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Why a Company Chooses the Snowball ERP Implementation Strategy: a Case Study Approach

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Abstract: The growing cost of ERP systems and their importance to organizations have made the implementation strategy increasingly critical. In this study, we discuss in detail an implementation strategy, the snowball ERP implementation strategy, based on an exploratory case study. Interviews with managers at all levels in a company in China revealed that motivations for the company to adopt the snowball strategy include financial pressure, assimilation pressure, technical readiness, and fear of failure. Further, we discuss three essential facilitating factors associated with the snowball strategy that impact the ERP implementation and assimilation successes, including long-term partnership with ERP vendor, strong IT champion, and the steady implementation team. Based on these findings, we propose a theoretical model on the snowball implementation strategy. Theoretical contributions and managerial implications are discussed.

Keywords: implementation strategy, ERP implementation, module by module approach, case study

1. INTRODUCTION

It has been well recognized that ERP plays an increasingly important role in companies across the world in the highly competitive global economy. ERP systems are commonly defined as comprehensive, packaged software solutions that integrate and automate many of the business processes associated with operations, production, and distribution aspects of a company (Davenport, 1998). In today’s business environment, ERP systems have been used in almost every aspect of business operations, including finance, accounting, business intelligence, and decision support, in addition to the traditional production and distribution processes.

While the ERP systems have been widely used by most of the companies (Sirksoon and Shepherd 2002) and the ERP market has been growing rapidly (Jacobson et al., 2007), two significant problems associated with ERP implementation and assimilation remain. First, the cost of ERP applications has been steadily increasing (Ross and Vitale, 2000), and ERP investment accounts for a considerable proportion of firms’ annual revenues (Ke and Wei, 2008). Secondly, the low success rate of ERP implementation projects is frequently reported (Gattiker and Goodhue 2005), leading many companies deeper into financial difficulties. Due to the high spending and high failure rate, it is essential for researchers to uncover the critical characteristics of the successful ERP projects.

To date, a number of critical success factors (CSFs) for ERP implementation and assimilation have been identified by scholars. For example, Delone and Mclean (2003) argued that information quality, system quality and server quality are three key factors leading to IS success. Umble et al. (2003) identified a variety of factors that are important to a successful ERP implementation, such as commitment by top management, extensive training, data accuracy and organizational change management, etc. Using a case study methodology, Kouki et al. (2007) presented the determinants of ERP assimilation success, including smaller size of the focal firm, IT skills and competence, top management championship, absorptive capacity, alignment with a firm’s business strategy, feedback from managers and users, coercive force from customers or government.

However, in the extant literature, ERP implementation strategy has not attracted enough attention from scholars. Implementation strategy is a unique characteristic of ERP systems because an ERP system is
composed of many functional modules that affect different parts of a company, yet all the modules are interrelated to some degree. ERP implementation strategy refers to the range and type of module selection and decisions concerning the integration with current and legacy systems (Parr and Shanks, 2000). A clear implementation strategy is essential for ERP success (Mandal and Gunasekaran 2003; Al-Mudimigh et al. 2001). Cooke and Peterson (1998) found that, comparing to companies that had no ERP implementation strategies, those that had performed much better.

In terms of selecting implementation strategy, many researchers noted that a module-by-module approach is preferred by most of ERP adopters (e.g. Stender 2002; He and Brown 2005). In a multi-case study, Liu et al. (2010) found that a cautious implementation strategy with the module-by-module approach was an important facilitating factor for organizational level ERP assimilation success. The module-by-module implementation strategy refers to implement one functional module of the ERP system after the other, which “breaks up the implementation of a standard application into separate smaller cycles” (Stender, 2002, pp. 908). In this paper, with a more vivid manner, we refer it as the snowball ERP implementation strategy. Although the significance of snowball strategy is mentioned frequently, few studies had examined it in details with substantial evidence. As a preferred strategy for implementing ERP systems in many companies, the snowball strategy is becoming increasingly important. To further our understanding of this strategy, we conducted this exploratory case study. We attempted to address following research questions in this study.

