultural factors were indicated which are, fail to get a local partnership then fail to realize localize, BPR issues due to the BP differences, human resource issues (because of unrealistic expectations for the), report and table format, and language. The environment factors were, economic reform (as mentioned in 2.4), and price competition. Technical issues include language, report and table, and cost control module.

Martinsons (2004) analysed the common and different characteristics between Chinese SOE and Chinese private ventures during the ERP implementation activities from his case studies of four Chinese SOEs and four private ventures that implemented the same ERP package, SAP's R/3.

The three common characteristics of ERP implementation in Chinese enterprises are: the project schedule were always exceeded, but rarely did the project budget; improvements were rarely made in the cycles, which resulted in the reduced customer satisfaction and system value; and the third one, which could also be applicable for cases in other countries, the projects led by management ended up with higher level of success than those led by IT managers. (Martinsons, 2004.)

In the research of Martinsons (2004), the eight differences characteristics of ERP implementation between Chinese SOEs and Chinese PV are as follows:

- 1) The aim of the ERP implementation for SOE was just to increase functional departments' consistency and reduce costs, instead of seeking for new income or realize end-to-end supply chain management, while the PV, who had higher level of IT infrastructure, set higher level of goals that aimed to enhance competitiveness.
- 2) The top management involvement in the project in PV was more active than their counterparts in SOE. Top management in SOE were usually reluctant to be directly involved in the project. The authors speculated the reason could be the leaders feared of

losing respects if they show unfamiliar with the system or IT tools during the project meetings, so they preferred deliver the task to middle management.

3) The third difference focused on the cross-functional steering committee which aimed to make decisions on the resolution of issues emerged in the ERP implementation process. Towards this aspect, the SOEs always had an older committee composition rather than the more capable ones. Further, the SOE committee would more like to control the project rather than supervise it.

4) Chinese PVs tended to hire consultants while SOE always not. Not only the Chinese SOEs rarely hired external consultants, nor did they choose the ERP experts but the general IT experts. The author thought the consultant position missing in SOE was due to the leadership's fear of losing face and control of the significant organizational change.

5) Chinese PVs are generally more capable to realize a broader and more cross-functional implementation than SOEs. This was because there were always conflicts between departments in SOEs. Each single units were concerned more on their own benefits and interests, rather than considering the organizational benefits as a whole.

6) The SOEs preferred to implement the ERP system in phases, while the PVs would implement the whole system at once. According to the author, the reason of this was the SOE's distrust on the impersonal system. They relied more on the interpersonal relationships. Also, the unfamiliarity with automation office tools increased their resistance of implementing the whole ERP package in short time and in once.

7) After the implementation, more data maintenance issues occurred in SOE than in PV due to different employee reward system. In SOE, the employees normally will not get additional reward for the active contribution for ERP project, which means the SOE employees have to make additional workload for the project and were expected to have a high-quality output. And in many cases, the SOE employees were also worrying about their position security due to the organizational change.

8) In SOE it was lack of evaluation and continuous improvement after the implementation. Managers were contented with simply reduced product costs, and did not care about other benefits it could bring. On the contrary, PV managers would do a comprehensive study of what benefits the ERP can create, and continue support the project even after the system has gone live. As a result, in SOE, although in many cases the costs had been reduced, but improvement of the whole supply chain was rarely shown.

## 3. Methods

The empirical study of this study is a qualitative study, and a Chinese SOE was as the case study involved in this study. This chapter briefly introduces basic components of qualitative research that include the philosophical assumptions, qualitative research methods, and data collection methods. The next half part describes how the qualitative research in this study was conducted.

### 3.1 Qualitative research

Kaplan and Maxwell (2005) identified qualitative research as a method that conducted in natural settings and gathers data in form of words instead of numbers, and the goal of qualitative research is “understanding issues or particular situations by investigating the perspectives and behaviour of the people that are involved in these situations and context.”

#### 3.1.1 Philosophical assumptions

All the researches, no matter qualitative research or quantitative research, need a specific assumption to be the philosophical basis (Myers, 1997). Following the classification of research epistemologies by Chua, Orlikowski and Baroudi (1991), the three philosophical assumptions of qualitative research are positivist, interpretive, and critical.

Positivist studies assume the existence of reality and relationships within phenomena are objectively given, and they can be expressed by measurable attributes that are independent of the researcher (Myers, 1997; Orlikowski & Baroudi, 1991). The research objective can be investigated by structured instrumentation (Orlikowski & Baroudi, 1991). Positivist researches are generally for test theory, to strengthen the predictive understanding of the phenomenon (Myers, 1997; Orlikowski & Baroudi, 1991).

Differentiated from positivist study, interpretive studies assume the access to reality is through the subjective meanings that people create when interacting with the world, i.e. the meanings are assigned by participants, instead of seeking for the readily “given” realities (Myers, 1997; Orlikowski & Baroudi, 1991). And the purpose of positivist studies is to generalize finding from one setting by a deep understanding of it to some other settings (Orlikowski & Baroudi, 1991). Orlikowski and Baroudi (1991) summarized a set of criteria of positivist studies: they are intended to enhance the understanding of the phenomenon under a cultural and contextual situation; the understanding of phenomenon should be examined in its natural setting; the examinations should be only from the participants’ perspectives without any views from researchers as an outsider.

For critical studies, the assumption is that the social status quo is consistently produced and reproduced by people (Myers, 1997). Critical studies are aimed to reveal and emancipate the restrictive and alienating conditions of status quo which are believed to be deeply rooted and hard to be shaken for any (Myers, 1997; Orlikowski & Baroudi, 1991).

### 3.1.2 Qualitative research methods

A research method is “a strategy of inquiry which moves from the underlying philosophical assumptions to research design and data collection” (Myers, 1997). Within qualitative research, Myers (1997) introduced four research methods: action research, case study, ethnography, and grounded theory. In the study, case study is applied.

Case study is a method examines a contemporary phenomenon within its specific natural setting, utilizing multiple methods of data collection from one or a couple of entities which can be people, groups or organizations (Benbasat, Goldstein, & Mead, 1987; Kaplan & Maxwell, 2005). It is therefore clear that the case study research method is suitable for IS research, as the objective of IS research is to investigate information systems in organization context, rather than the simply IT studies in software engineering research (Myers, 1997).

It should be emphasized that the research objective should be examined in its natural setting in a case study, by researchers as observers or investigators rather than participants, with multi data collection methods, to investigate research questions in form of “why” and “how” (Benbasat et al., 1987). Another key characteristic of case study is that the more effort and power the researcher put on the study, the deeper the findings that the researcher could reach (Benbasat et al., 1987).

Lastly, depends on the philosophical assumptions of the research, a case study can be positivist, interpretive and/or critical (Myers, 1997), which means a case study can either apply one of the assumptions or a few of them.

### 3.1.3 Data collection

According to Kaplan and Maxwell (2005), qualitative researchers generally have three data collection methods, which are observation, open-ended interviews and survey questions, and lastly documents and texts. Normally multiple of them are used in one research (Kaplan & Maxwell, 2005). A key principle of qualitative data collection is that to treat every element in the study as potential data (Kaplan & Maxwell, 2005).

Observation is a data collection method that the researcher participates in the studied setting actively, rather than the kind of passive or non-interactive observation (Kaplan & Maxwell, 2005). In such method, the researcher can involve with the participants such as participate in their regular meetings, ask them questions. Thus, the researcher is able to record the activities happened in the setting at once, as well as obtain the explanations and viewpoints of the participants on the spot, instead of memorize or obtain the data from a secondary resource (Kaplan & Maxwell, 2005).

