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RESEARCH OF ERP APPLICATION PROSPECTS AND ITS IMPLEMENTATION
AT CHINESE SMEs

Thesis

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Abstract

Small and medium enterprises (SMEs) are the foundation and driving force of Chinese economy development. However, majority of SMEs are relatively small-scale, which lack capital, human resources, low management level and channels of getting business information. Therefore, it is urgent that SMEs carry out the construction of informatization and implement ERP to raise the level of management. Meanwhile, ERP implementation is a complicated engineering and has a high risk. As a result, the successful rate of ERP adoption is very low. Hence, how to solve the problems of ERP application for SMEs is discussed in this paper.

Through the research methodology of theoretical approach and empirical analysis(case study), the paper explores the counterstrategies of ERP application for SMEs after clarifying the current situation and problems in ERP application.

In a nutshell, this paper gives significant suggestions in making a proper EPR implementation strategy, choosing the right ERP applied model and improving the success rate of ERP implementation for Chinese SMEs.

Key words: ERP(enterprise resource planning), SMEs(small and medium enterprises) Informatization, Implementation Principles, Applied models

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1 INTRODUCTION

With the globalization of economy and trade, competition among enterprises has become intensive. Enterprise informatization has been developing from large-scale enterprises to small and medium enterprises. Enterprise Resources Planning (ERP) systems are commercial software packages that enable information flow throughout companies and organizations. They improve the organizational performance and enhance the competitive advantages (Davenport, 1998). The amount of small and medium enterprises (SMEs) in China has exceeded 42 million, accounting for 99% of total amount of Chinese enterprises (Source: CCID Research 2005). Undoubtedly, SMEs play a vital role in promoting Chinese economy and prosperity.

In China, however, the majority of SMEs are relatively small-scale, which lack capital, human resources, low management level and channels of getting business information. Meanwhile, the market information system is not so effective and comprehensive. Nowadays SMEs have been faced with a complex and changeful business environment. Along with the process of economic globalization, on one hand that is the good opportunity of development, on the other hand SMEs are faced with the challenge foreign competitor joined. Hence, it is urgent that SMEs carry out construction of informatization and implement ERP to raise the level of management. Although SMEs have been increasingly embracing ERP in recent years, research indicates that many of them fail to reach their goals. The poor achievement can be attributed to, for example, wrong choice of ERP vendor, poor management after ERP implementation, high cost of supporting and maintaining ERP systems.

Through the research methodology of theoretical approach and empirical analysis(case study), the paper explores the counterstrategies of ERP application for SMEs after clarifying the current situation and problems in ERP application． The rest of the article is organized as follows. Section 2 presents literature review concerned with ERP basics and Chinese ERP market. Section 3 describes the current situation and existing problems of ERP implementation for SMEs. Section 4 proceeds to present ERP implementation principles and applied models for SMEs. The case study of ERP adoption in a Chinese SME and one ERP vendor from a Finnish company are provided in section 5. Section 6 deals with critical success factors (CSFs) analysis for ERP application. Finally, section 7 gives conclusions of this paper and forecasts the future research.

In a nutshell, this paper has a practical significance in making a proper EPR implementation strategy, choosing the right ERP application model and improving the success rate of ERP implementation for Chinese SMEs.

2 ERP EVOLUTION

Since ERP systems are lead into China, they have been embraced and implemented widely in Chinese enterprises. Companies want to learn advanced foreign management philosophy, ideas, and methods via ERP systems introduction to achieve the standardization, institutionalization, modernization of the management and to improve the competitiveness of the enterprise. However, the low success rate of ERP implementation results to a great waste of human, material and financial resources. Because of this, there is space for continuous improvement in the theoretical systems and application methods of ERP.

2.1. Basics of ERP

It is generally recognized in Information Technology (IT) field that ERP is a software product, which combines client/server (C/S), browser/server (B/S), relational database, object-oriented approach, user interface (UI) technologies etc (Liu and Ma, 2003). Management community considers that ERP is a management ideology for supply chain management, which is based on enterprise management system standards and development of MRP Ⅱ (Zhu and Jiang, 2001). Manufacturers think that ERP is a management system that integrates enterprise management concepts, business processes, basic data, human resources, computer software and hardware into the enterprise resource management system.

In the year of 2002, American Production and Inventory Control Society gave the definition of ERP as follows: ERP is a kind of effective management system which plans and manages manufacturing, distribution, the resources needed in customer orders including acquisition, processing, transmission etc (AR and WK,

2004).

ERP is based on computer technology, the latest development in management science and it uses information technology as a platform and integrates advanced business management concepts. ERP deploys and balances adequately in all aspects of enterprise resources and integrates business resources in the most scientific way to provide solutions for business decision-making and operation (Chen, 2004). From both theoretical and practical aspects, ERP provides solutions for the overall enterprise management and offers a set of enterprise management standards. At the same time, ERP adopts the mainstream of software architecture, relational database structures and object-oriented technology. ERP integrates enterprise management concepts, business processes in the enterprise resource management system. ERP extends the function of MRP. The core idea is based on the value chain to optimize resources of the enterprise. In a broad sense, the enterprise resources in ERP include internal resources and external resources. Internal resources mainly refer to human resources, capital, material, equipment and operating facilities, etc. External resources include customers, cooperative partners and market information, etc. ERP surpasses the traditional concept of MRP Ⅱ, extends the scope of management information system, not only includes the financial, distribution, production management, human resources, but also integrates quality management, decision support and other functions and also supports internet, intranet and e-commerce.

2.2 Evolution of ERP

After nearly half a century study, ERP systems experienced continuous improvement. The development of ERP has gone through several stages:

(1) MRP

In the stage of inventory management, it is usual to find stock-out, unnecessary backlog, the gap between forecast and real needs. In that situation, MRP (Material Requirements Planning) has been put forward in 50 years. Because of MRP, it is possible for enterprises to solve the contradiction between supply and demand in material needs. There is neither shortage of the materials nor excess inventory. MRP meets the changing needs of production.

(2) Closed Loop MRP

MRP is a top-down plan. Material problems may arise during implementation such as design changes, waste products, outsourcing and coordination cannot arrive on time. Capacity problems may also occur such as low equipment utilization rate, equipment failures and personnel absences. So when those problems occur, a bottom-up feedback which can reflect to plan layer is needed. In that case, the closed loop MRP was produced in the 70's. In addition to its material requirements planning, the production capacity plan, shop floor plans and procurement plans were also included in MRP. At the same time, MRP fed back the balance ability to master plan to form a closed loop planning and control of manufacturing resource planning systems, which can manage the production process of formulating a comprehensive material plan.

(3) MRPⅡ

Although Closed Loop MRP is a complete planning and control system, it does not present clearly in enterprises performance and effectiveness. It means that the cost of business planning and control are not taken into account. Some companies raised a new issue after 10 years of MRP implementation. They required a system dealing with material planning information, at the same time simultaneously dealing with financial information. It means that product sales plans are presented as the amount of money to show sales, and materials are endowed with the prosperities of

currency to calculate the cost and facilitate the quotation. The amount of money indicates capacity, procurement and external cooperation program to prepare the budget. It also shows inventory to reflect the amount of funds used. In short, the financial accounting system is required to obtain financial information simultaneously from the production system at any time to control and guide production activities. It will make the overall strategy in line with business objectives. In that case, MRPⅡ was produced, which was based on Closed Loop MRP, in the beginning of the 80's. In the stage of MRPⅡ, the financial resources were included in the program to make the enterprise financial cost under control. It also brought marketing and supply chain functions which were related with manufacturing resources into a supply chain management.

(4) ERP

With the formation of global economy and rapidly changing marketing demand, MRPⅡ could not meet the need of the new situation. In the early 90's, Gartner first proposed the concept of ERP. The main difference between ERP and MRPⅡ is the comprehensive information integration of supply chain management. ERP expands the traditional manufacturing, distribution, finance function of MRPⅡ system. It increases the demand for Customer Relationship Management (CRM). ERP also supports transport and warehouse management of circulation system, after sale service and online analytical processing (OLAP). ERP also supports the quality management of production security system and laboratory management, equipment maintenance, supports for multilingual, currency, taxation of cross-border business and multinational factory management. ERP supports remote communication, Internet / Intranet / Extranet, a variety of electronic commerce and electronic data interchange (EDI), and supports dynamic model of workflow (business process) and integration of information processing. In addition, business investment and capital operation, management of the various regulations and standards is also provided by ERP. In fact, the current function of ERP software has become a strong adaptability and wide range of applications in the enterprise management information system.

2.3 The main function of ERP

The functions of ERP software should be divided into two parts: basic and extended functions. The basic function is essential for all ERP software as the "entry" function, which emphasizes integrating all activities within the value chain. Extended function can make integration form upstream (suppliers) to downstream (clients) of supply chain. The integration of information system of back-end vendors belongs to the function of Supply Chain Management (SCM). The integration of information of front- end clients belongs to the function of Customer Relationship Management, CRM, Sales Force Automation (SFA) and Electronic Commerce (EC). The functions mentioned above are required functions of ERP software. In addition, in view of the characteristics of different industries, the software companies can adjust and supply some functions according to their own understanding of ERP.

2.4 The Chinese ERP market

The Chinese ERP market, which started in the late 1980s, has been booming in recent years because informatization has played a vital role in the development of enterprises. The demand of enterprise management system increases rapidly, in that case, the requirement of ERP is higher and higher. At present, Chinese ERP market is full of potential. Chinese enterprises have already realized that they cannot rely on low cost production, while ERP is a good medicine for Chinese enterprises to enhance managerial performance. According to the China Center for Information Industry Development (CCID), a well-known Chinese marketing research firm, the Chinese ERP market has grown from approximately USD $251 million in 2003 to USD $571 million in 2007. From 2002 to 2005, the average annual growth of the Chinese ERP market was 23.75% (Source: CCID Research 2008).

