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Introduction of an ERP System in a Chinese Company

SINTESI

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Sommario

Questo lavoro di tesi è stato svolto durante un periodo di quattro mesi in Cina alla Chongqing University, presso il College of Mechanical Engineering. Il lavoro è stato svolto su un caso studio con la collaborazione di un'azienda cinese con sede centrale a Pechino che vuole implementare SAP per migliorare la gestione degli ordini di vendita. L'obiettivo della tesi è l'individuazione dei particolari aspetti che possono rappresentare fattori di rischio per l'adozione di un sistema occidentale ERP in un'azienda cinese e la verifica di queste criticità nello specifico caso studio, attraverso un'analisi svolta come attività di Readiness Assessment per l'introduzione di SAP. Un'analisi della letteratura iniziale è servita per capire il problema e individuare una lista di aspetti culturali, organizzativi e tecnici che sono potenziali fattori di rischio per l'introduzione dei sistemi ERP occidentali in un'impresa cinese. Successivamente i dati raccolti dall'azienda attraverso alcuni strumenti di analisi qualitativa e quantitativa sono stati analizzati per capire la situazione attuale all'interno dell'impresa e verificare nel caso in esame l'esistenza dei fattori trovati in letteratura.

Abstract

This thesis work has been made during a period of four months in China at Chongqing University, at College of Mechanical Engineering. The work had been performed on a case study with the collaboration of a Chinese company with headquarter in Beijing which wants to implement SAP to improve the Sales order processing. The goal of the thesis is the identification of the particular aspects that could represent risk factors for the adoption of a West ERP system in a Chinese company and the verification of these critical issues in the specific case study, through an analysis made as activity of Readiness Assessment for the introduction of SAP. An initial analysis of literature was needed to understand the problem and to identify a list of cultural, organizational and technical aspects that are potential risk factors for the introduction of West ERP systems in a Chinese firm. Then the data gained from the company through several tools of qualitative and quantitative analysis have been analyzed to understand the current situation within the firm and to verify the existence, in the case in exam, of the factors found in literature.

1. Introduction

In the competitive business environment of today, companies need to improve the customer service and to be more and more efficient, through the reduction of costs and time in the entire supply chain. Key tools to achieve these goals are the information systems which gain, elaborate and distribute data, giving a great help to improve the management of a company. In the last decades more and more companies have been adopting ERP software as information systems. ERP systems are management information systems which integrate the information across the different business functions, through a single common database shared by all the functional areas. ERP systems can provide great advantages to the management of a company and better results than a traditional information system, but at the same time they are very complex software and they require a good planning to be successfully implemented within a company. This difficult can be accentuated if ERP systems are introduced in a context completely different from the West one where they were born: ERP systems have been created on a West organizational model and the adoption of these software by a company with different values, culture and way of management can present particular characteristics. In the case of a Chinese company which wants to implement an ERP system, the firm generally doesn't face only the change of software but a very transformation: change of ways to organize the work, re-definition of tasks, a lot of training and formation for employees.

I made this work at Chongqing University, China, during a stay of four months. I have been involved in a project of research in cooperation with "Deepcool", a Chinese company.

I was introduced to Deepcool by Dr. Peihan Wen, a Professor in the major of Logistics Engineering at Chongqing University, who has also supervised my work during the months in China. He has several projects with Deepcool and he is a consultant of the company. The project in which I have been involved was the introduction of SAP within the company to improve the Sales order processing of the firm.

2. Context and objectives

Deepcool is a Chinese company founded in 1996 and specialized in the manufacturing and providing of equipment for computers. Their main products are thermal systems for desktops and laptops, like CPU cooling and HDD cooling. The headquarters are located in

Beijing, China, while the factory and warehouse are located in Shenzhen, China. Also the suppliers of raw materials are located in Shenzhen area, near the factory.