Interview can be qualitative or quantitative (Seidman, 2012). Unlike in quantitative researches, in which the interview are mostly closed-ended with specified answers and predetermined sequences (Sofaer, 1999), qualitative interviews always start with a very open-ended question to reflect the nature of the research (DiCicco - Bloom & Crabtree, 2006; Sofaer, 1999), and subsequently the questions will keep in open-ended but more specific (Sofaer, 1999). The open-ended interview can reflect the real viewpoints of the participants in their own terms, and not restricted from a structured set of interview questions, but can be extended to another unprepared topic when the respondent mentions it and valuable for the study (Kaplan & Maxwell, 2005). Compared with open-ended interviews, open-ended survey questions method is more suitable for research on a large number of respondents, and always ends with question “Do you have any other important

comments?” for the topics or issues might not be considered by the researcher (Kaplan & Maxwell, 2005).

The last category of qualitative data collection method, documents and texts, can be documents, published journals, magazines, novels, newspapers, and even photographs (Kaplan & Maxwell, 2005). These sources can also be valuable qualitative data sources (Kaplan & Maxwell, 2005).

## 3.2 Qualitative research conducted in the study

Case study, out of qualitative research was utilized in this study, to understand “what is going on here” and “how the participants see it”, in the natural context without intervention of the researcher. Concerning the data collection methods, survey questions was applied in pilot study while interviews were conducted later with wider range of participants. Additionally, documents data collection method were primarily used in this study as background description, it also can be viewed as source of positivist study.

### 3.2.1 Philosophical assumptions in the study

Regards the philosophical assumption, positivist and interpretive study were applied, to obtain the objective truth and experiences of how the ERP project conducted in the case company and what happened by positivist study, then achieve the feelings of how participants involved in the project thought about the project, that is, how they explained what happened during the project subjectively, by interpretive study.

### 3.2.2 Data collection methods in the study

Restricted from the geographically and time conditions among the author and the participants, three data collection methods were used in the thesis: documents, survey questions, and interviews.

In this study, document resources were the YY implementation methodology (public online), and the project schedule (from the YY participant).

Limited by the objective condition during the study that the author was located in Finland while participants were in China, the empirical study can only be conducted by online interviews and email surveys.

Specifically, two pilot-surveys were sent to the internal consultant and vendor consultant in early March in 2014, to gain some basic and background information of the case and also for a preparation for the later formal interviews. Only the internal consultant answered the email and vendor consultant preferred the instant question and answer form, online interview to conduct the initial study. In addition to this, the current MSOE project champion also answered questions by survey form, because he did not have the proper devices for online chatting. He answered how the CSFs went during the project and ranked the top four most important CSFs from his perspective.

Other participants participated by online interviews. There were a prepared structured questions beforehand, which lists the CSFs categories as in the chapter 2, and to ask interviewees explain how each CSF conducted and related to the project process, and how they think of the CSF, how important it is to the project, and if it works for the project. Of course the interviewees will answer selectively with those they got impression or lots of comments to express. Yet the interviews were basically conducted in open-ended form

that the new questions and new directions can take place whenever needed that inspired by the answer or description of the interviewees. The interviewer wrote down useful information as notes during interviews and recorded the interviews for later supplement for the interview notes.

There were six participants in total in the empirical study. The basic information and their participated methods are as demonstrated in Table 2, and a code is given to each of them that will be referred as in subsequent text, based on their position in MSOE.

**Table 2.** Basic information of participants

No.	Current position	Age	Gender	Research methods <sup>a</sup>	Date (in 2014)	Code
1	director of science division	53	M	I	25.3, 13.4, 2.5	D
2	internal consultant	29	M	I, S	I 28.4; S 13.3	ICn
3	former project champion	32	F	I	27.4	FCh
4	project champion	35	M	S	10.5	PCh
5	employee of design department	30	M	I	25.3	E
6	consultant from vender	34	M	I	20.3 ; 2.5	VCn

<sup>a</sup> Research method types: interview (I) and/or survey (S)

Among the participants, D and E had the least knowledge and contact with the new system, but they can provide information in other aspects: D gave much information of the organization background and especially in terms of cultural aspect, as he had been in here after graduated in 1983; E provided a general feeling as a normal employee in MSOE or even an outsider from the system that what influences the ERP implementation brought to the enterprise.

The other four participants can provide more detail and precise information about the truth and their viewpoints about the implementation because of their work positions. On the other hand, VCn, as an outsider of MSOE, can supply information horizontally as a Chinese market ERP consultant with experiences with both Chinese SOE and Chinese private enterprises.

## 4. The case background

The basic background information of the case company, the ERP system it adopted and the ERP vendor, as well as the project process description based on implementation methodology from the vendor are stated in this chapter.

### 4.1 Organization background

The organization in the case study is a manufacturing SOE that produces military aircraft, so it is abbreviated as MSOE (Manufacturing SOE) here. MSOE was founded in 1950s, the total assets of it was around 200 million Euro. MSOE had over 1200 employees in total now.

During the Chinese economy reform that almost all of the Chinese SOEs were forced to transform into market-oriented business, MSOE also made huge changes. For example, in 1980s, when MSOE had limited fund to develop military products, it had to produce many civilian products to keep survive, such as bikes, food packages, and medical equipment, although these civilian products gradually disappeared that beaten by the private enterprises. But meanwhile, the military orders turned to be normal, and it turned to an aircraft manufacturing enterprise with both military and civilian customers.

The wage mechanism now in MSOE had already been reformed compared with decades ago, but still with the Chinese SOE features. As D introduced, the wage mechanism was reformed significantly during 1980s to 2000 in MSOE. MSOE applied the “queue” method to calculate the employ salary, that the salary amounts were ranked by performance of the employee that graded by their superiors, and there were rigid salary level classification for each position in each department. Yet the gap between the highest salary level and the lowest one would not be as large as in other types of enterprises, since it would cause psychological unbalance for employees. Therefore, the management should balance among the different levels of employees in the organization to make them all feel moderate.

The interviewee D set an example to explain this. An employee has been in the organization for more than 20 years, but was lack of motivation and hard work for those years and with result of still having quite low salary. He ever complained: why the newcomers with Master degree have already got high salary level than him! The interviewee D explained, that is why MSOE had to control the gap between different salary levels. The organization has to balance their psychological expectation, or they would be very unhappy with the organization and next their work, on the other hand it is almost impossible for the organization to fire such employees. So the organization needs to keep a good work atmosphere and mood for every employee.

In terms of IT tools in MSOE, D introduced, like other Chinese enterprises, MSOE introduced computers in 1990s, and after 2000, almost every one held a computer in many departments, and it was used to electronic circuit produce, mechanical drawing, and other similar applications. Till the project, although the bill of material was not in electronic version, the financial functions were already in electronic applications.

## 4.2 The ERP System background

The ERP product implemented in the MSOE is “U9” from the ERP vendor Yonyou (shorted as YY in the subsequent text).

YY was established in 1988, is currently the largest management software vendor in the Asia-Pacific area, and is the China’s leading enterprise cloud service provider. It has large market share in industries of finance, automobile, tobacco, etc. in China. YY has around 1.8 million customers in Asia-Pacific area in terms of software and cloud services, and over 60% of the China’s top 500 enterprises had implemented its products successfully. YY has been listed in on the Shanghai Stock Exchange. (“Organization profile”, 2014.)

U9 is a multi-unit collaborative manufacturing ERP system developed by YY that oriented to complex applications in rapid developing medium and large enterprises. It has highly flexible product architecture, to help enterprises respond to changes rapidly, and support improvements in terms of their business, operations and management. Currently U9 has had more than 500 successful cases, and mature solutions for 36 industry segments. (“Yonyou U9”, 2014.)