According to the survey of CCW Research, the total sales of TOP10 General ERP software vendors were USD $ 296 million in the first half of 2009. According to sales statistics, the top six manufacturers were UFSoft, SAP, Kingdee, Oracle, GenerSoft and Digital China. (Figure 1)
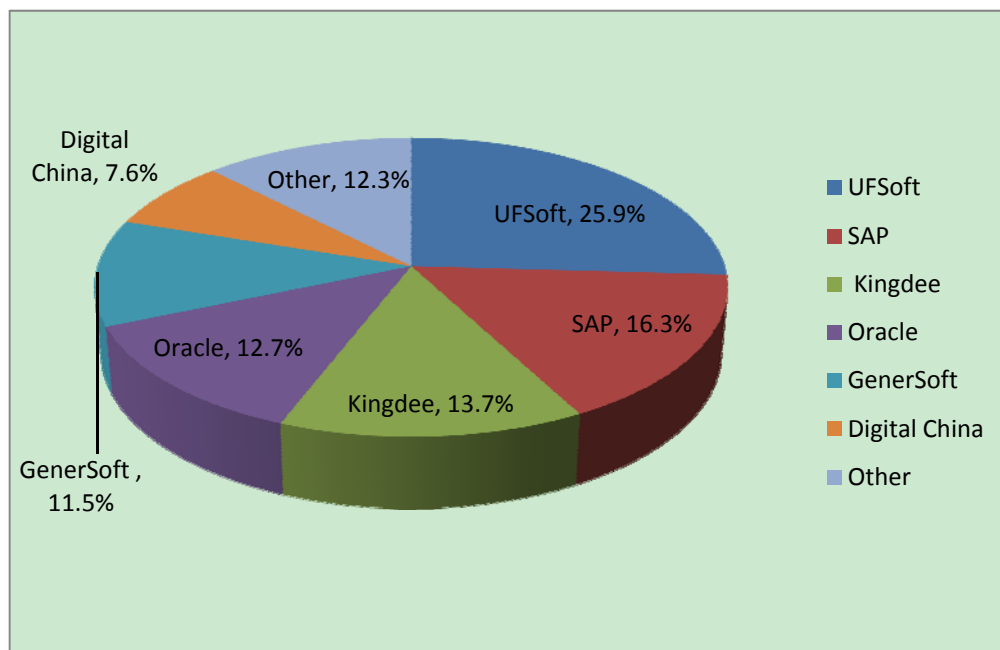
Figure 1. The brand structure of TOP10 General ERP software vendors in the first half of 2009.   (Source: CCW Research 2009)

In the 2009 report of Chinese ERP Market form CCW Research, domestic ERP vendors took a major share of the market. As figure 1 shows, the top six players hold 87.7% of the ERP market, with four Chinese domestic companies holding 58.7% and the two foreign ERP leaders holding 29% of the market. Evidently, the Chinese ERP software vendors have emerged as dominant players in this important market.

The number of small and medium enterprises (SMEs) in China has exceeded 42 million, accounting for 99% of the total amount of Chinese enterprises. Large volume and rapid development trend bring tremendous demand. The requirements of SMEs are relatively simple but the differences are large. Return on Investment (ROI) of ERP vendors in this area may be less than ideal. However, in The Long Tail theory, the market energy of combination of these products will be great

enough to compete with the mainstream of popular products. That tells us that mining the fundamental needs of SMEs, catering to their characteristics, providing corresponding products, can create miracles in the competitive ERP market.

3 ERP APPLICATIONS AND PROBLEMS OF CHINESE SMES

Chinese SMEs are the most dynamic part of the national economy. The contribution value to national economy is more than 40%. Total industrial output value and tax revenue of SMEs accounted for 60% and 40% respectively. Chinese SMEs provide for about 75% of urban employment opportunities. Thus it can be seen that SMEs take an important part in national economy and the development of Chinese society. (Source: CCID Research 2008)

3.1 The support of ERP provided to SMEs

3.1.1   The common problems of management in Chinese SMEs

The prevalent problems of Management in Chinese SMEs are low levels of planning, policy-making and financial management, high operating costs and low competitiveness.

(1)   Low levels of planning and policy-making

The decision is correct or not related to the success or failure of an enterprise. Decision-making cannot do without information. Information collection, processing and analysis, are the decision-making processes. Some SMEs do not use means of informatization. Analytical capacity is low coupled with incomplete information. Those problems result to managers, to a large extent, use their experience to make decisions.

A reasonable plan is based on the right decision. However, in the belief of most SMEs owners, hard-working is the inevitable choice of enterprises success. While

in the aspect of planning, SMEs often fail to define clear objectives. SMEs do not only lack systematization of the whole program system, but also ignore long-term strategic planning. They only pay more attention to gains and losses of the short-term interest. Although some enterprises have plans, plans themselves are flawed, which are difficult to implement.

(2) Low level of Financial Management

First of all, the daily management of Chinese SMEs is not strict and financial control is weak. Poor management of cash results to the idle or insufficient funds. Some SMEs believe that cash is the more the better, which results to the cash do not participate in the production flow.　Some SMEs are short of rational domination of capital. For example, over-purchase of real estate, which makes business cannot cope with badly-needed funds. Accounts receivable turnover is slow, resulting to the difficulty of recovery of funds. The reason is not to establish a strict credit policy, lack of effective collection measures, accounts receivables cannot be honored or bad debts build up. Inventory control is weak and cycle turnover is long. At the end of every month, the occupation of stock funds is several times more than their sale volumes, which results to the failure of capital flows. The poor management of raw material, semi-finished products and fixed assets lead to the waste of enterprise resources.

Secondly, the ability of financial analysis in SMEs is weak. Financial analysis is based on financial indicators to analyze and evaluate enterprises' financial position and operating results. It provides important financial information to improve financial management and optimize the economic decision-making. The main contents of financial analysis include solvency analysis, operations analysis and profitability capability analysis. However, the duties of most SMEs financial officers just fill in the monthly certificate, register books, and give a series of financial statements. It is not common to involve financial analysis.

Thirdly, management model is rigid and management concepts are obsolete. On the one hand, the typical management mode of SMEs is high degree unity of ownership and management. Business investors are also the operators. That model is bound to a negative impact on enterprise financial management. The property of a considerable part of SMEs is individual and private. In those enterprises, leaderships are centralized. Leaders are short of knowledge about financial management, which causes confusion in the financial management and distortion in accounting information. Enterprises do not or cannot establish internal audit departments. If there are these departments, the independences of an internal audit cannot be guaranteed. On the other hand, management ability and quality of managers are not high. Because of their own reasons in some SMEs, managers do not bring financial management into an effective mechanism of corporate governance.

(3) High operating costs and low competitiveness.

Comparisons with large enterprises, sale volumes of SMEs are small and the procurement of raw material is limited. Imports of raw materials are controlled by large enterprises and importers. At the same time, in China, both manufacturing and business formed the multi-stage wholesale marketing. In imperfect competition even monopoly situation, multi-level exploitation occurred. However, SMEs are often unable to develop new markets on their own. Distribution channels for production are long, which are influenced by traders and exploited by middlemen. In addition, SMEs have poor information management platform and management tools, which causes costs increase and resources waste. Those aspects mentioned above lead to high operating costs of procurement, inventory, production and sales, etc, which result to the high costs of end products and low competitiveness.

3.1.2   The support of ERP provided to SMEs

(1) The improvement of decision-making and planning through ERP implementation

Business intelligence (BI) or Decision Support System which ERP provides can fully analyze production, management, finance and other aspects of the entire enterprise. Through a variety of scientific methods, ERP provides different programs in accordance with different positions and different level of care of decision-makers. ERP inherits the idea of MRPⅡ, which are three-level program management, decision-making, planning and executing level. That is a program oriented management. The layer optimization of planning levels is from macro to micro, from strategy to technology, from coarse to fine. ERP is a closed-loop system. It requests tracking, control and feedback of the changing situation. Managers can respond quickly and adjust the policy timely according to changes of inside and outside of enterprises environmental conditions, which can ensure normal production.

(2) Applications of ERP strengthen the financial management of SMEs

ERP achieves the integration of logistics and financial flow, which benefits the cost management and control of SMEs. ERP includes functions of cost accounting and financial, which can directly generate financial data through production. ERP can directly convert the flow of materials into the flow of capital to ensure consistency of production and financial data. Financial sector can gain financial information timely to control costs. Through material and financial flows, ERP can reflect the operating status; analyze the economic efficiency of enterprises to direct and control operations and production activities.

ERP releases financial officers in SMEs from the complicated accounting work. After the implementation of ERP projects, accounting officers only need to

enter the original general accounting data into the ledger system. Large amounts of data calculation, classification, accumulation, storage, analysis, and other tasks can be done automatically by the ERP system. This improves the efficiency of accounting and meets the needs of economic forecasting and decision-making of the enterprise.

ERP will significantly improve the level of capital management in SMEs. Through business intelligence and decision support functions of the ERP system, companies can analyze cash flow to know whether the funds flow to the effective products and business areas, if the structure is reasonable or not. For example, from the rate of capital turnover, we can see whether the conversion of funds is smooth or not. Through the budget alarm system, managers can check whether the required fixed capital is high or not. Fixed assets and current assets account for total assets to understand if it is reasonable or not. Enterprises can analyze the financial safety through liquid ratio, cash ratio and other parameters to know about the capital operation. In addition, companies can determine the funds raising and find out using through the analysis whether the proportion of own capital, long-term debt and short-term debt are appropriate or not.

ERP can integrate financial analysis and financial forecasts to achieve predictions of sales, cost and capital etc. Enterprises can use variety of specialized analysis methods, such as comparative analysis, structural analysis and chain analysis to analyze and research financial data to support business decision-making. In the financial management activities, financial forecasting is the important work of making and adjusting the finance. The main contents of financial forecasting are sales forecasts, cost and funding requirements forecasts. Financial Analysis systems of ERP can provide automated budget preparation, comparison between the budget and the actual situation. According to the historical data, the decision support system of ERP can automatically calculate the predicted value, and the predictive value can be manually adjusted to give a more accurate forecasts.