Beijing's site has more than 100 employees, while more than 700 employees work in Shenzhen. The products are exported in more than 70 countries around the world; the main market is the Asian one, followed by America and Europe. The average Lead Time for Chinese customers is three weeks (two weeks of Order Lead Time and one week of Delivery Lead Time), while for Overseas customers is one month and three weeks (three weeks of Order Lead Time and one month of Delivery Lead Time).

The company is certified ISO 9000 and ISO 14000.

The main goal of this thesis is to identify the cultural, organizational and technical aspects that could represent risk factors during the adoption of a West ERP system in a Chinese company and to verify their existence in the specific case study of Deepcool.

3. Development of the work

3.1 Methodology

The work has been organized in the following steps:

- 1) Review of literature
- 2) Data collection
- 3) Data analysis
- 4) Results

The methodology of the work is summarized in Table 1, where the procedure is shown, as well as the activities for each step and the chapters where the activities are deeply explained.

STEP	ACTIVITIES	CHAPTER
REVIEW OF LITERATURE	Analysis of the Market of ERP Systems in China	3.2
	Identification of the risk factors in the introduction of a West ERP system in a Chinese company	3.3
DATA COLLECTION	Participation to business meetings of Deepcool through videocalls	3.4
	Exchange of emails with a Sales manager of Deepcool	
	Interviews face to face with fifteen managers of Deepcool: - Open questions - Survey with closed questions	
DATA ANALYSIS	Elaboration of the data gained from the video calls, the emails and the open questions	3.5
	Calculation of Mean and Standard Deviation of the results of the survey	
RESULTS	Comprehension of the need of an ERP System	3.6
	Explanation of the interest towards SAP	3.7
	Identification of the risk factors present in Deepcool for a successful introduction of SAP within the company	3.8

Table 1

3.2 Market of ERP Systems in China

A report of Credit Suisse (2011) classifies the ERP vendors in China into four groups, as we can see in Figure 1, according to the differences in client size and product line complexity: International ERP vendors, Industry solution vendors, Local ERP vendors and SaaS vendors.

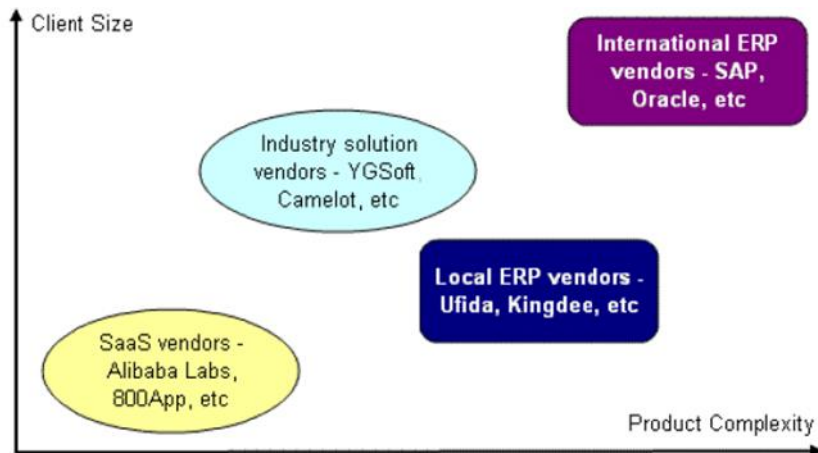


Figure 1 (source: Credit Suisse, 2011)

The same report shows the Chinese ERP market by industry and the ERP vendors market share in China. The Chinese industry with more implementations of ERP system is the manufacturing one, as shown in Figure 2. The market share of ERP systems in China is shown in Figure 3: SAP is the first ERP vendor in China, covering the 33% of China's ERP market, followed by Oracle (20%) and Ufida (14%).