VCn introduced, the ERP series products in YY were more localized, which means they had more local terms and management thoughts, while the concepts and ideas of ERP system were similar with western products, so it is easier to use for Chinese enterprises. In addition, he said, the ERP systems of SAP and Oracle can be more complex.

However, VCn said, the mechanism of the ERP implementation in YY was still not mature enough. The company was planning to deliver the implementation part of work to several reliable external consultancy companies. This type of transformation had been proved to be successful in top international ERP companies like SAP.

## 4.3 Project background

YY has its own ERP implementation methodology. It suggests the model of a successful implementation is to have a prepared enterprise, appropriate software, and a successful implementation method. The methodology of YY ERP implementation also includes the implementation lifecycle definition that is applied to every project. Five stages are involved in their lifecycle: project plan, visioning design, system construct, going live switch, and continuous support. After the last stage, YY will conduct acceptance work which signifies the close involvement of YY in the enterprise is basically finished. The experts will not work in the customer company any more but only keep periodical support and maintenance.

In project plan stage, project managers of the two parties (customer party and YY party) are appointed and the project teams are established. The common understanding of the project goals and methods are reached. In this stage the project is initialled formally.

In the visioning design stage, YY will investigate, comb, and diagnose the BPs in the customer organization, then analyse and seek for the optimization direction for the BPs. The visioning of the business running in the future is made based on the BP redesigns. The output of this stage is the business solutions.

In system construct stage, the business solutions generated from last stage is confirmed and accepted. In this stage many key activities are conducted: static data processing, redevelopment of U9 and its acceptance, user training, and simulation practices.

Coming to the going live switch, all preparation for the formal operation are done, as well as the plans, solutions, and environment for the system switching. The static and dynamic data are input, the switching programme is checked, the business permissions are assigned to different groups of users, and the switching mobilization meetings are organized.

## 5. The study

Generated and extracted from the survey, documents and interviews conducted with relevant participants in the case study, the results are illustrated in this chapter. Firstly the project process and its necessary details such as project team constitute, and several rounds of user training sessions, are described in the first subchapter. Secondly, the impressions and viewpoints of the participants during the project toward the CSFs items are stated by each CSF they stressed.

### 5.1 The project

The project basically followed the implementation methodology of YY. A couple of barriers and issues occurred though, many of them were resolved later, and lessons were learned from that. Next will describe the project objectively without personal touch, to introduce the personnel of the project involved people and the project process, as well as the lessons learned from it.

#### 5.1.1 Project team personnel constitute

In the case there were two parties involved in the ERP project, which were organization party and ERP vendor party. As to the project team, there were also two components of it, but referred as *ERP office* (also called as *internal experts* or *internal consultants*, belongs to MSOE) and *external experts* (belongs to YY) during the project. For the division of responsibilities, ERP office was playing more the role of “project team” during the project: although external experts did the initial BP analysis and combing, the ERP office were responsible for user training and were involved in regular meetings with managers and key users. The external experts, on the other hand, were as how they were called, stood an expert role that when there were issues cannot be resolved by internal experts, they would be called to provide more professional and hence more effective answer and solution. Another key task of external experts were to foster the members in ERP office to be the real “experts” with their knowledge of the system and implementation experiences.

Within the MSOE internal project team, there were three groups of staff involved in the project work as FCh introduced, in different period respectively, and served for different tasks.

The first group of staff were full-time employees that the formal members in the internal project team. They were also called “internal consultants”, as they were just working in the office next to the ERP vendor consultants’ office, and in every working day they would have several communications, in form of formal and informal meetings. Thereupon the internal consultants were equipped with more and more professional and solid system knowledge gradually during the close interactivities with external consultants.

Within the internal consultant group, the leader, who was also the project champion, worked in production department before he was transferred to the project. Another important member in this group was the one who has a relatively better technology background. She ever worked in the standardization department (department responsible for aligning the products and mechanical components to different standards such as

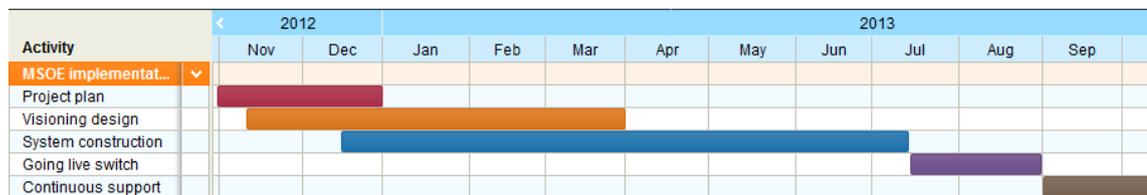
national standards, military standard, and industrial standard) and procurement department. She is also familiar with the one of the system SOW used, PDM. The third member was familiar with the product processes and procurement management. The other two members were from IT office before the project, their understanding and knowledge on BPs were limited. FCh put it frankly: there was lack of a team member from financial aspect, or the implementation effect would be better.

The second group of staff in internal project team involved in project work in form of “part-time job”, as they can only spend part of their working hours on the project work. This group of employees in MSOE were “business elite” in their own business departments. The amount of this kind of staff was large. Although they only spent part of working time on the project work, it had the top priority, so they always started to do it right away once they received the task, and accomplished it as soon as possible. Such tasks can cost three hours, or one hour, sometimes longer. To take an example of their work, in the BP combing stage, this group of staff were responsible for describing and discussing about the BPs in their own department, and report for it.

The third kind of participants in internal project team, as FCh’s classification, was the top managers in each department. They were responsible for the management of changes during the project. They can control their subordinates and make sure the tasks assigned to them to be accomplished well.

### 5.1.2 Project process description

The ERP implementation project in MSOE was launched in November of 2012 and continued till now on. The phase II project will be conducted in approximately September of 2014. The time schedule of the project is as depicted in Figure 2 as relevant document shows, based on the five stages YY ERP implementation model that has been introduced in chapter 3.3.



**Figure 2.** The time schedule of MSOE case.

The MSOE case generally followed the five-stage implementation model of YY ERP implementation methodology. In project plan stage, the project was launched and the ERP promotion leadership group and working group were founded, whereas the leadership group was consisted of several top managers and the working group was consisted of middle-level cadres. In project plan and visioning design stage, the main tasks were data preparation and BP combing.

There were project personnel changes before the going live switch stage. The YY project manager and the project champion of MSOE were changed in succession. Moreover, the former YY expertise team in MSOE was from the YY head office, later it was replaced by the local YY implementation team. The secondary understanding of MSOE BPs cost time to run-in for the new YY team.

During the first one or two months of going live switch, the project met big resistance from the internal staff. Two systems, the new ERP system and the ISs used by

departments previously, were simultaneously enforced to use in this period, which were the initial going live of ERP was a trial running. According to VCn's summary, there were three reasons for this upset measure: the finance department entered the project discussions quite late, so that the financial module of the ERP configuration still had many problems and it was plus related to many of other modules; the discussions on BPs were not sufficient enough yet; and it was such a large scale system with such complex BP structure that was applied to the whole organization at once. Therefore, the new ERP system did not have enough maturity and reliability to manage the data input and management for the whole organization. The single running of it could be risky.

But on the other hand, this measure also caused resistance and work delays as it doubled the interactive workload with ISs. Moreover, in this period of initializing the new ERP system, the advantages and benefits of implementing ERP were not reflected to the users at all. Under these unfavourable conditions, employees of MSOE began to show resistance to the IS using in the initial period of going live. But later by the re-modification of the ERP programme and a new round of user training, the condition turned better.