(3) ERP can reduce the cost of production and improve the competitiveness of SMEs

ERP can make the stock decrease by 30% to 50%, inventory turnover increase by 50%, procurement lead time reduce by 50%, downtime reduce by 60%, the lower manufacturing costs by 12%, production capacity increase by 10 % to 15%, on time delivery rate of enterprises increase by 55 % (APICS Research, 2005). Therefore, ERP implementation in SMEs can effectively reduce the cost in many aspects, for example the procurement, inventory, production, marketing and human resources etc. At the same time, by effectively fulfilling commitments to customers, products delivering on time, shortening response time, enterprises will win the customers loyalty. All of those enhance the competitiveness of SMEs and increase economic benefits.

In addition, ERP application can also reduce a lot of management costs in SMEs, and enable employees to improve work efficiency, and standardize multi-level management of enterprises. Between the internal and external operation of enterprises, ERP can help companies achieve an e-business model to broaden the scope of communication, to shorten communication time, to enrich forms of communication.

3.2 ERP Applications and Problems of Chinese SMEs

3.2.1 The status of ERP implementation in Chinese SMEs

In China almost 60% of SMEs already have department-level information systems, such as financial software, or Office Automation (OA) systems, but the utilization of ERP is not common(CCID Research, 2008). In the past, most SMEs did not think that they need information systems. In recent years, SMEs realize the

importance of establishing a modern management system to use advanced information technology.
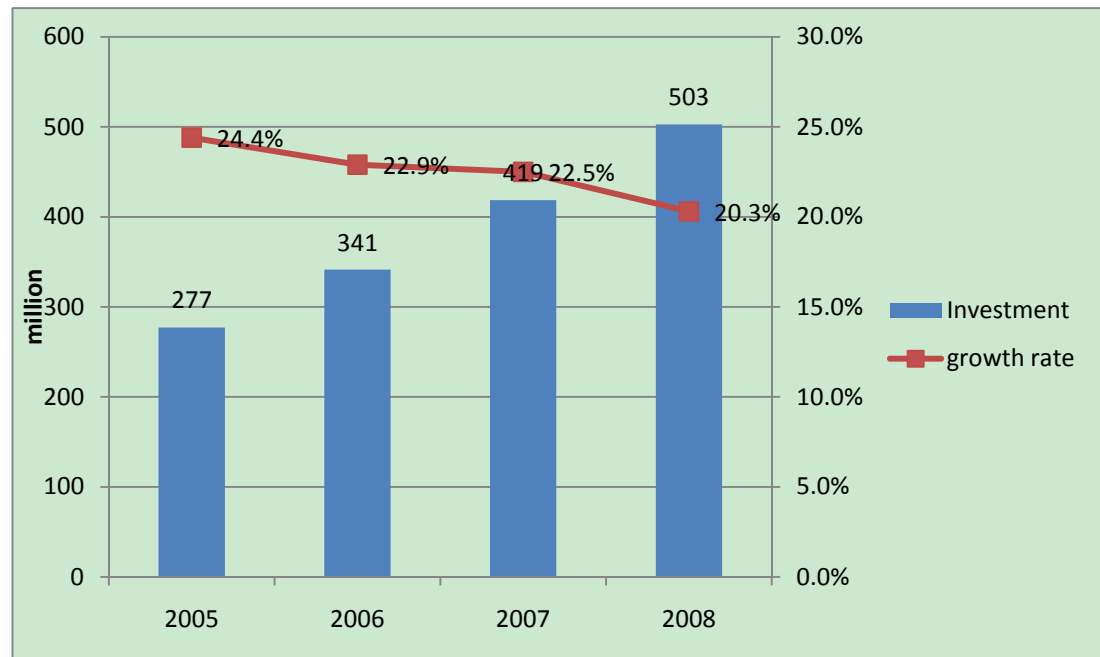
Figure 2. The investment and growth rate of Chinese SMEs' ERP market from 2005 to 2008. (Source: CCID research 2008)

In 2005, the investment of Chinese SMEs' ERP market reached USD $ 277 million, increasing by 24.4% compared with the value in 2004. (Figure 2)

There are many problems during the process of implementing ERP in SMEs. Enterprises yield faster results and bigger economic returns from smaller investments. But at the same time, the business base is weak; managers have limited understanding about integrated information system, enterprises lack IT personnel. There are many advantages of the implementation of ERP for SMEs. Departmental organizational structures are relatively simple. The levels of system settings are relatively small. Business is relatively not very complicated, which makes the extent of software re-development much lesser. All of the things mentioned above make it possible that ERP can be implemented in a relatively short time. The implementation of ERP is generally proposed and commanded personally by CEO of an enterprise. Decision makers have a full understanding of the enterprise's information management, a clear and urgent need, the confidence and full support,

which increases the success rate of ERP application in SMEs.

As a large ERP system, it is no need for SMEs to embrace all of the functional modules of ERP at once. The usual practice is to set up the overall framework of the ERP first, then implement progressively, which has become common for the ERP implementation of SMEs. Therefore, SMEs can start only a few core ERP modules at the beginning, but the underlying technical architecture should support future flexible upgrades. Financial and logistics have a relatively high level of standardization in ERP, which can solve the outstanding problems in the management process. Enterprises can consider implementing the finance and logistics modules in early periods, and then implement the production, quality, equipment and other modules. (Figure 3)
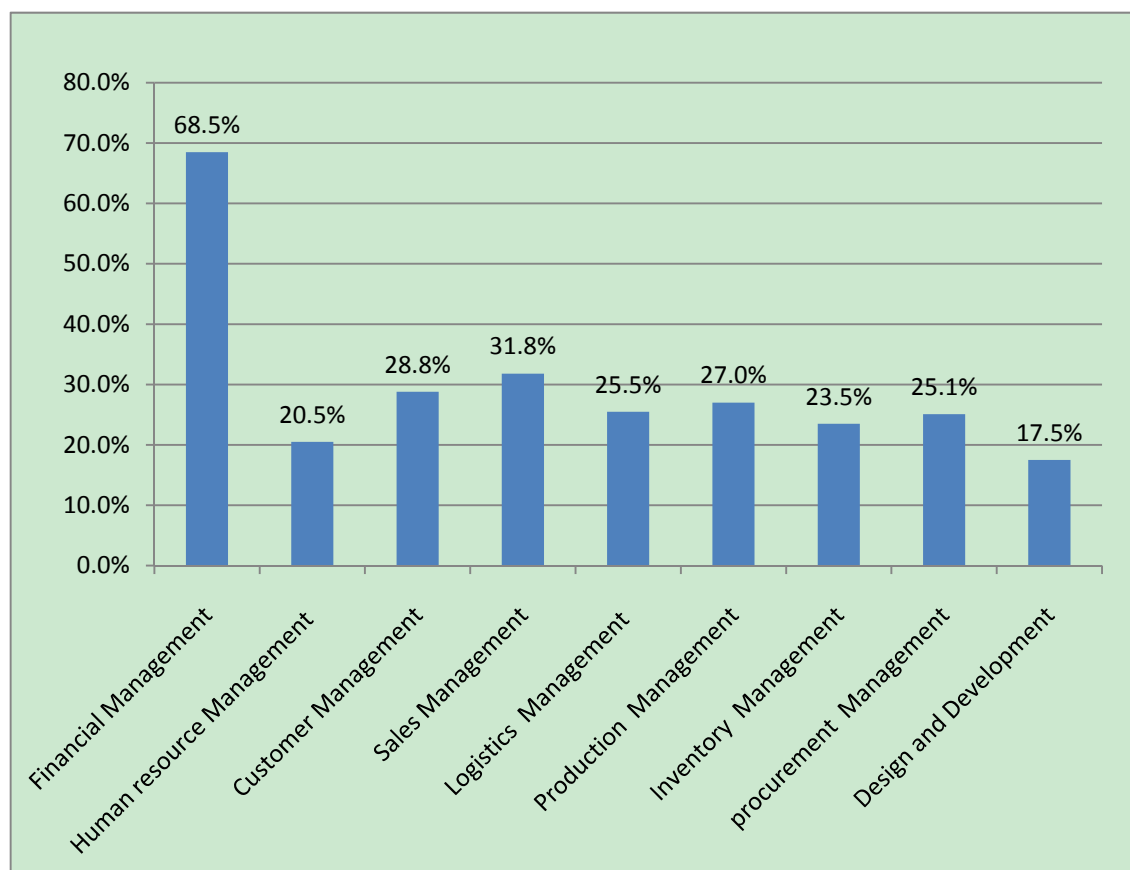

Figure 3. The construction of ERP sub-modules for SMEs in 2008. (Source: CCID research 2008)

3.2.2 The problems of ERP implementation in Chinese SMEs

Because of Chinese national conditions and characteristics of SMEs, the problems of ERP implementation are as follows:

(1) Irrational investment in ERP

Firstly, managers are short of correct understanding of ERP. Some leaders of SMEs do not understand the content and implementation process of ERP systems completely and accurately. They simply think that the implementation of the ERP is the same as spending money to purchase a set of office software, but they do not realize that the critical point of ERP is the management. Those recognition mistakes lead that many SMEs spend 90% of ERP project budget on purchasing full-featured ERP software systems, but ignore the needs of the enterprises themselves, ignore the personnel training and the adjustment of processes.

Secondly, SMEs have a poor comprehensive and accurate analysis of the feasibility and demand when making investment decisions on ERP, without considering whether they have the business conditions for implementing ERP or not and taking into account the actual needs of enterprises.

(2) The weak base of management

Because many Chinese SMEs are mainly transformed from family firms and township enterprises, the management base is relatively weak. Management system is not standardized. The ERP management theory is based on supply chain management. Supply chain involves the procurement, supply, finance, production and sales, etc. The lack of a good management infrastructure to ensure ERP implementation is fatal for the development of enterprises.