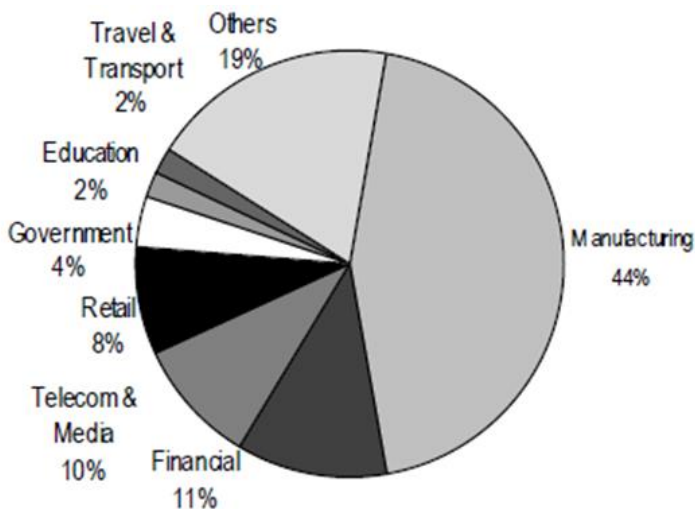


Figure 2 (source: Credit Suisse, 2011)

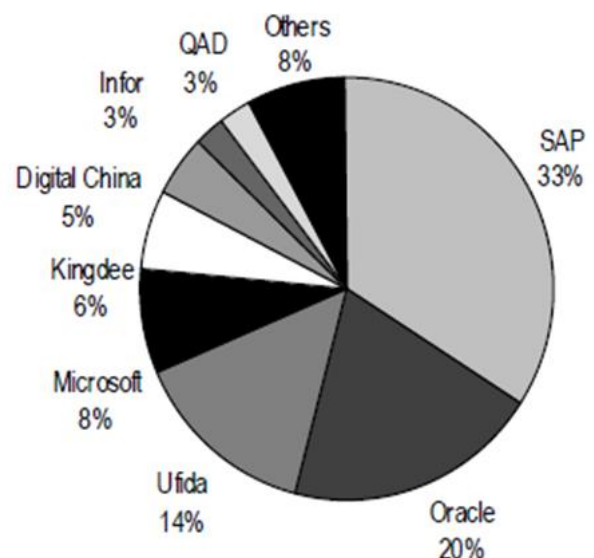


Figure 3 (source: Credit Suisse, 2011)

3.3 Risk factors in the introduction of a West ERP System in a Chinese company

Table 2 summarizes the cultural, organizational and technical aspects that according to the literature could represent potential risk factors for the introduction of a West ERP system within a Chinese company and their description. The list of the thirteen factors have been taken and combined from the works of Liang et al. (2004), Martinsons and Hempel (1998), Martinsons and Westwood (1997), Peng and Nunes (2009), Reimers (2002).