Also, as ICn described in email survey in 2014 May, after the system went live, most issues were from financial aspect, as there was no project team member from financial department, neither adequate involvement in the project after the system was put to use. In consequence, the problems emerged in financial aspect caused many rounds of repeat work, and a requirement from financial department always caused large amount of revision work for business departments, as well as the re-appraise of early phase BPs. Another issue in this phase was the accuracy of basic data. "The degree of basic data standardization was too poor, which influences the fluency of system running a lot", ICn stated.

In late November in 2013, the ERP system was finally be able to connect with the financial booking of MSOE, and the financial module of U9 can finally work normally since the beginning of 2014.

Current statement (till May, 2014) of the project was still stay in the continuous support phase, and not yet reach the final project acceptance, because of the coming phase II implementation according to VCn. In VCn's view, the solutions and function of MSOE project had already been finished for 80% to 90%. VCn thought MSOE did not want to reach the acceptance because normally, once the project reached acceptance by YY, the external experts would not work in MSOE daily any more, which would leave it in troubles when system-related problems occurred.

In the phase II, manufacturing execution system (MES) would be installed and integrated with the existing systems in around September of 2014. MES is a system deep into the planning level of manufacturing. ICn said it would include the detailed information of product orders, for example the assembling procedures and tooling.

### 5.1.3 Other pieces of the project

ICn described how the user training conducted in three stages: firstly before the system went live, there were several times of training, and in form of one-to-one for some key users; after the system was put into use, the user training was more intensively; and in the third round, which was intended to be done in coming months, the training will be carried out against each user role.

As ICn introduced, the MSOE had different meeting content, frequency and participants in different stages. In first stage, which is correspond to the visioning design stage in YY methodology, the project team had sometimes three to four meetings with functional department people to understand the BPs in their department. The participants were the key employees from the major department who's BPs were as discussion theme of the meeting, and the key employees from departments that with related BPs with the major department. In second stage, during which the implementation solutions were done, meetings were about ensure and reorganization of the solutions by discussion with the leaders of business departments. The meetings in third stage, which lasted from the going live switch stage, was relatively less frequency. The meetings in this stage were about intensive training to the department personnel. Lastly, from the beginning of 2014, when the system finally ran regularly and with financial module totally involved, the meetings were basically about flagged issues that waiting to be decided by top leaders.

There were generally four legacy systems in different departments in MSOE before the project. They were product data management (PDM) system (from YY) in design department installed around five years ago, U8 financial system (from YY) in financial department, a small software in marketing department developed internally, and Office Automation (OA) system (from YY) for general using across the whole organization.

Among these legacy systems in the case, the interface between PDM and U9 was finished and worked well. The system in marketing department will be dropped after data is synchronized well with data in U9. OA will be continually a separate system after the project as there are limited BPs controlled by it. The connection with U8 financial system had the biggest problem, because of the late involvement of financial department in the project, but it was already synchronized with U9 in the beginning of 2014.

#### 5.1.4 Mistakes and lessons learned from the project

FCh and ICn admitted there were work repetitions during the project, which wasted some human and time resources. FCh thought there were not big strategic mistakes, but in the project details, there were lessons can be learned. She took an example that took place in the department she was currently in, produce department. When they conducted the work of connecting paper account books to ERP system, it was taken for four rounds of work, due to the limited risks recognized and unfamiliarity with the BP. FCh believed such mistakes can be prevented by proper communication with the ERP office and YY team. Specifically, she said, when there were questions and uncertainties, person in the department should call staff of ERP office and YY to come, to ask and discuss about the solutions. Except of this she thought there would be continuously repeated workload.

Facing the resistance to the system and changes especially in the initial stage, in opinion of FCh, the project team should recognize in time that whether the resistance among different stages in different positions by different causes was a short-term issue or a long-term issue, in order to make proper resolution strategies to the specific issue.

## 5.2 CSFs in the implementation

In the project, the *top management support* was practically from the “second in command” or “the second highest authoritative” in MSOE. FCh said, this person was highly respected among MSOE and was very familiar with the businesses affaires in MSOE.

The ERP implementation was viewed as a “project of first in command” (a Chinese featured calling that means the project mastered and controlled by the highest boss in the organization) as a public concept in MSOE. Almost all the participants evaluated the top management support as the most important condition for the project success, and both FCh and PCh stressed the importance of it. FCh said, if the support was not sufficient, the project must be a failure. PCh answered it in the survey:

*“ERP is a ‘project of first in command’, there are many issues needed to be coordinate. If there is insufficient support from top management, it is hard to reach the expected performance.”*

FCh pointed out, the project team should inform, or report, or ask help from the top management when it was necessary. She asserted the notice was critical otherwise the top management would hardly be aware of the demands or risks then missed the chance to save it.

However, from perspective of VCn, the top management support in SOE was generally not as strong as in Chinese private enterprises. He said the primary reason for this was that although the SOE business model and structure was turning into marketing-oriented gradually, but still, for the top managers in a SOE, they had less responsibility and pressure for the enterprise performance and return on investment issues. In contrast, the bosses of private enterprises are truly owning their enterprises themselves, and the revenue and loss of for example an ERP project, should be borne by themselves. Therefore, they must pay 120% effort and resources on the project to ensure its success and maximize its effects as much as possible.

FCh, VCn, and ICn all admitted that the two **project champions** were quite capable in this case. FCh said, PCh had a capable management ability. VCn said, the two project champions both had quite strong capability.

PCh evaluated the project champion as second most important CSF in the MSOE project. He explained, the project champion must be familiar with both the BP and software. If the project champion is not familiar with ERP, will result in information asymmetry; likewise, if the person is without sound knowledge with the organizational BPs, the ultimate software will deviate from the BP, which resulted in a bad system structure for the organization.

FCh thought the project champion was the second most critical factor. She viewed it as a role of “guard a pass” in the project, and he or she can be unfamiliar with the business aspect but must be good at management, as this is a work of connection and transformation.

E evaluated **project team** competence as one of the top two important factors for a success ERP project, while the other was project management. He said the coordination role of project team that between different parties and different levels and departments of employees was so important in the project. Similarly, VCn stated the project team primarily played a communication and coordination role in the project.

In addition, VCn thought the high-capability internal consultants are very valuable for the organization, even in some cases as he knew, the organization only needed software products from vendor but did not need their expertise resources. To foster a high ability internal consultants, as VCn stated, can give the organization more in-time resolution of issues occurred in later usage, after the external experts quitted.

FCh stated there were more interdepartmental *communications* during the transition period that two systems were used in the same time. Although VCn thought the communication between departments were still not enough, for instance, the people in financial department was not care about the BP in the functional departments, meanwhile, as the employees' understanding about the system was not comprehensive enough, the data produced by functional department was not accepted by financial department as the data quality was too low, but in the contrast, functional department person thought the financial department person had too high requirement.

Also about the communication between the project teams and top management, FCh considered the project teams should report situations to top management when there were risks, or even potential risks that were predicted to emerge.

The *ERP consultant*, in the implementation experiences of VCn, only involved by some of the extremely large scale projects (such as over millions of euros scale project). Normal ERP projects he participated only involved two parties, he said.

PCh viewed ERP consultant as the third important CSF, because he insisted the capability of the consultant can influence the project progress and implementation effect. Therefore, he said the consultancy team should possess strong implementation ability, high level responsibility, and high level capacity to combine the system with local organizational BPs, then make the system to fit organizational management as soon as possible.

*Change management* was one tough work during the project. The IT usage was not so widely before the ERP. Although they had PDM previously, it was only used by limited departments and employees such as design department and product department. Especially some of the middle-age employees, ICn said, they almost never touched a computer before, thus the resistance by them was inevitable.