(3) The shortage of capital

First, the SMEs are short of capital supporting an ERP application. Enterprises not only invest a lot of software costs, hardware costs, but also invest a lot in capital in consultation and training; therefore invested capital is a serious shortage, which becomes one of the big issues in promoting the informatization of SMEs. Secondly, it is difficult for SMEs to collect money. On the one hand, SMEs lack a reliable security mechanism, which makes it difficult for them to get bank loans; On the other hand, because of not qualifying the standards of listed companies, it is also difficult for me to do financing from the stock market. Therefore the capital that SMEs use for the construction of informatization is limited.

(4) Poor educational level of workers and lack of professionals

Firstly, ERP requires innovative management thinking, reconstruction of business process, while the corporate management often restricted on the basis of original management mechanism, which resulted to misleading when enterprises embrace ERP. Secondly, enterprise business workers have poor training and deep understanding of the new management ideas and technical knowledge. Thirdly, because of "blurred" departmental walls (S.F. Huin, 2003), there are unclear duties in different departments of SMEs. The process of implementing ERP will involve the interests conflict of some departments, and even affect some staff positions. It results to impede the implementation of ERP and eventually leads to the failure of the ERP implementation. ERP requires interdisciplinary talents who both have knowledge of computer technology and business management to manage, maintain and secondary develop the systems.

(5) Deviations for expected ERP return on investment

Some SMEs think that ERP is omnipotent and all the business problems can be solved through the implementation of ERP. In fact, ERP is trying to solve the most core issues which are resource allocation, efficiency and the resulting costs during the business competition. But it cannot solve all the problems of enterprises, such as corporate strategy choice, corporate finance, and shaping of corporate culture.

(6) ERP implementation cycle is too long and lacks effective project management

ERP implementation is a complex project, including not only software configuration, network construction, but also involving a business management mechanism. Because of a long construction period, large capital investment, and no immediate benefits, those are very negative for SMEs. It will increase the business risk and project implementation costs. Moreover, many SMEs do not realize the complexity and systematic of an ERP project and are short of effective project management, which results to delays in the progress of ERP project and the budget exceeded. Therefore, in order to improve the success rate of ERP implementation for SMEs, correct implementation principles must be formulated and the appropriate model in accordance with the company's own characteristics and needs must be choosen.

4 THE BASIC PRINCIPLES OF ERP IMPLEMENTATION AND APPLICATION MODE FOR CHINESE SMES

The key point of ERP application in SMEs is the implementation process. Therefore, according to the current status of ERP application and existing problems, SMEs need to formulate the right ERP implementation principles and select the appropriate ERP application mode.

4.1 The basic principles of ERP implementation for Chinese SMEs

The ERP applications of Chinese SMEs should be based on their needs and capabilities. During the process of implementation, some SMEs may start with logistics, financial, and gradually extend to human resources, production, quality management, supply chain management and other systems, and finally construct the information system which covers all aspects of business. Other companies may choose complete ERP products. They first build the entire enterprise information platform, and then deepen each subsystem level in the future. Summarizing from those mentioned above, the principles are provided, which include three stages: the overall plan, step by step, and focusing on breakthrough" principles. The details will be explained as follows:

(1) The overall plan

The overall plan is the choice of ERP products which should fully cover the application needs of enterprise, full-featured, advanced technology, fully coordinated to ensure a reliable operation planning. The main purpose of business is profits; business activities should take into account the company's business objectives, and there will be costs and business results. Therefore, different

business activities such as finance, production, supply, marketing and the ERP system modules should be considered adding into financial data, finance is the center of the business.

Operations planning and execution run through the whole process of the ERP system, so the business process of each ERP module should focus on planning, which includes a business plan, a marketing plan, a production plan, a capacity a requirements plan, a material requirements plan and procurement plans.

Supply chain management, production management and financial management are the mainstream businesses of small and medium manufacturing industries. Therefore, the design and implementation of ERP should focus on those three lines. Supply chain management is the backbone of logistics business, which deals with the entire process from supply of raw materials to stock and sales. Inventory management is the core. Production management is the main part of manufacturing operations including production planning, equipment, personnel and other resource utilization, standardizing the manufacturing route and quality control, etc. Financial management is the key point of ERP integration and the embodiment of the end results for business activities of an enterprise.

(2) Step by step

Step by step is first identifying the most important business part of enterprises to implement ERP. During the implementation of ERP, the standardization degree of financial and logistics is higher, and those two are also easier to implement, which can solve the outstanding problems in the management process. Therefore they can be implemented first.

(3) Focusing on breakthrough

Starting with the most basic financial management system, as the financial software has been developed in China earlier. At present, Chinese financial management informatization is in the stage of large-scale developing and using "managed" financial software. The financial system is relatively fixed and the software system has been very mature. So focusing on the promotion of financial management system in SMEs is basically no risk.

4.2 The ERP application model for SMEs

Combining the characteristics of SMEs and problems occurred during the ERP implementation, SMEs can choose the following implementation modes according to their own characteristics and needs.

4.2.1 Outsourcing Model

Those SMEs which have good financial strength and technological power and at a high stage of development can embrace outsourcing model. They purchase ERP solutions from professional software vendors at home and abroad to be implemented in their enterprises. Currently, in the ERP software market, according to the characteristics and business requirements of SMEs, the status of capital and technical strength, many domestic and foreign professional ERP software vendors have introduced the ERP solution for SMEs. SMEs just need to pay a few million dollars; they can have a powerful ERP system which covers financial management of the enterprise, procurement management, production management, etc. In the current ERP software market, the mainstream ERP solutions for SMEs include: SAP

Business One of SAP Company; E. Business Suite Special Edition of Oracle Corporation; U860 of UFsoft Company; K3 system of Kingdee Company, etc.

(1) SAP Business One

SAP Chinese Company launched SAP Business One in September 2003, which aims to provide solutions for Chinese SMEs and help companies to accelerate the process of informatization and get the benefits of information technology.

In the aspects of functional design, implementation and cost control, SAP Business One takes full account of the weak financial strength, shortage of effective sales management, inventory management . The program is flexible and easy to implement, which can meet the requirements of sustainable development for SMEs.

SAP Business One mainly has the following features: fully integrated business functions, fully satisfying the requirements of Localization, open interfaces; friendly user interface, flexibility in the application of CRM management, online warning, powerful reporting analysis tools and strong customization tools.

(2) E. Business Suite Special Edition

Oracle is the world's second largest software company and also one of leaders in ERP business. Oracle launched E-Business Suite Special Edition according to the needs of information management for SMEs in November 2002.

Oracle E-Business Suite Special Edition is specifically tailored for the growing enterprises, which covers financial, procurement, order management, inventory, customer relationship Management (CRM), and business intelligence.   It uses the way of pre-installation, pre-configuration and runs on the Oracle database and

application server. Oracle E-Business Suite Special Edition extends the solutions of a great deal of successful experience in the mature enterprises to the growing enterprises. It solves conflicts between, for example, maturity and scalability of products, return on investment and risk, during the informatization construction of SMEs.

(3) U860 of UFsoft Company

UFsoft Company is the leader of domestic ERP vendors after nearly ten years of development. It accumulated 300,000 users in Chinese ERP market. It was launched U860 in November, 2004.

U860 system includes the following products: enterprise portals, financial accounting, management accounting, CRM, supply chain management, decision support, human resources management, office automation, group applications, and enterprise application integration. It centers on the idea of integrated application and management, which improves the core application of manufacturing and adds features of supply chain management and manufacturing analysis. At the same time, U860 further deepens the function of human resources and office automation, and integrates customer relationship management. It improves the external interface and internal application platform. U860 provides a management model which effectively integrates different resources and associated businesses.

(4) K3 system of Kingdee Company

K3 system uses self-developed advanced middleware technology to make ERP implementation as a building block which generally is free to mix and achieve rapid design and optimization of business processes. At the same time, through comprehensive management, flexible business adaptability and strong business

expansion and other characteristics, K3 system can effectively help enterprises to build a comprehensive enterprise performance management. It can also improve strategic business management for growth enterprises.

4.2.2 Customization

There are various types of enterprises, but it is impossible to find one kind of software which can fully cover all of their business processes and handle business-specific matters. Therefore, some SMEs whose business process is special and which have a certain financial strength and technology support, can choose customization. It means that enterprises can authorize professional software vendors to develop ERP systems according to the specific needs of enterprises.

(1) The advantages of customization

ERP Customization for specific industry meets the individual needs of enterprises; therefore, it has targeted, convenient, good service, scientific management and other advantages. During the development period, the informatization is needed badly. It can only develop the necessary function modules to make ERP systems more focused. Meanwhile, the custom development can be combined with the optimization and reorganization of the business process. In that way, this ERP system is more convenient to use.

(2) The disadvantages of customization

There are also some problems linked with custom development. Long development cycles, high costs, advanced ERP management concept is hardly accepted by enterprises. As customization should do personalized designs according to the actual needs of the enterprises, the period of design and implementation is

long. A lot of manpower and material resources are needed to complete it. At the same time, due to longer time-consuming, companies cannot get the benefits and rewards in short-term. Therefore, business leaders may doubt the solution during the process of implementation, which might affect the investment in financial, human and material resources. Custom developed ERP software is highly specific but less versatile, and therefore the ERP vendor must up to date with the latest software developments.

4.2.3 ASP model

ASP (Application Service Provider) model is suitable for SMEs which lack funds and technical support while have the urgent need of information management.

(1) The history and principle of ASP model

ASP concept was first put forward in the United States in 1999. Initially it was developed for SMEs which desire for information management but lack the capital needed. SMEs implement information management through hiring ASP's computer and software systems directly. In this way cost saving are reached and also the possibilities of informatization increase.