CATEGORY	RISK FACTOR	DESCRIPTION
CULTURAL	LANGUAGE	Most of Chinese people can't speak or understand English language. Translating a complex ERP system from English to Chinese in an accurate way can be very difficult.
CULTURAL	HIGH POWER DISTANCE	Chinese leaders rarely let their subordinates to make a meaningful contribution to the decision-making process. This, during the ERP implementation, could lead to decisions by the leader not appropriate because not taken with a real confrontation with the employees and without understanding the real user requirements.
CULTURAL	MISTRUST TOWARDS INFORMATION SYSTEMS	Chinese people often tend to make decisions based on their personal experience and intuition and not on clear and structured information provided by an information system like an ERP system.
CULTURAL	REPORTING FORMAT AND CONTENT	China's accounting has different standards from international accounting. West ERP vendors have to modify the financial accounting modules to meet Chinese requirements and there can be difficulties to do this, besides a potential increase of costs (more resources are needed) and time.
CULTURAL	FORMALIZING BUSINESS PLANNING AND PROCESSES	Chinese people are not used like West ones to organize formally activities and to document every task. Generally the re-design of business processes requires formal and documented procedures and a strategic planning; for this reason the lack of formalizing business planning and processes could be problematic to do BPR (Business Process Reengineering) which is often the key for a good ERP project.
CULTURAL	ACCEPTING AND MANAGING CHANGE	Chinese people usually don't feel the needing of change of the environment and this of course can be a problem for a re-engineering of the processes that have to be changed within a company, that often is necessary for a successful ERP project .
CULTURAL	BUSINESS RELATIONSHIPS	In Chinese culture it is very important to have a human relationship with someone before starting a business relationship. Every member of the business network in Chinese culture has to consider the needs of the other network members to make key decisions: this limits the ability of a single Chinese business to unilaterally make the changes associated with BPR, which is often essential for the success of an ERP introduction.
ORGANIZATIONAL	FEAR OF POWER REDUCTION AND FEAR OF LOSING JOB	Managers in Chinese company rarely share information with the dependents, and if they do it, that's through verbal conversations and not with formal reports. ERP system allows the share of many information along all the company and this could be seen like a threat by Chinese managers. ERP systems can also automate many manual activities and this can lead employees to be afraid to be replaced by software.
ORGANIZATIONAL	ABSENCE OF LONG PERIOD PLANS AND LACK OF TOP MANAGEMENT SUPPORT	The lack of planning is often one problem of Chinese companies. The short time behavior of Chinese firms make them tend to reach results in brief time, but with no focus on potential problems that could occur in the long term. This can be a problem for a successful ERP adoption, that requires a careful planning and a long-period vision.
ORGANIZATIONAL	LACK OF IT EXPERTISE AND LOW TRAINING OF EMPLOYEES	Chinese firms often don't have a good IT team within the company. For this reason the maintenance and the monitoring of ERP systems' performance could represent a problem. Besides, the lack of training of employees could make them less willing to use advanced information systems like ERP and to change their way to work and their habits.
TECHNICAL	POOR SERVICES FROM FOREIGN ERP SYSTEM VENDORS	ERP system vendors are key actors for a successful ERP implementation. For the implementation of ERP system in a Chinese company, ERP vendors should not be only expert in the technology of the software, but they should to know at least something about Chinese culture and attitudes and often foreign ERP vendors haven't familiarity with the particular context of Chinese companies.
TECHNICAL	INEXPERIENCE OF ERP SYSTEM CONSULTANTS	Local Chinese consulting companies generally lack familiarity with foreign vendors' ERP products.
TECHNICAL	HIGH COSTS	Foreign ERP products are usually considerably more expensive than those of Chinese vendors; for this reason foreign ERP vendors often found it difficult to compete with domestic vendors.

Table 2

3.4 Data Collection

During the four months of work I gained information and data from Deepcool through several tools of qualitative and quantitative analysis:

- **Video calls.** I participated to some business meetings with Deepcool through video calls to help them with benchmarking; in these occasions I received some information about the company.
- **E-mails.** Through some exchanges of e-mails with a Sales manager I gained some important data and documents from the company.
- **Interviews face-to-face at headquarter in Beijing.** I spent a week at headquarter of Deepcool in Beijing, where I had the opportunity to interview fifteen managers of the company. The managers interviewed belong to the Sales, Logistics, After Sales and Finance divisions. Every interview was recorded with the exception of the After Sales Manager (for lack of authorization). Interviews were conducted both with open questions and a survey with closed questions.

Open questions were centered around:

- The main operations in Deepcool
- The informatization situation within the firm
- The current problems of the Sales order processing
- The interest towards SAP as a new information system

All the people interviewed answered to a survey with closed questions in the last part of each interview: every participant was requested to assign a score to thirteen aspects in a scale of evaluation from 1 (“totally disagree”) to 5 (“completely agree”) in answering to the question “According to you could this aspect represent a potential obstacle in the adoption of a West ERP system like SAP in Deepcool?” and possibly to comment the choice. The thirteen aspects of the survey are the ones that according to the literature can represent potential risk factors for a successful introduction of a West ERP system within a Chinese company.

The goal of the survey was to verify which of these aspects are critical in Deepcool, and so potential risk factors for the implementation and use of SAP within the firm.