As to the specific problems and difficulties during the project, both FCh and ICn strengthened the period of initial use of the ERP was tough, that to guarantee the information safety (because the new system was not reliable enough yet), the legacy system was still in use together with new system. Facing the doubled workload, users showed resistance for new system even for the work. Despite the doubled workload, another hit for employees was there was no returns to show the meanings of their hard work, that is, it was still not the period that benefits of ERP adoption can be seen. This made the user resistance even severe.

But as FCh viewed, when obstacles emerged, it is important to judge if it is a long-term or a short-term issue, then to make strategy on how to overcome it. Participants all viewed this as a period cannot be avoided and the hard time actually passed peacefully. In this hard period, the members of ERP office worked hard to persuade employees among the departments to actively use the new system, as ICn introduced.

Regarding the management and controlling of all kinds of changes and difficulties during the project, FCh thought there were two groups took it closely and cautiously, which enabled the change management was taken without huge conflicts and mistakes.

Firstly was undoubtedly the project team, which was also the most critical player in FCh's mind. They were responsible to spread spirit and values of the project to everyone in the company. For instance, for the smile curve, with organization performance as vertical axis and project processes as horizontal axis, project teams should ensure the

understanding of it of every level employees in the organization, from the basic employees, to middle level management, to top management.

Secondly, FCh stressed the effects of middle level managers (the managers of each department), who were also a group of the project team: they were closer leaders for employees, so that they can convert commands from top management or from ERP office to work requirements that easier be accepted by employees, trying to make them work actively and efficiently with the increased workload. They knew their subordinates best and knew how to manage them and stimulate their motivation and simultaneously minimize their resistance. Also, they were the ones who can control more closely and precisely to the progresses of work assigned by project teams. The aforementioned work and manage advantages were something that other people cannot achieve.

ICn believed the *user training* schedule and arrangement was appropriate, because not until the employees practically used the system, many problems could not be detected in only simulated conditions.

In VCn's description, before the system went live, external experts arranged for the training presentations and exercise questions for employees, but during this period, the level of employees' attention paid on the training was not enough. After the system went live, training was arranged primarily by the ERP office, and was more intensive and detailed.

The *data inaccuracy* before the project influenced the ERP introduction severely, ICn said, if quality of the input data cannot be guaranteed, then the data throughout the system and the data as output would all be rubbish and unavailable.

The fourth important CSF for PCh was the accuracy and timeliness of the data. "It is the necessary condition of success of the project, especially in the initial stage, if the data is not accurate and timely, the project schedule and effect will be affected. MSOE has a low level of information, which brought huge difficulties to the information processing. The original data was checked for five rounds before finally inputted into the system."

In general, the "big pot" nature of MSOE does influence the ERP implementation, since whether the employee spends effort on the ERP project will not matter his final salary a lot (FCh). The potential risks can occurred from the lowest level employees, whose jobs in the project was primarily data input. Nonetheless, she believed the management and controlling from department leaders was the most effective solution for it. Department leaders generally had high level of capability and consciousness for their own position as well as work tasks assigned to them and their departments. Therefore, for the department leaders, they would not pay less effort to the project only because of their personal interests.

ICn answered in the email survey: "highly standard and accurate data is the most powerful support for the ERP system!!" VCh thought data quality was another big problem of generally Chinese SOEs (other than insufficient top management support).

PCh was unwilling to give explicit *planning* documents of MSOE project, due to the confidential feature of MSOE, but he disclosed the goals and milestones in the initial project planning were basically achieved by now (2014 May).

Additionally, VCh considered another factor that influenced the project schedule was the confidential nature of MSOE that many measures and solutions had to be reported and

negotiated with upper level group of MSOE. He said, sometimes a decision can be made in one week in normal enterprises would need two to three weeks in MSOE. Therefore, such factors led to the longer implementation cycle for MSOE. Likewise, ICn stated after the ERP was put into use, it met a little resistance from the leaders that they were not happy about the data transparency.

## 6. Discussion and implication

In the study, literature review gave three aspects of information and contribution to the theme, which are, 1) the basic introduction and understanding of CSFs in general ERP implementation projects, 2) Chinese culture features, Chinese SOE features, and features of ERP implementation in Chinese SOE from existing literature, and 3) ERP implementation CSFs specially for Chinese SOE.

The CSFs should be noticed against the theme of the study are marked in bold font to enable a more intuitive reading, while the culture dimension categories in 6.1.2 are marked in bold plus italic.

### 6.1 The result of the study

Based on chapter 2 and 5, the literature review and result of the case study, CSFs in Chinese ERP implementation related discussions are depicted below in three categories: 1) CSFs generated directly or indirectly from existing literature about ERP implementation in Chinese context, 2) CSFs generated from cultural related discussions in terms of Chinese national culture and Chinese SOE culture, and 3) CSFs selected based on the observed phenomena related to the topic of this study and the viewpoints of participants about the CSFs.

#### 6.1.1 CSFs from existing literature

The CSFs of ERP implementation in China in the new list are selected based on three sources: CSFs suggested directly and indirectly by existing literature, CSFs extended from culture characteristics in existing literature, and lastly CSFs extended from the case study.

##### *Directly*

From the literature related to ERP implementation in Chinese SOE, some indicated CSFs especially need attention in Chinese SOE or Chinese enterprises, while some others suggested CSFs that are super critical for not only Chinese enterprises but for general level objects. These two categories are both within scope of this study.

Zhang et al. (2005) reminded ERP projects in China to notice the data quality issue, as well as **legacy systems**, **project visioning**, and **vendor quality**. Generated from Chinese culture feature or tolerance of unclear information mentioned by the authors, **data accuracy** issue should be noticed. In addition, in their study, Chinese SOE needed to be paid more attention than Chinese private enterprises to guarantee its success.

In the case study of Shanks et al. (2003), four CSFs only appeared in the Chinese case experience and not listed in the Australian one are, **external expertise**, **data accuracy**, **clear goals** (only appeared in planning stage and just ranked 5th), and **education and training** (only appeared in stabilisation stage and ranked 3rd), from which can be seen that the external expertise and data accuracy were two important CSF especially for Chinese enterprises. Besides, **top management support** and **balanced project team** were both had high rankings in the Chinese case study, although they also appeared in

Australian case, it could imply the two CSFs are generally important for ERP implementation.

In addition, the authors suggested the **project champion** appointment should be taken carefully in Chinese context, that a highly-respected and authoritative person should be appointed. Otherwise, the authors expressed, it would be hard to manage the resources and assign tasks for a project champion who was a subordinate.

### *Indirectly*

In the studies of Liang et al. (2004) and Xue et al. (2005), which listed the fail reasons of western ERP implemented in Chinese enterprises, part of the reasons were restricted by period factor, that nowadays, as western ERP vendors have entered Chinese market for a few decades, and the same time the Chinese domestic ERP vendors are also developing, some factors indicated by the researchers were already overcome, such as the accounting and financial standards differences, report and table format differences, incompetent local consulting partners, and even language barrier. Other issues mentioned by the two groups of researchers that simultaneously within the scope of this study are inadequate customer support and unrealistic expectations. Among them, proper visioning and planning for the project is more applicable and general in current Chinese situation, but to **make sure top managers understand and build the project mission correctly** is constantly critical.

Among the three common characteristics between Chinese and Australian case study by Shanks et al. (2003), the **lack of continuous improvement** should be noticed to be the feature of Chinese enterprises, as the other two, exceeded project time schedule and **general business managers as project leader**, are more general to the broad ERP implementation, though the later one is basically more critical for Chinese context than the former one.