ASP uses the facilities of centralized management to provide customers with application deployment, leasing, hosting and outsourcing services. ASP installs a variety of application software in the internet data center (IDC) or server clusters. The functions of application software and services based on these functions through the network are provided to users according to the form of monthly fees or usage-based fees. ASP is responsible for managing, maintaining and updating these functions and services. Customers provide some or all of their authorization related to business processes to the application service provider, and provide

relevant business data.　All of these service deliveries are based on the network; customers will access these services via a remote network.

(2) The advantages the ASP model to SMEs

ASP model is an effective way to solve the problems of SMEs informatization. Its advantages are in the following areas:

i.　Reducing the initial investment and facilitating the cost control

By adopting the ASP model, the costs of enterprises in the IT area can be controlled. Enterprises should not bear the costs of the software and hardware installation, purchasing and upgrading, the huge communication costs and professional development and maintenance costs, but only pay to ASP service providers in a form of a monthly fee, which reduces the software and hardware investment cost of the enterprise.

ASP is a very suitable option for SMEs which need e-commerce but are short of capital. Enterprises do not need to have separate IT departments, because the hardware system is more durable, maintenance and optimization of the software system is the duty of ASP companies. It can reduce the large costs of system maintenance. At the same time, enterprises can save a lot of capital by investing in the area with the greatest competitive advantages and accelerate business growth.

ii.   Flexible to meet customer needs

At present, the characteristic competitive services, to some extent, influence and decide the competition between the enterprises. It leads to the need of having unique personalized services during the process of enterprise e-business, for example, web interface style, business process reengineering and optimization. These personalized services are likely to come from their existing information systems and may also be made in accordance with changing in the market and new services.

The systems companies already have, ASP can rebuild by using Web services technology to move local area network to Internet. Enterprises not only save costs and shorten response time, but also can use this special service without geographical restrictions. In addition, the market is constantly changing, so enterprises hope e-commerce services can also change. According to this, ASP can use their technology and successful development experience to customize services for enterprises. Most of the services developed by ASP are the basis of modern commercial standards, and designed by the IT experts, so the services are available and reliable.

iii.   Meeting the needs of remote offices for distributed companies

In an increasingly business competitive society, the largest characteristics of the environmental application of ASP are universal, that is, as long as accessing the Internet, we can enjoy efficient services provided by ASP. An ASP centralized data system can make enterprises enjoy the commercial software through the online mode, which meets the business interaction and information sharing at any time.

iv.   Reducing the burden on enterprises

ASP not only can provide management consulting services, but also can make a strategic analysis report for SMEs through customer data. Therefore, ASP allows SMEs to keep pace with market and technology trends to seize opportunities. In addition, ASP services can provide a better e-business environment for enterprises. During the construction of information systems in SMEs, because of scale and investment limitation, many SMEs may not take backup and disaster recovery measures. However, ASP service providers are able to offer the public a disaster backup system, or even provide enterprises with large-scale storage networking and data center technologies to enable enterprises to enjoy the best professional information services.

(3) Barriers of the ASP model implementation for SMEs

The implementation of ASP for SMEs will bring many benefits, but it will also face some obstacles, mainly in the following areas:

i.   Security and reliability issues

The major challenges of ERP implementation which is based on an ASP model are information security issues of the enterprise. Most of the SMEs are afraid that the important information and data in ASP data center will leak or be lost. In general, ASP application services products are all placed in the ASP data center for customers use at any time, enterprises worry about damage to sensitive information. Who is responsible for the safety of ASP service is also a big question. About reliability issues, ASP providers must give their customers nearly 100% uptime and network reliability.

ii.   The concept issues of enterprises

Many business managers think that the ownership of hardware and asset is very important. ASP business model has changed these concepts. Abstract information and the business process of software representation become more important than having the hardware. At the same time, enterprises are anxious for outsourcing critical business data to third-party management and storage.

iii.   Quality of service and support

Service quality agreement signed by customers and ASP applications stipulate that the ability of application must be reached to provide the range of services and performance standards. The scope of services and service flexibility often conflict. As enterprises require ASP to meet their unique needs (such as customization), ASP had to face more serious challenges. The key and core of ASP are the software applications. Enterprises appreciate ASP because of its professional software services, but Chinese software has been relatively weak, most applications simply cannot adapt to network environment. In addition, software piracy is rampant in Chinese software industry, which no doubt also damages ASP industry.

iv.   Infrastructure factors

The reality of the domestic network infrastructure, including bandwidth, speed, stability are still far from ideal, in that case, enterprises may not entrust their management work to the network. Therefore, when SMEs choose the ASP model, they should select ASP partners carefully. They should focus on understanding the procedures provided by the ASP application and service types of the facilities, take into account the stability, growth, and network communications capabilities and data security of ASP.

4.2.4 The combination of outsourcing and customization platform pattern ERP

Some functions of the outsourcing model cannot meet the special needs of SMEs. The customized models are high cost. There are certain risks in the stability and data security of ASP. In order to evade those problems, Chinese SMEs can also adopt the combination of outsourcing and customization platform pattern of the ERP model.

At present, basically there are two platforms: one is based on rapid development purposes, the technology platform which provides complementary development tools. The other is the management platform which is based on the technology platform. The design idea of combination of outsourcing and customization platform-based ERP is "customer focus ". The product architecture is very flexible and enterprise users can very easily make changes on the condition that the main frame does not change. Enterprises can easily meet their changing business processes with the support of this platform.

Compared with the traditional secondary development of ERP, platform-based ERP has the following advantages:

Table 1. Comparison between Traditional secondary development and Platform-based ERP development

Traditional secondary development	Platform-based ERP development
Low efficiency, a large number of duplicate codes to compile.	High efficiency, visualized process, nearly zero code development.
Difficult to learn and operate	Simple operation
The system of secondary development cannot be upgraded to a common ERP system, code almost needs to be re-developed if it is upgraded.	It's easy to upgrade and maintain, saving costs.
Poor integration, resulting in duplication of investment.	Strong integration, lower cost of business investment.
Poor scalability, the system extensibility is low after changing the business process.	Strong extensibility, supports for business process changes and adjustment.
Higher development costs and higher costs of changing.	Lower development costs and lower costs of changing.

SMEs which have a strong technical development force can choose a platform-based. Because the platform-based ERP only provides a standard framework of ERP to enterprises, enterprises make personalized development based on that framework. Some SMEs with informatizatoin power a relatively weak cannot adopt this model.

4.3 Analysis of ERP Software Selection for Chinese SMEs

The domestic and foreign well-known ERP software vendors have focused capital and technology on developing a variety of general ERP products for SMEs. In order to save time and costs, most of SMEs choose an outsourcing

model. Therefore, here a brief analysis of ERP software selection for outsourcing model is given.

For many SMEs, because of mistakes of software selection in previous work, there is a failure in the implementation of ERP. If SMEs want to ensure a successful ERP implementation, enterprises should first ask themselves following questions. What kind of business and what types of production they belong to? What kinds of problems exist in the management? What goals do they want to achieve through the ERP implementation? Then the enterprises should know what are the major ERP software vendors are. What are main functions of ERP solutions? Whether they can meet the needs of the enterprise or not, as well as the reputation, service and support of ERP software vendors.

4.3.1 Making clear the goals of ERP implementation

The decisions of SMEs should be based on their own development strategies and goals to determine the goals of ERP implementation, and thus select the appropriate ERP software. The simplest way of defining goals of ERP implementation is to find what problems enterprises want to solve through ERP implementation. For SMEs, the company's top leadership must be involved in the selection work and ERP implementation must be considered as the "number-one project." If top leaders do not participate, it will be difficult to combine the objectives of ERP implementation with business development strategies.

4.3.2 Determining the direction of ERP Software Selection

Before the formal selection, enterprises should assess the infrastructure according to the objective of the ERP system and combine with the management

needs and problems. For SMEs, if they have not become a fixed pattern in fixed pattern, they should consider small and medium software as the main target. For those SEMs which are still at the initial stage or wish to improve the management through ERP adoption, if they focus more on production and planning, small and medium software of foreign vendors are relatively reliable. If the business focus is sales, deposit and financial aspects, the domestic software already has a strong capacity and the advantages of localization and they are easy to maintain.

4.3.3 Selection of ERP software

After determining the direction of ERP software selection, the enterprise can contact product suppliers. They can choose several major ERP vendors and propose the needs so that vendors can provide solutions. According to their own business needs and scales, enterprises can comparatively analyze the performance, price, service and other factors of ERP to select suitable models. The evaluation criteria of the ERP software are as follows:

(1) Features of software.

Enterprises should consider whether the software can meet the needs of the enterprise's management or not, in particular some special needs. In general, the functions of ERP software are generally acceptable, but the software cannot take into account the individual needs of every enterprise, so secondary development is very important. In that case, enterprises should not only understand the basis of software functions, but also know about the possibility of secondary development and its scope, cost, effects, etc.

(2) Maturity of software.

Enterprise could examine the history of the software business, the number of customers and test the demo version of the supplier.

(3) Scalability of software.

Software scalability is reflected in three aspects:

i.   Providing a flexible and complete solution

Enterprises can select step by step from simple to complex manufacturing production control systems according to their needs.

ii.   Integrated enterprise-class comprehensive solutions

Based on existing solutions, enterprises can easily extend to e-commerce, office automation, customer relationship management, supply chain management and other integration applications, and all these solutions are seamlessly integrated.

iii.   Secondary development platform

During the process of project implementation and operation, enterprises can add different special applications into the system. Software is easy to use and maintain.

(4) The human degree of systems

For example, the case of Windows operation, graphical interface features (such as graphical process definition, permission settings, bill of materials, etc.), and integration of desktop major applications (such as the Office suite, outlook exchange and other mail system integration, etc.), convenient interface and menu design capabilities. All of those mentioned above make the operation simple and easy to learn.

5 CASE STUDY

5.1 Case study from the user's aspect

Wei Chao Machinery Mould Co. Ltd implemented ERP system in 2008 and achieved good results. This case is introduced here and an analysis of ERP application mode, implementation methods; effects after implementation is given, which can provide a reference for other SMEs which intend to implement ERP.