3.5 Data Analysis

The answers to the open questions of the interviews face-to-face and the data obtained from the company through emails and video calls were elaborated and used to have a better comprehension of Deepcool and in particular of the current situation of informatization and the problems of the Sales order processing. The results of the survey were exported to Excel where the Mean and the Standard Deviation were first calculated for each aspect, and then used to identify which of the aspects found in literature could represent potential risk factors for a successful adoption of SAP within Deepcool. The aspects with a ratio between Mean and Standard Deviation over 3 were considered the most meaningful ones for Deepcool and so the potential risk factors for the introduction of SAP within the company.

3.6 The need of an ERP system in Deepcool

The company currently doesn't have any kind of information systems, with the exception of the financial office. Every employee is familiar with Microsoft Office. Stock of the warehouses are daily updated on an Excel data sheet in Shenzhen. This sheet is downloaded daily from the Logistics responsible, to check availability and the current situation of the quantity and the kinds of goods in the inventory. Also the reports of the customers' orders are updated on an Excel data sheet by the sales responsible. Information is shared mostly manually, through tools like E-mails, phone calls, Wechat, both within the company and with the external (customers and suppliers).

Customers don't share their forecast data with Deepcool and because of language problems there is often the need to use a software of translation with foreign customers. The transfer of documents depends on manual printing, email or online sharing, which is very time dispendious and can lead to a lack of the information during the "route". Financial department uses the "K3 financial system". This is a software that helps to do the financial operations (for example billings and invoices are stored in the K3 system). It is specific for the financial department and it is not integrated with the other business functions. Only financial operators use it.

Every office staff has his own office email and personal computer.

From the answers to the open questions of the interviews the main problems emerged about the current situation are the following ones:

- Slow information flow

- Frequent lack of information across the business functions; sometimes for example there is no record of the communication because the employee forgets it
- Long-time of response to the customers because the daily manual updating of the documents is a lot time-consuming and because of some problems of communication with the customers
- High costs of storage; this happen for many cases of overstock warehouse due to an incorrect production plan

Deepcool needs an information system to work in a way more efficient and to reduce the number of human errors. During the last year the firm has considered the possibility to install an ERP system to improve the current situation.

The benefits expected by Deepcool from the introduction of an ERP system are the following ones:

- Sharing of the information in real time; this could make the processes more efficient and avoid the frequent lack of information across the business functions
- Reduction of the order lead time that would allow a shorter time of response to the customers
- Better tracing of the customers' orders with an improvement in the communication with them
- Reduction of the costs: ERP systems can allow the reduction of the stocks with a better production plan

3.7 The interest towards SAP in Deepcool

Deepcool is still in the phase of "Project Chartering" of the process of implementation of ERP systems within a company developed by Markus and Tanis (2000), so it is still planning the adoption of an ERP system and in particular is in the moment of the "package selection". The company from the beginning has been oriented towards a West ERP system instead of a Local Vendor: this because Deepcool is planning the expansion in Europe and America with the opening of new warehouses in these areas and it wants to have a system based on a "common language" for the communication with the new centres. In particular the firm would be interested to install SAP Business One.

The main reasons that led to the interest in SAP Business One are the following ones:

- It is one of the best packages for the industry of Manufacturing
- SAP has many partners in China
- It covers many modules and functionalities

In particular the SAP modules useful to improve the situation of the company are the logistics ones: “Sales and Distribution”, “Production Planning”, “Material Management”.

3.8 Risk factors of the introduction of SAP in Deepcool

The goal of the survey was to verify which of the aspects, that according to the literature could be risk factors for a successful introduction of a foreign ERP system within a Chinese company, are critical in Deepcool. This analysis has been useful for the company as part of activity of Readiness Assessment. A summary of responses to the survey with the Mean (M) and Standard deviation (S.D) for each aspect is shown in Table 3.