1) Why do companies choose a snowball strategy for ERP implementation?

2) How does a snowball implementation strategy make a contribution to ERP implementation and assimilation success?

With these research purposes, we interviewed 3 managers at different levels in a company which has used ERP applications from 1990s. In the remainder of the paper, we review the literature related with this topic and present the research methodology and major findings.

2. LITERATURE REVIEW

ERP implementation strategies (or implementation approach) have been a topic of some ERP studies. In an integrative framework for ERP software implementation, Al-Mudimigh et al. (2001) suggested that companies had to make a fundamental decision about the implementation strategy which can be further classified into three categories: step-by-step, big bang, and roll-out. The step-by-step strategy refers to implementing ERP modules continuously, while the big bang strategy means all of the ERP modules are simultaneously implemented across an entire company. The rollout strategy, which may be implemented as step-by-step or big bang, creates a model implementation at one site, which is then rolled out to other sites (Al-Mudimigh et al., 2001, pp. 223). El Amrani et al. (2003) combined step-by-step and roll-out (also known as “site-by-site”) into one category, named “progressive strategy”. Similarly, Stender (2002) described a module-by-module implementation approach as the “incremental enterprise system implementation strategy”, and then they further presented two ERP implementation strategy types: “incremental” and “big bang”. In a most recent article, based on Parr and Shanks (2000), Katerattanakul and Lee (2009) proposed three ERP implementation approaches, including big bang, mini big bang and phase implementation. Phase implementation refers to incrementally implementing the ERP either module-by-module or site-by-site in a phased manner. Mini big bang approach, which is intermediate between big bang and phase implementation, has several go-live dates for different subsets of ERP modules.

To conclude, among these various categories, two most fundamental ERP implementation strategies emerge naturally: one is the “snowball strategy,” and the other one is the “big bang strategy.” In this study, we define the snowball strategy as implementing ERP modules incrementally, either one by one or subset by subset. Actually, the term of snowball strategy is in congruent with module-by-module, step-by-step, progressive,
incremental, and phase implementation strategies we have reviewed above. On the other hand by using the snowball analogy, we want to emphasize the cyclical nature of implementation process: each implementation project, either it involves one module or a subset of models in the ERP package, must be completed and applications associated with the module or modules must be successfully used or assimilated before the next cycle of implementation starts.

A majority of studies suggested that the snowball ERP implementation strategy is widely adopted by companies. In an empirical study exploring the relationship between implementation variables and performance improvement of ERP systems, Tsai et al. (2007) found that, out of 173 responders, 103 companies choose the snowball strategy to implement their ERP. Katerattanakul et al. (2009) also reported that 52.34% companies used the snowball strategy. Stender (2002) believed that the increasing complexity of ERP implementation projects was the reason for many companies to favor the snowball over the big bang. They argued that a snowball strategy reduced project complexity of each project cycle. He and Brown (2005) proposed that the snowball ERP implementation strategy was more suitable and less risky for the organizations without adequate infrastructure than the big bang. However, a few studies have presented contrary ideas. For example, Franch and Pastor (2000) argued that the module-by-module implementation might lead managers to view ERP as just “a big piece of software.” Parr and Shanks (2000) believed that both of the two implementation strategies have pluses and minuses. In general, the snowball strategy is less risky but takes a longer time; whereas the big bang is riskier but could achieve significant business impact in a shorter period of time (Parr and Shanks 2000; Liu et al. 2010). Although each has its own merits, Liu et al. (2010) found that most of the companies seemed to be more risk averse and thus chose the snowball strategy.

In any case, the snowball strategy is an important option for companies which are going to implement ERP systems. Thus, it’s meaningful for us to examine this strategy in detail to identify critical contingent factors that might impact the success or failure of this strategy. Given the lack of theoretical guidance on these issues, in this study, we adopted an exploratory case study approach in the hope of enriching ERP implementation strategy theories and better informing ERP implementation and assimilation practices. In the following sections, we show a detailed narrative of the case study and its major findings.