5.1.1 Introduction of the enterprise

Wei Chao Machinery Mould Co. Ltd was established in 2002, has currently 300 employees, and annual sales are USD $ 5.4 million. It is a typical SME. The enterprise integrates design, manufacturing, sales and service with advanced production and processing equipment such as computer controlled injection machines, numerical control spark machines and large radial drilling machines. This enterprise has design, manufacture, production technology and strict quality guarantee system. The main products are metal mold of auto parts. Because of the durable and reasonable structure, reliable quality, the enterprise has won widespread good reputation and trust of customers.

5.1.2 Problems during the development of the enterprise

(1) Product design is not standardized

The traditional way of mould design is as follows:

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┌──────────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│ The   initial│──▶│ An   overall │──▶│ Plan         │──▶│ Manufacturing│
│ design       │   │ plan         │   │ inspection   │   │              │
└──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘
                                                                  │
                                   ┌──────────────┐   ┌──────────────┐
                                   │ Repairing    │◀──│ Testing      │
                                   └──────────────┘   └──────────────┘
```
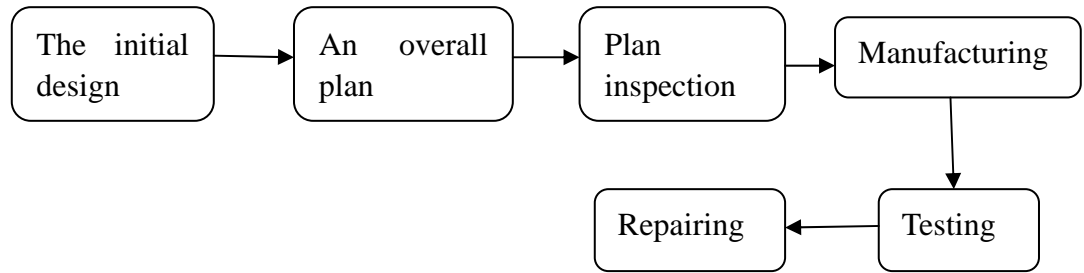
This traditional serial design process cannot take full account of the various requirements such as manufacturability, maintainability, safety and quality assurance, which leads to the long period of products development, high costs and products obsolescence. In the enterprise, computer information integrated technology which is based on concurrent engineering needs to be developed.

(2) Production and management plans are not accurate

The enterprise lacks an effective operation management system and support of information platform technology, which influences the mould production and extends the period of mould manufacturing. Meanwhile, blind procurement leads to overstock, financial budget and report is not accurate.

(3) Price and cost accounting is not accurate

Mold quotation and cost accounting are not accurate, the sales staff and designers of the enterprise only use their experience by considering the factors of design and manufacturing to produce a rough estimate. However, cost control is the key point of enterprise management, which reflects the core business competitiveness. At present, the mold die industry is under heavy pressure of lower and lower prices. Cost management is not accurate, which hardly reflects, analyzes and controls the production and economic benefits.

(4) Low degree of information sharing

Product data is stored in each discrete isolated computer systems and management of technical documents is the paper at hand. The enterprise is short of prompt and effective search tool. Low levels of product data sharing and slow information feedback result to repeat design in many similar parts of products, which affects the product development cycle, development costs and profits. As the low degree of information sharing, business contacts with customers and suppliers are not convenient. There is no effective way to support the dynamic alliance of manufacturing model.

Those problems mentioned above limit the development of enterprises, seriously affect the business efficiency and competitiveness. Therefore, how to shorten the product development cycle, reduce production costs, and improve management efficiency has become an urgent need in solving business problems. As described in section 3 of this paper, these problems can be solved through the implementation of an ERP system.

5.1.3 The enterprise solution

In order to solve the problems mentioned above to, improve the level of management, the top leaders of Wei Chao Machinery Co. Ltd decided to implement ERP systems in 2007.

Before the implementation of ERP systems, the enterprise made full preparations. First, the executive leadership fully realized the importance of ERP system applications. At the same time, they drew personnel from all key positions to set up an ERP project team and invited the consulting company to train all employees about ERP knowledge. Second, the ERP project team made clear the needs of the

enterprise, conscientiously carried out the research work within the enterprise and listed various process problems in the enterprise. After fully knowing the problems and needs, the enterprise decided to purchase the product which has good versatility and compatibility to achieve information management. Through implementation approach of the "step by step", gradually testing whether ERP functional modules are applicable to the enterprise or not, the enterprise can obtain the best return on investment.

Through careful consideration, Wei Chao Machinery Co. Ltd finally selected Digital China as a partner. Digital China ERP software use the latest software component technology and master-slave distributed processing structure of multi-layered, and combines the process control technology of a dynamic business process. It covers the distribution management, inventory management, manufacturing management, financial management, human resources management, quality management and decision support, etc.

5.1.4 The ERP Application of the enterprise

(1) Standard enterprise management

After improving the cost management, the enterprise clearly masters the dynamic information of material, labor and capital during a production process. Through flexible cost management models in the system, the enterprise can accurately know the cost structure of each product, which not only makes the sale strategies more flexible, but also avoids the workers in the business sector does not understand the actual cost of products resulting to zero or negative profit.

(2) Overall enhancing the efficiency of the enterprise management

An ERP system can track and control the whole procurement position, business conditions and production schedules, and then generate data to help the enterprise to optimize inventory management. In the information system, through project planning and process control, the enterprise can manage the entire life cycle of mold production. Production line managers directly feedback the actual progress of mold production, the system faithfully monitors the progress of every task in the project. ERP fulfills the data integration of all departments; logistics and cash flow also achieve consistent dynamical control, which can strongly support business decisions.

(3) Effective control of operating costs

Information system can make planning costs for molds, which is based on cost estimation when the order is issued within the company. There is an early warning of costs set up in the system to monitor the cost elements, which can effectively control the costs to ensure profits target. When the mold materials are issued, the system can compare the differences between the total cost of materials and program designed material cost, and then the enterprise can decide whether to issue or not. In the process of materials procurement, the system can compare the difference between the final prices and planning prices to effectively control the cost of procurement.

5.2 Case study from the vendor's aspect

In the first part of the case study, the ERP implementation is presented in one of the Chinese SMEs, from the aspects of ERP application mode, implementation methods and effects after implementation. Here, one Finnish company, MHG System Ltd is discussed, from the ERP vendor's perspective.

5.2.1 Background of MHG System Ltd

MHG Systems Ltd is the supplier of bio-energy ERP systems. MHG ERP is based on ASP model to provide services, users do not need to install a large software system, do not need to invest money to buy hardware. All services are available online through the network. Compared to a traditional ERP, MHG ERP only focuses on bio-energy industry and forest industry, which is based on the raw material flow from the source-to-end supply chain management and takes into account the traditional ERP Invoicing and financial functions.

MHG system is like a multi-module optional transformer. From figures 4 and 5 below, there are different functional modules to manage different services, such as map, power, forest, mobile, pellet, recycling, plantation, terminal, invoicing and accounting and so on. Customers can select modules entirely according to their business need, and they pay only the license cost of modules which they use.
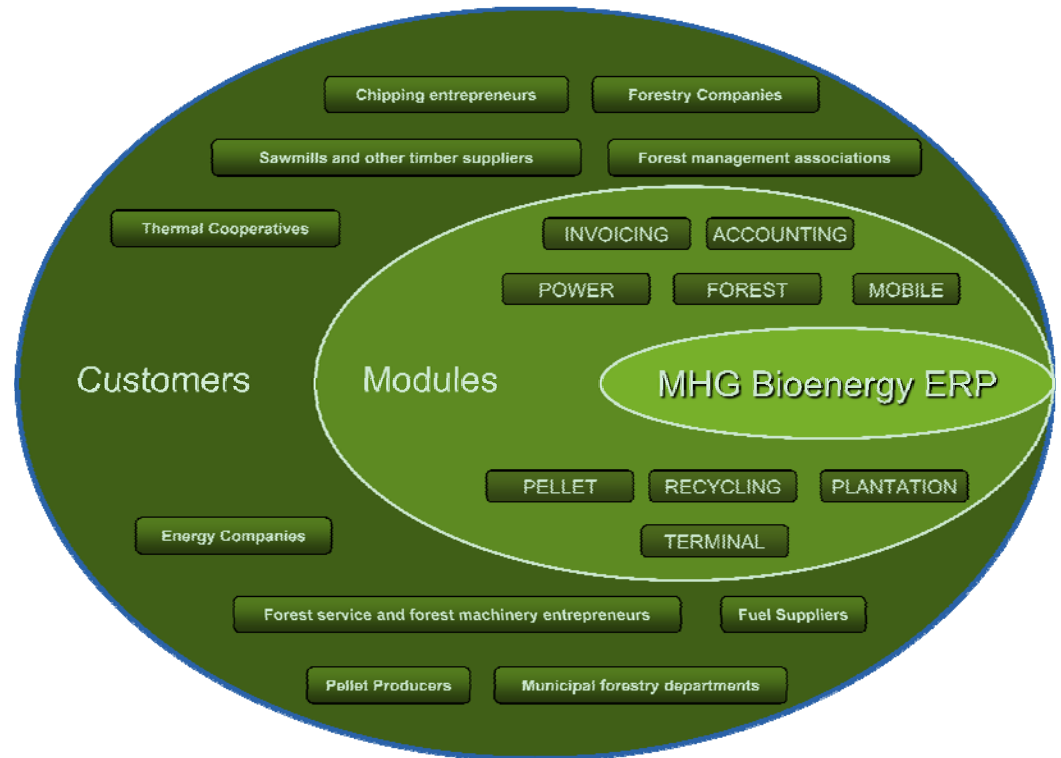
Figure 4. Onion Structure of MHG Bio-energy ERP and targeted customer groups. (Source: MHG System Ltd Business PowerPoint 2010)

Figure 5. Modules of MHG Bio-energy ERP. (Source: MHG System Ltd Business PowerPoint 2010)

As an ICT (Information and communication technology) solutions provider in bio-energy industry, in addition to the MHG ERP network software, MHG also provides consulting, training services and related equipment. With the help of a network or face to face training to customers, they will have a better understanding of the services. Apart from software training, MHG also provides the forest owners with moisture testers, handheld PDAs (Personal Digital Assistant) or mobile phones which build MHG modules and trucks RFID (Radio Frequency Identification) positioning systems and other hardware devices for the transportation contractor. These devices give a guarantee for customers to obtain more accurate data on the biomass flow.

The headquarters are in Mikkeli, Finland. Now the sales teams are already working in Helsinki, Madrid, Bucharest and Philadelphia in a global level. In 2008, MHG faced the biggest crisis; however, the company overcame the crisis by putting more efforts on the services and cooperation opportunities. Currently, the company is talking with two Chinese partners UFIDA, INSPUR and some other ERP vendors about co-operation.

5.2.2 The advantages of MHG in China

(1) The bio-energy industry in China is at an early starting stage

Currently in Chinese bio-energy industry, ERP implementations are mainly at electricity power industry and coal industry, and there is still much room for growth. Many of Chinese ERP vendors, for example UFIDA，largest ERP software vendor in China，still focuses on the optimization of internal resources allocation, the primary business processes management and controlling, which is more suitable for

manufacturing industry, but does not match the specific requirements of energy industry. For energy field, ERP software is needed to focus more on the raw material flow from the source-to-end supply chain management and higher level of customization. The bio-energy industry is at an early starting phase, there has not been a well adopted bio-energy ERP system until now in China. It is evidently that China will import advanced technologies. Therefore, there is a good chance for MHG to do some pilot projects with Chinese partners. It is a way to obtain the advantage of early entry and lay a solid foundation for MHG's further development in China.

(2) Targeted service, Professional knowledge background.