CATEGORY	ASPECT	M	S.D
Cultural aspects	Language	3.47	1.06
	High power distance	1.53	0.64
	Mistrust towards information systems	3.20	0.94
	Reporting format and content	1.93	0.70
	Formalizing business planning and processes	3.07	0.88
	Accepting and managing change	2.33	0.90
Organizational aspects	Business relationships	1.73	0.80
	Fear of power reduction and fear of losing job	1.87	0.92
	Absence of long period plans and lack of top management support	1.80	0.77
	Lack of IT expertise and low training of employees	3.33	0.82
Technical aspects	Poor services from foreign ERP system vendors	2.07	0.96
	Inexperience of ERP system consultants	2.13	0.74
	High costs	3.40	0.91

Table 3

I prioritized the thirteen aspects according to the ratio between Mean and Standard Deviation and I considered meaningful the ones with a ratio over 3. The ranking is shown in Table 4.

RANK	CATEGORY	ASPECT	M	S.D	M/S.D
1	Organizational	Lack of IT expertise and low training of employees	3.33	0.82	4.06
2	Technical	High costs	3.40	0.91	3.74
3	Cultural	Formalizing business planning and processes	3.07	0.88	3.49
4	Cultural	Mistrust towards information systems	3.20	0.94	3.40
5	Cultural	Language	3.47	1.06	3.27
6	Technical	Inexperience of ERP system consultants	2.13	0.74	2.88
7	Cultural	Reporting format and content	1.93	0.70	2.76
8	Cultural	Accepting and managing change	2.33	0.90	2.59
9	Cultural	High power distance	1.53	0.64	2.39
10	Organizational	Absence of long period plans and lack of top management support	1.80	0.77	2.34
11	Cultural	Business relationships	1.73	0.80	2.16
12	Technical	Poor services from foreign ERP system vendors	2.07	0.96	2.15
13	Organizational	Fear of power reduction and fear of losing job	1.87	0.92	2.03

Table 4

So I identified the first five aspects of the ranking as the most important and critical ones and so as potential risk factors for the adoption of SAP in the case of Deepcool.

The five risk factors are shown in Table 5, with their description and the potential impact on the company, in terms of adoption of the system or a failure of the project of implementation of SAP.

RANK	CATEGORY	RISK FACTOR	DESCRIPTION	POTENTIAL IMPACT
1	ORGANIZATIONAL	LACK OF IT EXPERTISE AND LOW TRAINING OF EMPLOYEES	Within the company there is not a very IT team and most of people have no idea of what a management information system is. For this reason the monitoring and maintenance of SAP within the company could be very complicated and there should be the help of external consultants.	CORRESPONDENCE FAILURE: the lack of a good IT team that helps the monitoring of the project to ensure that the implementation of SAP proceeds as planned could lead to a no match between SAP and the planned goals EXPECTATION FAILURE: the fact that many end users don't know what ERP systems are and how they work can lead to wrong ideas and expectations towards the use of the system
2	TECHNICAL	HIGH COSTS	The managers interviewed were worried about the price of a foreign ERP system. Even if the most of them recognized the needing of a management information system like that to integrate data and make more efficient the business processes, they were afraid about the great cost of SAP compared to the other Chinese ERP software, even if the expertise of SAP is greater than Chinese packages.	CHOICE OF THE SYSTEM: the high initial costs of SAP could lead the company to give up on the adoption of the system
3	CULTURAL	FORMALIZING BUSINESS PLANNING AND PROCESSES	China is characterized by a low uncertainty avoidance and this is reflected in the tolerance towards ambiguity and a low tendency to "formalize" procedures and planning. This is true also in Deepcool, according to the managers interviewed: for the most of processes there are not written procedures and documentation, everyone knows his own tasks and responsibilities and everything is still mostly made in an unstructured way, even if they have just implemented ISO 9000 to have more formal procedures and standardized business processes. This weakness could be problematic to do an effective BPR.	CORRESPONDENCE FAILURE: with the lack of a good BPR the use of SAP could lead only the "automation" of many processes without a real optimization of them, which is one of the main goals of the project to install SAP
4	CULTURAL	MISTRUST TOWARDS INFORMATION SYSTEMS	From the interviews conducted some managers appeared a little reluctant to the idea of an information system that can provide them the "best" solution to their problems because they think that within the company employees can solve by themselves the issues. Some of them were also afraid for the security of data put in an ERP system.	INTERACTION FAILURE: users could not have the right approach to SAP because of the mistrust towards the use of information systems
5	CULTURAL	LANGUAGE	In Deepcool very few people can speak English, even some managers can speak only Chinese. Moreover also managers who can speak English often have misunderstanding with foreign customers. People interviewed talked about the fact that many daily problems rely on the language and that probably this could represent one great barrier for the adoption of a foreign ERP software. For sure translating all the SAP packages in Chinese language could represent a great complication, and a mix of Chinese and English interfaces could be very confusing for the users.	CHOICE OF THE SYSTEM: the difficult in translating SAP could lead the company to give up on the adoption of the system