3. RESEARCH METHODOLOGY

3.1 Case study design

As a research methodology, case study is used in many situations to contribute to our knowledge of many aspects of organizations and society, such as individual, group, organizational, social (Yin 2003). The purpose of most case study research is to answer the why and how questions (Yin 2003). Furthermore, case study is believed to be more suitable for studying a focal phenomenon or event on which little or no previous research has been conducted (Benbasat et al., 1987; Dubé and Paré, 2003). Considering these features, the case study methodology fits well with our research objectives.

We designed an embedded single case study to understand why companies choose the snowball ERP implementation strategy and how such a strategy leads to ERP implementation and assimilation success. Our research design called for the visiting companies that had successfully implemented some or all modules of the ERP system with a progressive approach. In order to yield rich and reliable insight into the complex issues of the snowball implementation strategy, we selected one particular company that has been successful in their ERP implementation and individuals from a variety of levels within the case company. Although our study is a single case study, collecting data from multiple sources enables researchers to “confirm the accuracy of data as it is collected and to extend the depth of the analysis as insights are gained” (Murphy and Simon, 2002, pp. 310).

Following the case study guidelines as specified in Lee (1989) and Yin (2003), a pre-designed interview
protocol with open-ended questions was developed for all interviews to increase the reliability of the data source and to decrease bias (Yin 2003). An English version of the questions was first developed and then translated into Chinese by the bilingual authors. The English and the Chinese versions were then compared one question at a time by the authors to ensure minimal loss of accuracy. Some modifications were made as a result of this process.

3.2 Case company and interviewees

Our case company is a foreign-owned cosmetic manufacturing in a southern city of China, with its parent company in Japan. The parent company is the fourteenth largest cosmetic manufacture in the world and the third in Japan. Our case company is a branch of this multinational conglomerate in China, founded in 1988. For the purposes of confidentiality, the case company is referred to as company K in this paper. The annual revenue of company K is 300 million RMB. In company K, there are about 1300 employees. The number of ERP users is over 50.

Company K started to use information systems for managing its business operations in large scale from 1993. The first attempt was the adoption of a financial module by UFIDA which is the biggest domestic ERP vendor in China. In 1998, company K selected UFIDA U8 as its target ERP system. The modules of UFIDA U8 were implemented in company K incrementally over a decade. Up to present, there are about 20 ERP modules running in company K, including finance, production, purchase, inventory, sales, MRP, quality management, human resource management, etc.

Our research team visited company K on March 6, 2009. The data collection process took the whole day through face-to-face interviews. With the explicit permission of the participants, we recorded all interviews using digital recorders and collected some useful introduction documents on company K’s ERP usage. The interview recordings were later transcribed into text using professional transcription service. In total, we interviewed 3 individuals. All of them are managers at different levels in company K and associated with ERP system. The first participant is the Vice President of the company, who is a member of top management team and in charge of production, purchase, quality management and IT. He has intimate knowledge of ERP systems, pushing the ERP implementation forwards as an IT champion. The second one is the manager of the IT department, who is a middle level manager in company K. The third interviewee is the ERP system manager. She reports to the IT department manager and is directly responsible for the daily operations of the ERP system.

4. RESEARCH FINDINGS

4.1 The snowball ERP implementation strategy

Our case company is a foreign-owned cosmetic manufacturing in a southern city of China, with its parent company in Japan. The parent company is the fourteenth largest cosmetic manufacture in the world and the third in Japan. Our case company is a branch of this multinational conglomerate in China, founded in 1988. For the purposes of confidentiality, the case company is referred to as company K in this paper. The annual revenue of company K is 300 million RMB. In company K, there are about 1300 employees. The number of ERP users is over 50.

After a 3-years process of system and product evaluation, company K finally chose UFIDA U8 which was designed for SMEs (small and medium enterprises) in 1998 as its ERP platform. At that time, the top management team made a long-term planning for ERP implementation. To reduce the risk of failure, they decided to implement the finance module first, and other modules would follow. That was because company K had been using a financial management software package from UFIDA for 5 years. Thus, they had enough confidence to implement and assimilate the finance module of UFIDA U8. This was the beginning of their
module-by-module ERP implementation process. After 10 years, company K has successfully implemented and assimilated the entire suite of UFIDA U8 ERP system. Now, most of the company’s business processes are running on the UFIDA U8 platform.

