

# **Research on ERP Application in China**

Project of Setting-up Finetech ERP System

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<p>Abstract</p> <p>ERP (Enterprise Resource Planning) is the most suitable management tool for enterprises to improve management level and core competitiveness. In western countries, the ERP is applied successfully and widely. For enterprises in China, especially SMEs, the results are often not satisfactory.</p> <p>Finetech Group, as a typical SME, urged a highly integrated management system to improve current business situation. The thesis target was to find scientific implementation method for Finetech and setting a successful example for SMEs in China. Based on the specific requirements of Finetech Group, the implementation processes were introduced and at last some essential measures to succession were classified.</p> <p>In the research process, many problems about management and operation process were discovered and resolved, which could be a part of pushing the development of ERP in China.</p>			
<p>Keywords ERP, SMEs, Core competitiveness, Implementation methods</p>			

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## 1 INTRODUCTION

### 1.1 Study Background

It has been over 30 years since China reform and opening-up, and China's exporting trade has been keeping a significant rate of growth. China, as one of the world's biggest manufacturing bases, possesses a bigger and bigger status of international trade. What is obvious to notice is that China's economy boomed as a leading country during decades. However, in the meantime, the enterprises, especially some SMEs, had been put into a battlefield with international companies and they suffered from an inferior position.

In China, the export of machinery manufacturing companies became the main force. With the rapid growth, some weaknesses have arisen as enterprise management cannot follow up with the growing scale of business due to the neglect of internal management and control. Most export enterprises are mainly SMEs whose scale is small, strength is not powerful, and the management level is limited. So obviously they don't have the ability to keep up with smooth development when they cannot be faced with some external factors' changing such as policy and market environment, which puts them in a passive situation.

To avoid this negative impact, these SMEs need to improve their own core competitiveness to update the management level. By far, in the history of enterprise management, informatization is the most profound change of enterprise management ideas and infrastructure, which will bring successful innovation and the development of management level. [1] Faced with fierce market environment, the frequent change of globalization management demands enterprises to react quickly. Enterprise management information system enhances the predictability and stability of the manufacturing and operating by collecting various information data on economy daily management activities. At the same time, it also helps enterprises improve their strain capacity to defend the capricious market environment and resist the risk of competition.

## 1.2 A Project of Finetech ERP System Setting-Up

### 1.2.1 Study Target

When the current economic globalization has become the main stream of world business and economic links between countries are increasingly getting close to being an organic integration, SMEs are faced with big and numerous opportunities as well as lots of pressure on management. With the fundamental changes have taken place in a competitive environment, enterprises have to choose from changing the existing management model to adapt to the world or being knocked out in fierce competition.

In China, SMEs started to learn and implement some management system to improve their competition. Undoubtedly, ERP system is the most advanced management tool that adapts to the world's economic integration, the development of management decision-making and enhancing competitive power. In the implementation process, the enterprises and executors were used to treating the analysis of the requirements and the final solution as the core point. However a successful project does not only depend on the carrying-outs and appropriate implementation, but also suitable process is the key. [2]

### 1.2.2 Study Content

The thesis will start with the ERP background like how ERP system grew phase by phase. After that, the implementation of ERP system in western countries and China are introduced. From the former cases, some problems in common level are specified. Then detailed information about Finetech Group and the reason why the Finetech group wants to set up an ERP are also included. The project will be introduced via project plan and implementation. At last, the conclusion of the thesis will be stated.

Based on the research on ERP system at Finetech, this thesis will analysis the implementation process deeply with knowing the ERP system's theory and conduction methods. It also could offer useful ideas and methods for other SMEs in China when they apply a similar system to reach enterprise management informatization.

In this paper, the general idea is combining the theoretical research and case analysis. Thus, the key to successful implementation of ERP and result will be defined based on a detail of project background study and the real situation of Finetech group.

## 2 ERP SYSTEMS

### 2.1 ERP Theory and Development History

#### 2.1.1 The Basic Concept of ERP System

Preliminary ERP theory was mentioned as a computer program for the first time in the 1990s when Mr. L. Wylie wrote an article named “**ERP: A VISION OF THE NEXT-GENERATION MRP II**”. It was accepted gradually and spread in the worldwide business field and now it turns out as one of the modern theories on enterprise management. Enterprise Resource Planning, as in short ERP, is a management platform offering decision and control measures for organization executives and staff by systematic management ideas based on information technology. [3]

ERP, as an integrated management system, which consists of enterprise management ideas, business processes, basic data, human resources, computer hardware and software, is a management pattern to improve the economic efficiency and profit. Its main purpose is to balance and optimize various resources such as material, finance, information and even time and space. In the meantime, it is applied to coordinate different departments in the firm and to carry out business activities in the marketing orientation. Overall, ERP is a program, firstly, and a fusion of IT and management ideas.