The eight different characteristics between Chinese SOE and Chinese PV in ERP implementation specified by Shanks et al. (2003) can be analysed and processed into CSFs that should be noticed in the ERP implementation in Chinese SOE as below:

1) The different implementation objectives would directly lead to the different implementation results. So it is important for the leadership to discuss and negotiate with the consulting party in a deep and detailed level about the possible benefits and meanings that the ERP implementation could bring, in order to maximize the effort of the whole project. After that, it is the CSF of **top management support** which decides the implementation effect that if the top manager prefer to have a best implementation effective, the initial **visioning and planning** could be made well, otherwise if the top manager only want to realize very basic benefits, the ERP is impossible to run its full power in later phases.

In addition, the CSF of **legacy system** also stands a role in this SOE and PV difference. Legacy system has to be taken into consideration as it suggests the level of the existing IT infrastructure in the organization and further, the IT abilities and level of IT acceptance of the organization staff. This is a good reference when making the ERP strategy in the beginning of the project.

2) **Top management support** is not enough here in the second difference description, reflected on their involvement was not deep enough and their attitude to the project was not so passionate, concerned and active.

3) The third difference reflected again the **top management attitude** on the project. They would like the project under their control rather than to maximize the benefits it could bring to the whole organization. Therefore, they assigned the authoritative ones to the steering committee to control the project progress rather than assigning the capable ones to assist and succeed it.

4) **ERP Consultant** stands an important role in the ERP implementation, as the literature review section implies. Apparently the CSF of ERP consultant is missed in the Chinese ERP implementation.

5) About the department individualism, a correct **project team composition** can moderate it for some degree. A project team with team members from various departments work together, will effectively improve the understanding and harmony between functional departments. Moreover, **user training** and **powerful top management support** are two factors than can work for this issue. User training can spread the spirit of the system implementation importance, reduce the user resistance of the system, and provide a good employee IT ability to increase the acceptance of the system. Meanwhile, effective top management support will emphasize the important position of the project in organizational wide, and allocate enough resources to decrease the individualism of single department.

6) The sixth factor points to three CSFs. The distrust on IT systems refers to the poor **legacy system or existing IT infrastructure** the organization had. So the implementation team should notice the IT ability basis of the organization to plan a better project management; the reliability on interpersonal relation refers to the **organizational culture**, which should also be taken into consideration in the initial phase; lastly, due to the aforesaid organization features that bring problems for implementation project, the **change management** during the project is crucial to convey part of the organization context, both material and spiritual, to better connect with ERP system and new work style.

As discussed in the first item, the **legacy system** should be noticed as it implies the organizational IT background and also decides somehow the scale and progress of the implementation.

7) The data maintenance issue is primarily due to insufficiency of **top management support**. As the existing literature suggested, top management should put the ERP project as a top priority in the period of time. The top management should assign enough human resource and other resources to the project to guarantee the quality and success of it.

8) Again the lack of continuous improvement refers to the insufficient **top management support**. The top managers' views are not correct and deep enough to realize an implementation that can achieve most of the benefits an ERP system can bring.

From the analysis above, it can be concluded that most of the differences observed by Shanks et al. (2003) in their case study can be inferred to the top management support factor, that if the top management support was strong enough, those problems might not be generated in the Chinese case company. Of course there are also other CSFs deserved to be noticed, which have been marked in bold font.

## 6.1.2 CSFs from cultural characteristics

The differences between China and western culture specified by the four national culture dimensions imply the gap between Chinese behavior and values with the western people. As reviewed in the second chapter, the ERP system has the western built-in values. Therefore, those Chinese behaviors and values that differ from western people are very likely to be the obstacles for ERP implementation in China.

For the *power distance* dimension, Chinese are generally comfortable about being in a less powerful position than some others that are more powerful. This reflects on the employees in SOEs are comfort of following policies made by superiors and doing tasks allocated by them, therefore no matter when treating with the demands, visions and plans made by managers, or during the change management and user training, these requirements and work are all easier accepted by Chinese SOE employees than by western enterprise employees. It means, simultaneously, the emphasis and control on aforementioned CSFs can have more effective result in the Chinese ERP implementation.

According to literature review and empirical studies, dimension of *individualism* seems to have even lower score for Chinese SOE employees than the general Chinese people. Under the social rule of ‘proud and interests of the group is more important’, ‘it is crucial to maintain the group harmony’, ‘personal relationship prevails over the business task’, the **change management** could be hard to progress. Since during any change, the small society normally would inevitably experience disharmony and interests missing, the change management should be strengthened by **stronger top management support and deployment, reinforced project management**, and also **more prepared user training** for the going live. Also, the “personal relationship prevails over the business task” characteristic suggests the ERP vendor or consultant can try to establish a close relationship with the organization during informal meetings in the early stages to

China got a score of 66 in *masculinity* dimension, which implies China has a more masculinity culture rather than feminine. “Dominant value in society is material success and progress”, “Failing in school is a disaster”, “Maintenance of economic growth should have highest priority”, etc. features in masculinity culture refers to the desire to success and fear of losing face. This reflects the “face” issue of top management.

As reported by Martinsons (2004) in his case study, the less involvement of Chinese leadership in the project was due to their fear of losing respect when they showed inability with the system or project, while on the other hand, as suggested in previous literature and case study, top management support is so important in the implementation. Therefore, **mobilizing the top management** to involve and spend adequate effort and resources on the ERP implementation is a vital task.

China is closer to the *uncertainty accepting* culture according to its score, implies it “would be more tolerance to opinions different from what they are used to”, “not expected by their environment to express emotions”. These features could be reflected on some degree of easier conducted change management but lower data quality in the legacy system. Therefore, the **data accuracy** should be noticed especially in earlier stage, this was also proved by the interviewees from case company and earlier study (Shanks et al., 2000; Zhang et al., 2005).

Weak uncertainty avoidance also implies the Chinese “work hard only when necessary”, and possibly be clear about their own work responsibilities, and are not willing to touch the work with ambiguities assignment. Due to this factor, the project team should pay

attention to the work assignment that unclear assignment should be prevented. Also for the **top management support**, **user training** and **project team work**, the importance of ERP should be stressed again and again, to let employees accept the truth that it is something will change their work style and will be involved in their everyday work later on, furthermore will benefit the organization as a whole as well as each individual within it, then they will take it more actively and as a compulsory work to learn it and use it.

Another Chinese feature suggested by uncertainty acceptance is that, they always only care about the task is “done” instead of “done well” or “achieve the goals and ability through the task”, which is called *xingshihua* in Chinese. For instance, if a report is assigned as an assignment of a course within limited time, the Chinese students would rather “finish it with decent quality (but looks well)” than “do it as much as possible but guarantee each points have been understood and learned totally”. This feature could cause repeat work in ERP implementation, such as in user training, the employees might do the learning and exercises hasty, as he has not realize the real necessary of learning it, then undoubtedly he has to learn it in second round.

To conclude, the CSFs suggested by Geert and Jan (1991)’s four national culture dimensions are, **change management** through stronger top management support, better project management, and effective user training, and possibly **closer vendor-organization relationship** investment, to treat with the collectivist culture; **mobilizing top management** to obtain their more involvement for the masculinity culture; and **data accuracy issue** should be noticed for the uncertainty acceptance culture, as well as ERP value and importance broadcast through top management support, user training and project team work.

### 6.1.3 CSFs from case study

**Top management support** was evaluated by at least two participates as the most critical factor for MSOE case. Participants considered the support from top leaders played a decisive role on many crucial issues, such as resource allocations, and the determination when project met big problems.

Another issue that had been mentioned and strengthened for many times by almost all participants was the **data quality**. The initial quality of existing MSOE data was very poor, because of the low IT spirit and awareness of the basic staff, and the long story of it which runs a few decades before any electronic office tools were introduced. There were a large amount of data needed to be input, and huge workload caused resistance and ultimately low quality of initial rounds of data input. From another view, the rooted uncertainty acceptance nature of Chinese people resulted in the perfunctory attitude toward their ERP related work, which conflicts with the uncertainty avoidance spirit of ERP system nature.