When talking about their implementation experience, the Vice President emphasized the importance of a clear IT strategy in the interview:

“A company must have a steady strategy, especially IT strategy. This will directly influence your future spending [on ERP] and success possibility.”

Further, he pointed out that the snowball implementation strategy was a key factor:

“Why did some companies fail in ERP projects? Maybe the company didn’t have a technological team. Or maybe the company attempted to change over from knowing nothing about IT to an IT professional immediately. These are all the causes of failure …..We must persist in a step-by-step IT strategy. We should conduct ERP implementation strictly according to the different situations we are in.”

We found that all three interviewees highlighted the significance of the snowball strategy during our interviews. They all believed that this strategy was perfectly fit for company K. The Vice President further expressed that they would continue taking this strategy in the future. In his opinion, their ERP usage was just at a middle level and the present ERP system needed a number of improvements. He said:

“ERP assimilation in organizations may be categorized into five levels, including primary school level, middle school level, undergraduate level, master level, and doctoral level. I think my company is at the undergraduate level now…… If we want to reach the highest level, we should build up ERP alignment with all of our suppliers [and customers].”

According to our interviewees, company K’s next target module to be deployed is the business intelligence (BI) module. They have been using Microsoft EXCEL to create analytical reports based on the data exported from their ERP system. They felt that it’s becoming increasingly inconvenient for them since the data sets have become bigger and bigger.

4.2 Motivations for snowball ERP implementation strategy

Company K’s adherence to the snowball ERP implementation strategy leads to some interesting and important questions. Why did the company choose such a strategy? What built up company K’s confidence to persist in using this strategy as a guideline to implement varied ERP modules of UFIDA U8? After further analyses of the interview transcripts, we found that there were a number of factors that motivated company K to select and continue the snowball ERP implementation strategy. These factors included financial pressure, assimilation pressure, technical readiness and fear of failure. We now provide a detailed account of these motivations based on our interviews.

4.2.1 Financial pressure

The significant cost of ERP systems and implementation projects are widely reported. Koch et al. (1999) believed that ERP is expensive no matter what kind of company was using it. Wu and Wang (2003) further argued that it was difficult and expensive to undo once ERP implemented. Thus, facing the high investment on software and hardware, financial pressure is a major concern for every company that is considering ERP systems. When talking about why they selected an incremental implementation approach, the Vice President said that:

“It's mainly due to the financial considerations......Our parent company prescribes that we can only decide the spending less than 1 million RMB. If a spending is more than 1 million, we must report to our parent company. To avoid the financial risk, we decided to try the modules one at a time. We adopted this flexible strategy and accumulated steadily......Now, there are 20 ERP modules running in our company.”
Company K employed the snowball ERP implementation strategy to avoid not only the financial pressure but also the lengthy approval process of the parent company. Actually, with the snowball strategy, if the ERP project is abandoned at a certain implementation stage, the company can reduce the financial losses as compared to the big bang implementation strategy.

4.2.2 Assimilation pressure

The snowball implementation strategy will lead to lower pressure for the company to assimilate the ERP modules all at once (Liu et al., 2010). This can also reduce the resistance from mid-level managers and employees, and increase the chances for the company to realize the benefits of the already implemented modules. In contrast, if the company has all ERP modules implemented simultaneously, all of the users are under a lot of pressure to learn not only how to use their own ERP functions but also how to cooperate with other users to make the workflow smooth and process integration successful. This may cause the ERP project becomes out of control and falls into costly failure. From this perspective, the Vice President stated that:

“If we implemented many ERP modules in 1998, we couldn’t assimilate all of them [all at once] ………During the process of the company’s continuous development, some new requirements will emerge. That’s the right time for the company to initiate new ERP functions. For example, in 2005, we implemented the MRP module. That’s because the pressure of materiel management became very high at that time.”