Figure 2.1 ERP main components [3]

## 2.1.2 ERP Development

The basic concepts of ERP grew up from MRP (Material Requirement Planning) to later MRP-II (Manufacturing Resource Planning). Afterwards, some ideas like JIT (Just In Time) and ASP (Advanced Planning Schedule) were mixed together. Thus, new style MRP-II was not used in traditional manufacturing factory anymore, and it was widely applied in different fields to improve management level.

The development history could be divided into five phases: Order Point Method, Basic MRP phase, Closed MRP phase, MRP-II phase and modern ERP phase.

### 1) Order Point Method

OPM started in 1930s and its main idea was that the manufacturing process makes a certain material inventory decrease to the preset amount point, the logistic department would make a new order fulfilling the inventory. With a look inside, OPM is a method coming from safety stock and the figure (Figure 2.2) below shows what is the reorder point.

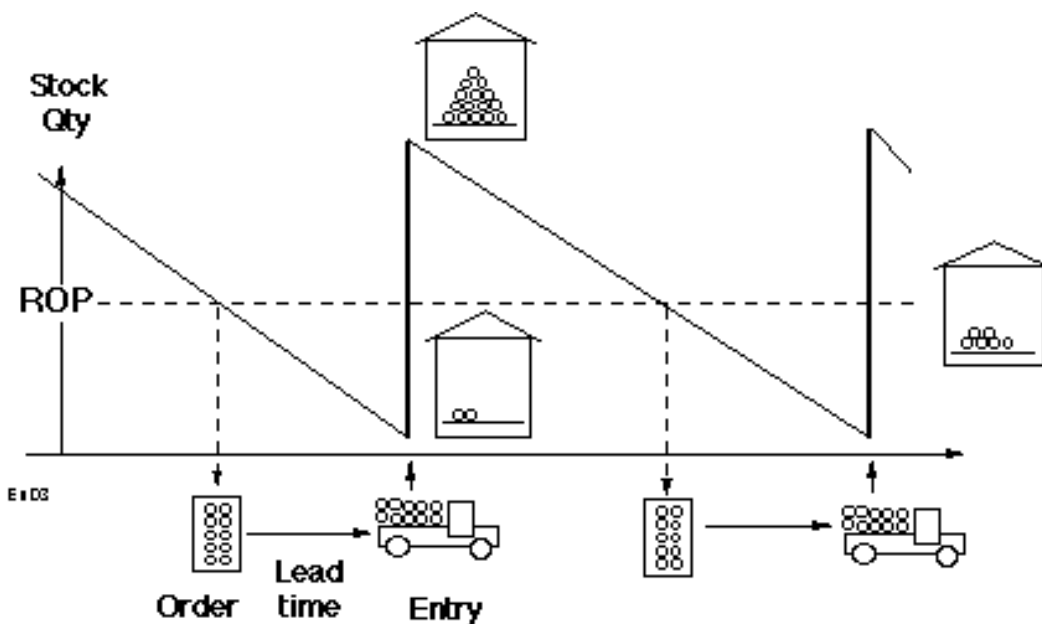


Figure 2.1.1 Reorder point [4]

Although OPM could keep a safety stock for factory, it may lead to an inventory backlog situation. Because when it comes to the reorder point, the factory may not get a new order at the same time. It is a waste of money to purchase and keep.



## 2) Basic MRP Phase

With the development of the computer systems in 1960s, it became possible that a large quantity of data is calculated in a short time. And based on OPM, MRP gives a solution to the reorder point. The APICS gave a definition to MRP which is that with a combination of main production schedule, material requirement list, inventory record, uncompleted orders and so on, it will figure out the requirements of various related materials, propose some suggestions about making some new material orders and modify and coordinate orders. [5]