Table 5

4. Conclusions and Further Development

The finding of this work is that five of the thirteen aspects found in literature could be potential risk factors for the implementation and use of SAP within the company: three cultural risk factors, one organizational risk factor and one technical risk factor. While the language and high costs can't be affected, the company could act to reduce the risk of the other three factors because it regards mostly aspects that can be influenced: the users' involvement and training, the skills within the firm and the lack of formalizing the processes. Some suggestions to improve the probability of a successful introduction of SAP are shown in Table 6.

RISK FACTOR	SUGGESTION TO REDUCE RISK
<p>LACK OF IT EXPERTISE AND LOW TRAINING OF EMPLOYEES</p>	<p>RECRUITMENT OF SPECIALIZED TECHNICAL IT EXPERTISE. The risk linked to the lack of an IT team in Deepcool could be reduced with the recruitment of specialized people. The inclusion of an expert IT group within the company could be useful to have a good monitoring of the project, through the setting of the right milestones and targets to keep track of the progress of implementation of SAP to ensure that the project proceeds as planning.</p> <p>EFFECTIVE USER TRAINING ON THE SYSTEM. User training could help to avoid an Expectation failure of the project due to the lack of knowledge of the employees about the ERP systems. End users must be prepared to the introduction of SAP, through an effective training and a clear explanation of how the new system will work.</p>
<p>FORMALIZING BUSINESS PLANNING AND PROCESSES</p>	<p>COMMITMENT TO FORMALIZE THE PROCEDURES AND TO REDESIGN BUSINESS PROCESSES. The risk linked to the lack of formal processes can be reduced with an effective commitment of the company, first in formalizing the current procedures and then to re-design the business processes. With a correct BPR the introduction of SAP could really lead an optimization of the business processes.</p>
<p>MISTRUST TOWARDS INFORMATION SYSTEMS</p>	<p>EFFECTIVE COMMUNICATION TO THE USERS. A good communication to the end users could be useful to reduce the disbelief of many employees towards the use of an information system: employees should be convinced of the system utility and of the advantages that SAP can provide to their ways to work.</p>

Table 6

During the work on this thesis there were some limitations that have to be mentioned:

- The single case study: the findings can't be generalized to all the Chinese companies
- Difficult of accessing to data in China: making research in China can be impossible without making a prior "human" relationship with the members of the organization
- Small size of the sample: because of the single case study the answers could not be given by more than fifteen managers
- Limitation of time: an approach with a longitudinal study to see the implementation and post implementation phases would have been ideal but it wasn't possible for the constraint of time

This topic is recent and it has not been enough investigated in the current literature. I think that further research on this field could be useful: China nowadays is a key player in the world economy and there are many aspects of this country that need to be deeply understood, not only for an introduction of a West software within their companies, but also to understand better their market and to improve the communication between West and Chinese companies.