From this statement, we can see that companies may choose not to implement all ERP modules at the same time since their absorptive capacity can’t afford to such a high stress. Further, this statement also suggests that internal managerial needs could be a driver for new modules implementation. It can transform stress into driving force.

4.2.3 Technical readiness

Technical readiness is critical to organizations in IT adoption stage (Jeyaraj et al., 2006), which can further influence IT implementation stage. The more technical preparation for ERP software, the higher probability of ERP implementation success. In contrast, if a company doesn’t have enough technical knowledge about the ERP modules to be implemented, it could lose the support of the top leadership on the project and land itself in a difficult position.

The ERP manager of company K was deeply aware of the importance of technical readiness. During the interview, she gave an example:

“Before we decided to implement MRP module of UFIDA U8, we conducted careful testing [on that module] with production data. Over the years, we were not satisfied with different versions of MRP module until the 860 version of UFIDA U8 was released. After our testing, we found that UFIDA made significant improvement on MRP functions in that version. So we finally decided to implement the MRP module.”

The manager of company K’s IT department further argued that:

“When a new version or module was released, we could get the news immediately, and then tested it at once. If the testing result was satisfied, we would be interested in it. Otherwise we wouldn’t consider implementing it.”

The snowball strategy enabled company K to have enough time to get ready for implementation of every ERP module. Sufficient technical readiness, as a result of the snowball strategy, enhanced the company K’s confidence for implementation success and made their project leaders and users cooperating with UFIDA’s consultants more effectively.

4.2.4 Fear of failure

The snowball strategy can minimize the destruction caused by implementation failure. With a module-by-module implementation approach, even if the company failed in the latest ERP module implementation project, it wouldn’t destroy the previous successes. This is also an important reason for the
organizations to choose the snowball strategy which can reduce the risk of failure of the whole ERP system.

When being asked if there were certain ERP modules that were used for a period of time but eventually failed, the manager of IT department said:

“Yes, we have. It’s the retail module…….There were a lot of gaps in the retail module of UFIDA U8. Also, the module was unstable [at that time]. Our ERP users viewed this as an excuse to abstain from the use of retail module…….Although I believed that such a module is important to us, it’s finally undone.”

In our interviews, all of three interviews had mentioned the failure of retail module. Even though they complained that UFIDA U8’s retail module was unsatisfactory, for example the module didn’t integrate with other modules very well, they all viewed this failure as a valuable experience. Fortunately, this failure didn’t affect other modules’ usage thanks to the snowball ERP implementation strategy.

4.3 Facilitating factors

In addition to the motivations identified above, we also found other important factors associated with the snowball ERP implementation strategy that influenced the implementation and assimilation successes. Although a number of critical success factors (CSFs) were reported in existing literature (e.g. Umble et al. 2003), the facilitating factors we revealed were especially essential to the companies using the snowball implementation strategy. These factors are not the reasons why companies choose such a strategy. However, if a company attempts to implement the ERP system step by step, the managers must pay attention to these factors. Based on our interviews, we provide a brief account of these facilitating factors, including long-term partnership with ERP vendor, strong IT champion and a steady implementation team.

The first one is a long-term partnership with ERP vendors. For one thing, during ERP selection period, a company must make sure that the ERP vendor it chooses has good reputation and is managed well. This is especially critical to the companies with snowball implementation strategy due to the fact that their implementation will be continuing for a longer time. The Vice President expressed this view when talking about the process of their vendor selection:

“Before we selected UFIDA, we had an IT vendor in Shanghai. But our cooperation failed eventually. We gradually found that their competence was limited…….UFIDA is quite different. UFIDA upgrades their ERP products continuously and they pay much more attention to the users’ suggestions. They can always give us something new.”

A company should also interact with their ERP vendor frequently. In this process, the client can get more technical help from the vendor, while the vendor benefits from the experience of the client for improving their ERP product (Liu et al. 2010), as the Vice President of company K said:

“We have a good partner relationship with UFIDA. Some of their top managers are my friends…….We gave some advice on the improvement of UFIDA U8. UFIDA would choose some of the most common demands from customers to include into their next ERP product release. During this process, our relationship gets closer and closer…….I went to UFIDA to talk to their product managers and top managers more than 10 times one year. If I could choose [the ERP vendor] again, I’m sure I will also choose UFIDA.”