Although there are many software vendors claiming to be ASP providers, very few of them can provide ASP services. The application services they offer have limitations in a large extent, just the basic services like email, website, human resources, but rarely relate to business critical applications which enterprises mostly need. MHG is different from other ASP providers, which provides more targeted ASP services, specifically for the development of IT solutions for bio-energy industry. MHG has a team of senior industry background; they have bio-energy industry business experience, understand the operations on the entire process chain to help MHG improve its various modules. MHG is also supported by a strong technical team, which integrates advanced technology into different modules, such as mobile solution, digital maps, CO2 tracking, 3rd party IT / ERP Integration. All of those make MHG more competitive in the Chinese market.

(3) Solving the problem of large one time investment, reducing the cost of users in IT support.

An easy and quick implementation of services is necessary in the modern

business world today. It is important to be able to react quickly to the growing and changing needs of the customer. MHG Systems offers its services as a Cloud Service. Cloud Services prevent problems that occurred when the service was suddenly used more by an increased number of users amount or increased number of simultaneous users of the service. Cloud Service doesn't require any expensive hardware purchases from the customer. Also the customer doesn't have to worry about hardware or software upgrades or maintenance. It is the job of MHG to ensure that the customer always has sufficient server resources and the newest updates. In short, Cloud Services offer customers with more flexible ways to work.

(4) Customer Priority

The Starter Package offered by MHG Systems, is an easy, affordable and risk free way of trying MHG service. With the Starter Package customers get to try how well the service meets their company's needs. The package has a fixed price and no license restrictions. Customers can test it with as many persons as they need. MHG can also set up a net meeting to demonstrate the service for customers.

5.2.3 The possible barriers of MHG development in China

(1) The shortage of forest resources in China

China has rich forest resources. Forest area and growing stock volume are ranked seventh among the world. However calculated by per capita terms, China is one of the countries which have smallest forest. According to statistics, the land area in China is 7% of the total world's land area, while the Chinese forest area is only about 4% of the world's forest area; forest volume is less than 3% of the world's forest reserves. The forest area of National average per capita is 0.12 ha; volume is 9.1 m3, but the world average is 18% and 13% respectively. China's forest coverage

rate is only 54.2% of the world in average. China's existing forest productivity is low. The situation about the shortage of forest resources in China cannot be changed for the long run.

(2) The risk of MHG technology leakage in China

MHG is a software company, technology is the core competence. However, as well known, piracy is rampant in China. Pirated software is popular even after Chinese government has been making great efforts to stop it. Hence, that is a critical issue for MHG to consider it before entering the Chinese market.

(3) The concept issues of enterprises

As the discussion before about the ASP model implementation in China, many business managers think that the ownership of hardware and asset is very important. ASP business model has changed these concepts. Abstract information and business process of software representation have become more important than having the hardware. The major challenges of ERP implementation which is based on an ASP model are the information security issues of the enterprise. Most of the SMEs are afraid that the important information and data in ASP data center will leak or be lost. In general, ASP application services products are all placed in the ASP data center for customers use at any time, enterprises worry about damage to sensitive information. Who is responsible for the safety of the ASP service is also a big question. At the same time, enterprises are anxious for outsourcing critical business data to third-party management and storage.

(4) Cultural differences

MHG ERP systems are designed in Finland. These systems reflect European industry practices. When these ERP packages are implemented in China where different cultures exist, it is likely that the ERP's underlying culture and business logic conflict with the local culture and business logic, will cause misfits which negatively affect the ERP implementation outcomes (Davison, 2002; Soh et al., 2000).

Networks of people are the basis of Chinese societies. Chinese people prefer to adapt to the environment rather than to seek for a scientific solution. Paternalism, personalism, and highlight in a face to face communication are the important elements in Chinese business culture. However, the Western culture is shaped by individualism, impersonalism, simple and direct way of communication (Martinsons and Westwood, 1997). In that case, the Chinese culture must be taken into account when investigating ERP implementation issues in China. The ERP systems needs to be localized to reflect the features of the local management (Liang and Xue, 2005).

5.2.4 Discussion of barriers solving

According to the barriers mentioned above, here an analysis of a possible way is given to help MHG minimize the barriers when entering the Chinese ERP market.

(1) About the security and reliability issues

During the promotion of MHG ERP systems in China, the company should highlight the safety and reliability of these systems. What kind of technology MHG used to support their customers nearly 100% uptime and network reliability and

how to guarantee data security. During the translation work of converting MHG website from English into Chinese, some detail description about the safety and reliability of MHG ERP systems cannot be found. We suggest that the company should emphasize that aspect in the front-page of MHG official Chinese website.

(2) About Localization

During the process of localization, MHG can make an effort in the following aspects.

i.   Product Localization

When doing the translation work of ERP system from Finnish into Chinese, the local culture and business logic should be taken into account. It is important to present more localized Chinese language in the MHG ERP system. In the interface design process, it is also necessary to consider the habits if Chinese customers. In a nutshell, MHG needs to be oriented by the logic mind of Chinese customers to design ERP systems which are suitable for Chinese Market.

ii.   Workers localization

Local people know more about the Chinese market environment and know more about the needs of Chinese customers. For every foreign company, if it wants to do business in China, it is essential to employ Chinese or people who have a Chinese culture background. At present, MHG's business in China is still in early stages, the company plans to find some appropriate agencies, through their existing people contacts and understanding of Chinese bio-energy industry, to define more business opportunities in China. But in the long run time, I think MHG needs to establish research centers in China and hire Chinese business analysts and software

engineers to improve its products.

iii.   Operation localization

To put it in a simple way, the company needs to handle business in China in accordance with the rules of the Chinese market. Those rules of Chinese market are not compulsory by law, but just to be followed within the industry as common sense. Chinese people said that those are "hidden rules" which represent the unique Chinese characteristics. Although those rules can be broken, and cannot be observed, even they seem to be incomprehensible for foreign enterprises, foreign companies will be having difficulties in further development in the Chinese market if they do not follow those rules.

6 THE CRITICAL SUCCESS FACTORS ANALYSIS OF ERP APPLICATION FOR CHINESE SMES

The critical success factor (CSF) is an approach to define the organizational information needs, which was advocated by Massachusetts Institute of Technology. Rockart defined it in 1979: In order to reach the goals of organizations or managers, the company must continue to pay special attention to some of the activities or work, which means that these key activities must operate in good condition (Rockart. J.F, 1979).

ERP implementation in Chinese SMEs can help enterprises to establish a stable, flexible and dynamic management system. From the view point of operating characteristics, many SMEs are in the changing process from the start-up stage to the development stage. In the start-up stage, the business is more focused on leading products and services, exploiting markets. In the development stage, market competition, quality assurance and the reducing costs is the core. ERP implementation can help enterprises solve the key issues of reducing costs and improving quality. Correct implementation of ERP can help SMEs to plan management mode, strengthen management practices and systems to achieve the timely monitoring of operating the business process. Therefore, there are critical success factors of ERP implementation in SMEs as follows:

6.1 Reasonable demand

Before ERP implementation, enterprises must be clear of the status of the operation, the purposes of the ERP implementation, which will help them to select

the appropriate ERP model. For some enterprises that urgently need to improve the management, the purpose of ERP adoption is to use software features to standard management. For some enterprises that have poor information management, internal statistics lag result to the wrong decision making, through the ERP information management improve the supervision and business management.

6.2 The concept changing

(1) Correct understanding

ERP implementation is not a simple construction of enterprise information management system. Through the enterprise information planning and combining the ERP integration with corporate strategies, enterprises can make clear the objectives at all stages and achieve long-term benefits.

(2) The involvement of corporate leadership

The involvement of corporate executives in the leadership of ERP implementation is the key to success, which has been generally recognized. This participation process cannot be simply interpreted as approval and signature, business leaders need to truly realize the importance of ERP. Leaders should base their strategic planning on corporate vision but not be committed to the enterprises' short-term benefits. Meanwhile, they should strengthen people-oriented management; the project structure and operating mechanisms should be established. ERP is a cross-functional engineering, the business process must be carried out by organizational restructuring and adjustment, which will inevitably cause transfer of rights and interests between difference departments, then that forces leaders to coordinate.

(3) All employees working together

Since the implementation of ERP inevitably results to the transfer of rights and interests between departments and while ERP implementation requires for a full participation of the management, all employees in all departments must work together.

6.3 A good basis of management

The basis of management involves many aspects, the more critical points are the following:

(1) The basis of business process

Enterprises which implement ERP do not build an information processing system, but update business management ideas, management models and restructure business process flows.

i.   Select opportunities for changing process

For SMEs, due to the constraints of management, process restructuring cannot start at any part. Therefore, first the enterprises must analyze all operational procedures, and then select most prominent part of problems to be reconstructed.

ii.   Select a scientific and rational restructuring method