Therefore, to moderate the conflicts between Chinese nature and ERP nature, the **project team** works between them should try best to understand employees’ behavior firstly, and then make strategies to overcome the gap.

VCn affirmed the ERP project in generally Chinese SOE needed more attention and efforts than in Chinese private enterprises. He summarized the two most primary shortages of SOE compared with private enterprises, which were data quality and top management support. As explained in chapter 5, due to the Chinese SOE nature, the employee quality could hardly be all high, so the data quality inputted by them cannot be guaranteed. Also, for the top management support factor, the responsibility and pressure

for Chinese SOEs leaders could be not as so high as for private enterprises leaders, so that the determination, attention and resources they put on the project could be less.

#### 6.1.4 The outcome of the study

From all the literature review and empirical study that have been done, the suggestions about how to conduct a successful ERP implementation in Chinese SOE are listed below.

With cognitions of the existing objective conditions of the SOE, which means the legacy systems, data quality and IT infrastructure of the enterprise, the project team can learn the basis of implementation as well as the level of IT acceptance and ability of the employees. These could be referenced when making corresponding plans and schedules.

Considering the two main groups of implementing objectives, the Chinese SOE employees and top leaders, the understanding of them is also facilitate relevant project plan making and implementing work conducting. The group of ordinary Chinese staff that without accepting highly western-mode education are more uncertainty acceptance than normal western staff, together with the *xingshihua* feature, which two points both signify the staff are with more perfunctory attitudes to their work. Therefore, a successful ERP project in China requires a high capacity project team to treat with this issue.

Top management support is proved to be extremely critical for a successful ERP implementation, while in Chinese SOEs, it is with non-less importance but with more difficulties and obstacles to get enough support from them. Chinese SOE leaders are lack of motivation and responsibility to take actively part in the project, as the organizational ownership does not actually totally and only belong to them. "Face problem" is another barrier for them to involve deeply and frequently in the project as suggested by Martinsons (2004).

Therefore, without power to change the status quo of SOE nature and Chinese culture, the project participants, especially the project team members, the consultants and the vendor should firstly understand and accept the negative facts aforementioned and do not try to escape them. Then, based on these cognitions, the project team can make ERP implementation strategies and plans, for example training plans and meeting plans. But the top crucial task for the project team is to collaboratively mobilize the top managers in SOE to actively participate in project, by letting them aware and understand all potential advantages and benefits that the system can bring to the company, as well as the possible consequences if they do not pay enough attention and resources on the project. Because in the prove from literature review and case study, the top management support is the most critical for a ERP project in Chinese SOE that it could directly determine the success or fail of the project. About the employee problem, the project team should make appreciate plans based against their characteristics, and try to stimulate their active thinking of their work in order to motivate them in project related tasks.

Having made the proper plans, again the strong ability of the project team is required to carry out the plans solidly, to ensure each task in each project stage is truly understood and done by relevant person, by effective communication and proper project management. Because it is a period during which the cultural and BP changes are taking place in the SOE, project team should be prepared for the user resistance and all kinds of conflicts and problems occurred during this phase, especially the data related issues are more critical, as the literature and case study proposed.

After the project the top management should continually pay attention to the project and allocate resource to achieve the continuous improvements, as the cases study of Martinsons (2004) pointed out, the Chinese SOE is lack of awareness to maintain the continuous improvement in post-project phase.

In addition, the Chinese collectivism and relation-based cultural feature implies a close relationship between the parties, SOE and vendor, or SOE, consulting company and vendor, can help to build a more smooth cooperation among them.

## 6.2 Limitations of the study

Limited to the author's ability, time, and objective conditions, the study is not ideally comprehensive. In the initial CSF introduction, not all CSFs appeared in existing literature were listed and discussed, for example system testing, troubleshooting, post-implementation evaluation that covered by Finney and Corbett (2007).

The inference part from Chinese culture characteristics to possible CSFs directed by them covered large distance, and the inference could be too subjective, thence not valid enough. The same with the analysis of the eight differences among ERP implemented in Chinese SOE and private enterprise cases, among which the inference might be excessive that almost all differences were pointed to the insufficient top management support.

Meanwhile, as suggested by Finney and Corbett (2007), the view of different stakeholders is missing in existing literature. Although the vendor and organization stakeholders participated in the empirical study, the viewpoints they provided were still not distinct enough from each other restricted by the depth and scope of the study.

## 6.3 Implications for other researchers and further study

It is meaningful to study CSFs of ERP implementation in divisions of its different stages. There are a couple of researchers gave different divided categories (Markus & Tanis, 2000; Nolan, 1973; Ross & Vitale, 2000). For example, Markus and Tanis (2000) divided the ERP implementation into four phases, chartering phase, project phase, shakedown phase, and onward and upward phase. Similarly, Nolan (1973) separated the whole process into initiation, contagion, control and integration stages.

The discussion in form of divided ERP implementation stages can provide a more intuitive and accurate picture, since many of the CSFs only work for one or a couple of them, such as visioning and planning is intensively done before the project starts, change management is done after the project starts, whereas some CSFs should be strengthened for certain stages, for example data accuracy should be guaranteed in the initial phase of the project or it would cause many problems and repeated work.

This study tries to give some suggestions about how to conduct a successful ERP implementation project in China context, the conflicts between eastern culture in Chinese SOEs and western built-in culture in the ERP systems get some degree of moderation and mitigation by the methods suggested in this study. But such topic can be expanded into endless aspects and dimensions to study, for example the culture study can be conducted in more case companies to listen to how they think about this from various perspectives. So the other researchers can follow one or more to dig on the basis of this study.

For the conflicts of such status quo, on the other hand, the seeking for solutions of it can simultaneously coincide the history developing track. As the history developing is

unreversed, the Chinese can only follow the current global trend that led by western world, but potentially could seek balanced combination points of its inherited cherished philosophy and current trend, to reach its harmony state.

## 7. Conclusion

The study tries to seek for ERP implementation CSFs in Chinese SOEs from two sources of information: literature review and the empirical study. Specifically, literature review provided the general knowledge about ERP implementation CSFs, Chinese SOE related cultural characteristics, and relevant studies of ERP implementation in China. The empirical study, on the other hand, took a more practical and deep look at the ERP implementation phenomena in one Chinese SOE, by using positivist study to present how the implementation progressed, and interpretive study to obtain the perspectives of participants of the project and relevant CSFs, with participants of internal consultant, former and current project champion, external consultant, and normal employees in case enterprise.

By integrating the information of the three sources, the outcome of the study is a set of CSF-related suggestions for ERP implementation in Chinese SOE. Before the project started, the situation of legacy system, existing data quality, and the organizational IT infrastructure should be figured out, which can be referenced when making relevant plans. The top management support and data quality issue should be noticed in the very beginning of the project. The project team should mobilize SOE top managers be aware of the significance of the project, so that they can make corresponding commitment and support to the project, as well as adequate resource assignment. For data quality issue, the project team can improve it by making proper training plans for the users. During the project, the effective communication between implementing parties and among organizational departments can facilitate the project success

The core part of the outcome is to notice the cultural characteristics of Chinese participants during the implementation. Before the project launched, the relevant personnel should understand its cultural features, such as uncertainty acceptance culture, to make proper preparation of later plan making and communication activities. Then the work conducted with them will have ideal effect instead of disappointing and repeated work.