The second facilitating factor is a strong IT champion in the company. IS literature has widely recognized the significant role of IT champion in information systems implementation and assimilation (e.g. Reich and Benbasat 1990; Beath 1991). Especially to a company which is implementing an ERP system using a snowball strategy, an IT champion accomplished in both technological and managerial aspects is essential. The IT champion should have a comprehensive vision of the ERP system, and then decides suitable module-by-module implementation procedures for the company. The Vice President of company K was such an IT champion, who promoted the snowball strategy. When being asked what his role in ERP implementation was, the Vice President
said:

“I know a lot about not only managerial aspect but also technological aspect. So I can communicate with them better. Further, I can give out some good improvement suggestions on our ERP system, including some directional suggestions.”

The third one is a steady implementation team. Sarker and Lee (2003) argued that a balanced and empowered implementation team was one of the three key social enablers in ERP implementation. Similarly, Umble et al. (2003) viewed a great implementation team as a critical factor for successful ERP implementation. Based on our interviews, we found that a steady implementation team was more important under the condition where the snowball strategy is being used. This point was mentioned by the Vice President when being asked to give some suggestions to other companies:

“One key point is that you should have an implementation team [in your company]. This team will help you to achieve the objectives. You are impossible to finish it all by yourself. The team should be kept steady. Although we have used ERP for many years, the core members of our implementation team are still there.”

If the implementation team changes its members frequently, the original intention of snowball strategy may eventually be lost due to the loss of institutional memory and knowledge.

5. DISCUSSION

The primary objective of this study is to further our understanding of the snowball ERP implementation strategy by understanding its context and contingency factors. That is not to say the snowball is the only effective strategy for ERP implementation. When selecting the appropriate implementation strategy, a company should consider its current situation and history comprehensively (Al-Mudimigh et al., 2001).

Our study contributes to the theories of ERP implementation strategy by identifying four motivations for the snowball strategy and three facilitating factors associated with the strategy. The relationships between these factors and ERP implementation and assimilation success can be summarized in Figure 1. Even though we can’t assert our findings based on just a single case, these findings lay the foundation for the development of more sophisticated theoretical models that can be empirically validated in the future.

![Diagram showing the theoretical model on the snowball ERP implementation strategy](image-url)

**Figure 1. Theoretical model on the snowball ERP implementation strategy**

From a managerial perspective, this study could offer some guidance to management practices for the companies that are going to select or have selected the snowball ERP implementation strategy. For one thing, the theoretical model can inform the companies about to initiate their ERP implementation about the motivations and facilitating factors of snowball strategy. If these factors fit well with the companies’ overall strategic plan for ERP implementation, the companies should choose this module-by-module implementation
strategy. For another, to the companies that have already adopted the snowball strategy, they should focus their attention on the facilitating factors to improve their chances of success.

6. CONCLUSION

Using a case study design, we conducted interviews with managers associated with ERP implementation and assimilation at different levels at a mid-sized company in China to capture the essence of the snowball ERP implementation strategy. Based on our findings, we proposed a theoretical model that identified four motivations for adopting the snowball strategy, namely, financial pressure, assimilation pressure, technical readiness and fear of failure, as well as three essential facilitating factors associated with the snowball strategy: long-term partnership with ERP vendor, strong IT champion and the steady implementation team. Significant theoretical and managerial implications of the study were discussed.

As an exploratory case study, our findings need to be considered in the light of some limitations. This study is conducted in a single organization setting with its unique characteristics, such as its firm size, industry, organizational culture and national culture. Thus, it necessitates caution when extending the findings to other companies and countries. The generalization of our findings may be limited. However, we believe that our study has laid a solid foundation for developing more sophisticated and comprehensive models of ERP implementation strategy. In terms of future research, our study suggests a number of future potentials. For instance, future research could focus on conducting a multi-case study and an empirical study to further develop and test the theoretical framework.

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