According to the ideological essence of Business Process Reengineering (BPR), the implementation of BPR can be conceived as a three-dimensional form of a multi-level structure. The whole BPR implementation system consists of concept reconstruction, process rebuilding and reconstruction of organization.

(2) The data base

ERP system requirements for data base are integrity, accuracy, and reliability. Therefore, inaccurate and inconsistent data occurred in traditional manual data management must be abandoned. During the ERP implementation process 70% of the work is based on data collection, collation and application. Inaccurate data inevitably leads to inaccurate information. Accurate but not standard data can only be valid in the local area, it is difficult to transfer and share the data. Therefore, the data platform construction and standard unification have become necessary conditions for successful ERP implementation for SMEs.

(3) The basis of human resources

The basis of human resources includes the corporate staff quality, ability, sense of responsibility and a variety of human resources policies. An important issue during the ERP implementation process is computer operation training. Operational capacity, job understanding and learning ability are the critical factors affecting the success or failure of the implementation. Therefore, SMEs must pay more attention to the training of the staff and related personnel training. Business leaders must be clear first of all, what the ERP is, what ERP can bring. Meanwhile, general staff training is also important; they will be the daily users of ERP systems, their understanding of ERP and sense of responsibility are directly related to the success of ERP implementation at SMEs.

6.4 A right implementation strategy

Due to shortage of funds，it is difficult for SMEs to fully implement ERP system at one time. In that case, enterprises should develop a comprehensive overall planning to guide ERP implementation step by step. For example, Starting from those bottleneck business processes, enterprises should give priority to those demands which can significantly improve critical value-added activities. Firstly, a module or a sub-system is implemented, and then step by step implementation of other modules and subsystems is carried out. After a period of construction, enterprises can achieve a more comprehensive integrated ERP system. During that process, the staff of SMEs can gradually adapt to the working environment of information management. Since the implementation of ERP is under the guidance of the overall plan, the various modules and subsystems are run under the unified framework and they are fully compatible with each other.

If Chinese SMEs can taken into account the critical success factors mentioned above, they will be able to ensure the success rate of ERP implementation, which will effectively improve the confusion of management, high operating costs and low competitiveness in SMEs.

7 CONCLUSION

In order to ensure the success of ERP implementation at Chinese SMEs, this paper analyzes the following points:

(1) Making clear own conditions and needs of the enterprises

The problems of management in enterprises are multifaceted, but enterprises must be clear of the most important issues and strictly analyze business process in accordance with the requirements. At the same time, enterprises should determine the stage of informatization and decide the further task of informatization.

(2) Implementation of the ERP step by step

Enterprises should adhere to the basic principles of informatization: overall planning, step by step, approach focusing on breakthrough. Chinese enterprises identify that the financial management is the core business objective; business conduct is essential to achieve financial goals. Thus, SMEs must follow basic principles and combine them with the organizational structure in order to achieve systematic applications of ERP.

(3) Strict adoption ERP in accordance with implementation phases.

Fully preparing for each activity, enterprises must value the key elements analysis of the ERP model and focus on the key areas of ERP implementation to control the risks of ERP application.

Those points mentioned above have a practical significance in making a proper

EPR implementation strategy, choosing the right ERP application model and improving the success rate of ERP implementation at Chinese SMEs.

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ABBREVIATIONS:

APICS: American Production and Inventory Control Society. The Association for Operations Management is the global leader and premier source of the body of knowledge in operations management, including production, inventory, supply chain, materials management, purchasing, and logistics. (Source: http://www.apics.org/about/)

ASP: Application Service Provider.   An Application Service Provider (ASP) is a business that offers software services to customers, using computer networks and the Internet as the mechanism to deliver and manage the service.
(Source: http://compnetworking.about.com/od/internetaccessproviders/g/providers_asp.htm)

BI: Business Intelligence. Business intelligence (BI) refers to computer-based techniques used in spotting, digging-out, and analyzing business data, such as sales revenue by products and/or departments, or by associated costs and incomes.
(Source: http://en.wikipedia.org/wiki/Business_intelligence)

BPR: Business Process Reengineering. Business process reengineering (BPR) began as a private sector technique to help organizations fundamentally rethink how they do their work in order to dramatically improve customer service, cut operational costs, and become world-class competitors. (Source: http://en.wikipedia.org/wiki/Business_process_reengineering)

B/S: Browser /Server. In this structure, the user interface works to achieve through the WWW browser, very small part of business logic is achieved in the front end (Browser), but the main business logic is implemented on the server side (Server).

BOM: The Bill of Materials. List of all raw materials, parts, intermediates, sub-assemblies,

etc. (with their quantities and description) required to construct, overhaul, or repair something. See also bill of quantities.

(Source: http://www.businessdictionary.com/definition/bill-of-materials-BOM.html)

CCID: China Center for Information Industry Development. CCID is currently the largest group of IT information services in China.

CSFs: Critical Success Factors. Critical success factor (CSF) is the term for an element that is necessary for an organization or project to achieve its mission.

(Source: http://en.wikipedia.org/wiki/Critical_success_factor)

C/S: Client/Server. The client–server model of computing is a distributed application structure that partitions tasks or workloads between the providers of a resource or service, called servers, and service requesters, called clients.

(Source: http://en.wikipedia.org/wiki/Client%E2%80%93server_model)

CRM: Customer Relationship Management. CRM (customer relationship management) is an information industry term for methodologies, software, and usually Internet capabilities that help an enterprise manage customer relationships in an organized way.

(Source: http://searchcrm.techtarget.com/definition/CRM)

EDI: Electronic Data Interchange. Electronic data interchange is the structured transmission of data between organizations by electronic means. It is used to transfer electronic documents or business data from one computer system to another computer system, i.e. from one trading partner to another trading partner without human intervention.

(Source: http://en.wikipedia.org/wiki/Electronic_Data_Interchange)

ERP: Enterprise Resources Planning. ERP is a business management system that integrates all facets of the business, including planning, manufacturing, sales, and marketing. As the ERP methodology has become more popular, software applications have emerged to help

business managers implement ERP in business activities such as inventory control, order tracking, customer service, finance and human resources.

(Source: http://www.webopedia.com/TERM/E/ERP.html)

EC: Electronic Commerce. Electronic commerce, commonly known as e-commerce or e-Commerce, or e-business consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks.

(Source: http://en.wikipedia.org/wiki/Electronic_commerce)

Gartner: An information technology research and advisory company in United States.

ICT: Information and communication technology. ICT is often used as a synonym for information technology (IT) but is usually a more general term that stresses the role of telecommunications (telephone lines and wireless signals) in modern information technology. (Source: http://en.wikipedia.org/wiki/Information_and_communications_technology)

IT: Information Technology. Information technology (IT) is "the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunications".

(Source: http://en.wikipedia.org/wiki/Information_technology)

IDC: Internet Data Center. IDC is based on the INTERNET network for centralized collection, storage, processing and sending data to provide operation and maintenance of facilities, equipment and related service system.

MRP: Manufacturing Resource Planning. MRP is a method for the effective planning of all resources of a manufacturing company.

(Source: http://en.wikipedia.org/wiki/Manufacturing_resource_planning)

OA: Office Automation. Office automation refers to the varied computer machinery and software used to digitally create, collect, store, manipulate, and relay office information needed for accomplishing basic tasks and goals. Raw data storage, electronic transfer, and the management of electronic business information comprise the basic activities of an office automation system. (Source: http://en.wikipedia.org/wiki/Office_automation)

OLAP: Online Analytical Processing. OLAP is a methodology to provide end users with access to large amounts of data in an intuitive and rapid manner to assist with deductions based on investigative reasoning.

(Source: http://www.microstrategy.com/OLAP/)

PDA: Personal Digital Assistant. PDA is a handheld device designed to facilitate organizational ability from a mobile platform.

(Source: http://www.wisegeek.com/what-is-a-pda-personal-digital-assistant.htm)

RFID: Radio Frequency Identification. RFID is a technology that uses communication via electromagnetic waves to exchange data between a terminal and an electronic tag attached to an object, for the purpose of identification and tracking.

(Source: http://en.wikipedia.org/wiki/Radio-frequency_identification)

ROI: Return on Investment. A performance measure used to evaluate the efficiency of an investment or to compare the efficiency of a number of different investments.

(Source: http://www.investopedia.com/terms/r/returnoninvestment.asp)

SCM: Supply Chain Management. SCM is the oversight of materials, information, and finances as they move in a process from supplier to manufacturer to wholesaler to retailer to consumer.

(Source: http://searchmanufacturingerp.techtarget.com/definition/supply-chain-management)

SFA: Sales Force Automation. SAF automates business tasks such as inventory control, sales processing, and tracking of customer interactions, as well as analyzing sales forecasts and performance. (Source: http://whatis.techtarget.com/definition/0,,sid9_gci350521,00.html)

SMEs: Small and Medium Enterprises. SMEs are companies whose headcount or turnover falls below certain limits.
(Source: http://en.wikipedia.org/wiki/Small_and_medium_enterprises)

UI: User Interface. UI is the system by which people (users) interact with a machine.
(Source: http://en.wikipedia.org/wiki/User_interface)