## References

- Akkermans, H., & van Helden, K. (2002). Vicious and virtuous cycles in ERP implementation: A case study of interrelations between critical success factors. *European Journal of Information Systems*, 11(1), 35-46.
- Aladwani, A. M. (2001). Change management strategies for successful ERP implementation. *Business Process Management Journal*, 7(3), 266-275.
- Al-Mashari, M., & Al-Mudimigh, A. (2003). ERP implementation: Lessons from a case study. *Information Technology & People*, 16(1), 21-33.
- Al-Mashari, M., Al-Mudimigh, A., & Zairi, M. (2003). Enterprise resource planning: A taxonomy of critical factors. *European Journal of Operational Research*, 146(2), 352-364.
- Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies of information systems. *MIS Quarterly*, 11(3)
- Benson, J., & Zhu, Y. (1999). Markets, firms and workers in chinese state- owned enterprises. *Human Resource Management Journal*, 9(4), 58-74.
- Bingi, P., Sharma, M. K., & Godla, J. K. (1999). Critical issues affecting an ERP implementation. *IS Management*, 16(3), 7-14.
- Chang, M., Cheung, W., Cheng, C., & Yeung, J. H. (2008). Understanding ERP system adoption from the user's perspective. *International Journal of Production Economics*, 113(2), 928-942.
- DiCicco- Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical Education*, 40(4), 314-321.
- Finney, S., & Corbett, M. (2007). ERP implementation: A compilation and analysis of critical success factors. *Business Process Management Journal*, 13(3), 329-347.
- Fui-Hoon Nah, F., Zuckweiler, K. M., & Lee-Shang Lau, J. (2003). ERP implementation: Chief information officers' perceptions of critical success factors. *International Journal of Human-Computer Interaction*, 16(1), 5-22.
- Gao, L. (2008). A couple of reviews and thoughts of Chinese SOE reform. *Opening Herald*, (2), 19-21.
- Geert, H., & Jan, H. G. (1991). *Cultures and organizations: Software of the mind*. McGraw-Hill, New York,
- Groves, T., Hong, Y., McMillan, J., & Naughton, B. (1994). Autonomy and incentives in chinese state enterprises. *The Quarterly Journal of Economics*, 109(1), 183-209.
- Gu, Sh. T., & Xie, S. Q. (2002). Reviews and thinking of the Chinese SOE reform. *Economic Review*, 9, 2-6.

- Gupta, A. (2000). Enterprise resource planning: The emerging organizational value systems. *Industrial Management & Data Systems*, 100(3), 114-118.
- Holland, C. P., & Light, B. (1999). A critical success factors model for ERP implementation. *IEEE Software*, 16(3), 30-36.
- Hong, K., & Kim, Y. (2002). The critical success factors for ERP implementation: An organizational fit perspective. *Information & Management*, 40(1), 25-40.
- Hunton, J. E., Lippincott, B., & Reck, J. L. (2003). Enterprise resource planning systems: Comparing firm performance of adopters and nonadopters. *International Journal of Accounting Information Systems*, 4(3), 165-184.
- Ifinedo, P. (2008). Impacts of business vision, top management support, and external expertise on ERP success. *Business Process Management Journal*, 14(4), 551-568.
- Kaplan, B., & Maxwell, J. A. (2005). Qualitative research methods for evaluating computer information systems. *Evaluating the Organizational Impact of Healthcare Information Systems*, , 30-55.
- Krigsman, M. (2013, Feb 22). 2013 ERP research: Compelling advice for the CFO. Retrieved from <http://www.zdnet.com/2013-erp-research-compelling-advice-for-the-cfo-7000011619/>
- Li, J. S. (2003). Relation- based versus rule- based governance: An explanation of the east asian miracle and asian crisis. *Review of International Economics*, 11(4), 651-673.
- Li, S. (2002). Does east love guanxi more than west? the evolution of relation- based governance: Contemporary and historical evidences\* . *Global Economic Review*, 31(1), 1-11.
- Liang, H., Xue, Y., Boulton, W. R., & Byrd, T. A. (2004). Why western vendors don't dominate china's ERP market. *Communications of the ACM*, 47(7), 69-72.
- Markus, M. L., & Tanis, C. (2000). The enterprise systems experience—from adoption to success. *Framing the Domains of IT Research: Glimpsing the Future through the Past*, 173, 207-173.
- Martinsons, M. G. (2004). ERP in china: One package, two profiles. *Communications of the ACM*, 47(7), 65-68.
- Monk, E. F., & Wagner, B. J. (2009). *Enterprise resource planning* Cengage Learning.
- Myers, M. D. (1997). Qualitative research in information systems. *Management Information Systems Quarterly*, 21, 241-242.
- Nah, F. F., Lau, J. L., & Kuang, J. (2001). Critical factors for successful implementation of enterprise systems. *Business Process Management Journal*, 7(3), 285-296.
- Nolan, R. L. (1973). Managing the computer resource: A stage hypothesis. *Communications of the ACM*, 16(7), 399-405.

- Organization profile*. Retrieved May 12, 2014 from <http://www.yonyou.com/about/index.aspx>
- Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. *Information Systems Research*, 2(1), 1-28.
- Roberts, H., & Barrar, P. (1992). MRPII implementation: Key factors for success. *Computer Integrated Manufacturing Systems*, 5(1), 31-38.
- Ross, J. W., & Vitale, M. R. (2000). The ERP revolution: Surviving vs. thriving. *Information Systems Frontiers*, 2(2), 233-241.
- Schwalbe, K. (2010). *Information technology project management, revised* Cengage Learning.
- Seidman, I. (2012). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* Teachers college press.
- Shanks, G. G., Parr, A. N., Hu, B., Corbitt, B. J., Thanasankit, T., & Seddon, P. B. (2000). Differences in critical success factors in ERP systems implementation in australia and china: A cultural analysis. *ECIS*, 537-544.
- Sofaer, S. (1999). Qualitative methods: What are they and why use them? *Health Services Research*, 34(5 Pt 2), 1101-1118.
- Somers, T. M., & Nelson, K. (2001). The impact of critical success factors across the stages of enterprise resource planning implementations. *System Sciences, 2001. Proceedings of the 34th Annual Hawaii International Conference On*, 10 pp.
- Stefanou, C. (1999). Supply chain management (SCM) and organizational key factors for successful implementation of enterprise resource planning (ERP) systems. *Supply Chain Management (SCM)*, 12, 31-1999.
- Sumner, M. (1999). Critical success factors in enterprise wide information management systems projects. *Proceedings of the 1999 ACM SIGCPR Conference on Computer Personnel Research*, 297-303.
- Sumner, M. (2000). Risk factors in enterprise-wide/ERP projects. *Journal of Information Technology*, 15(4), 317-327.
- The Hofstede centre: What about China? Retrieved May 4, 2014 from <http://geert-hofstede.com/china.html>
- Thong, J. Y., Yap, C., & Raman, K. (1994). Engagement of external expertise in information systems implementation. *Journal of Management Information Systems*, 11, 209-209.
- Umble, E. J., Haft, R. R., & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European Journal of Operational Research*, 146(2), 241-257.

Xue, Y., Liang, H., Boulton, W. R., & Snyder, C. A. (2005). ERP implementation failures in china: Case studies with implications for ERP vendors. *International Journal of Production Economics*, 97(3), 279-295.

*Yonyou Implementation Methodology 7.0*. Retrieved from <http://wenku.baidu.com/view/251fbbdf6f1aff00bed51e14.html>

*Yonyou U9*. Retrieved May 12, 2014 from <http://www.yonyou.com/product/U9.aspx>

Zhang, Z., Lee, M. K., Huang, P., Zhang, L., & Huang, X. (2005). A framework of ERP systems implementation success in china: An empirical study. *International Journal of Production Economics*, 98(1), 56-80.