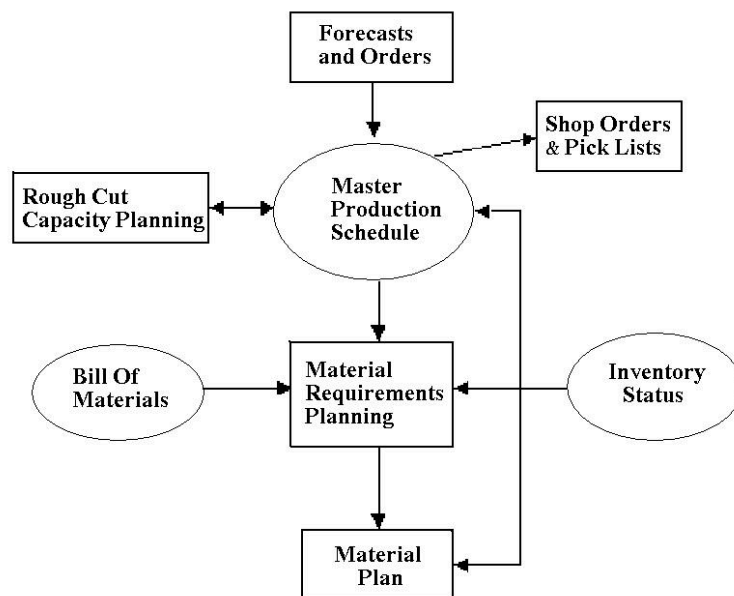


Figure 2.1.2 MRP structure [6]

The main target is reducing and optimizing the inventory at a lower variable cost, which is the core idea of ERP.

## 3) Closed-Loop MRP

Normal operations of MRP system need a realistic prominent production plan. Not only does it reflect market demands and contract orders but also satisfies the constraints of enterprise production capacity. Therefore, basic MRP system took a further step to contain the requirements, execution and control plans, which form a closed loop. So in other words, it emphasizes the more attention to the control of both input and output.

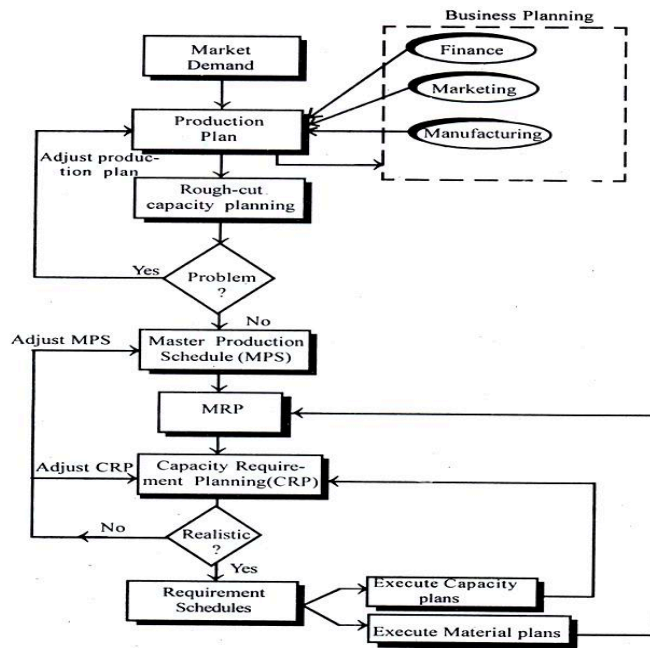


Figure 2..1.3 Closed-Loop MRP [7]

4) MRP-II

People added some manufacturing operations like marketing, accounting, financing and engineering technology into closed-loop MRP in 1980s. MRP-II could help enterprises to use various resources effectively, control capital taken-up, reduce production cycle and achieve the overall optimization and occupy the market with the best products and services.

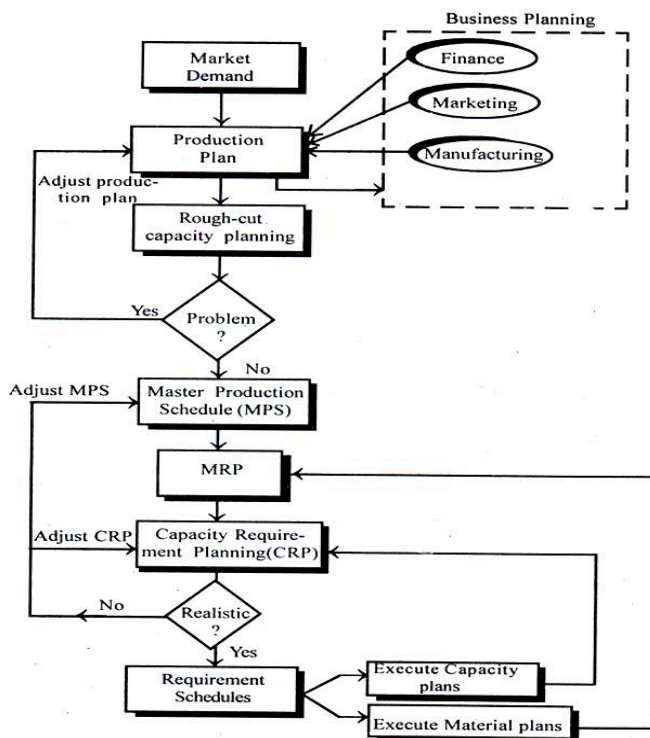


Figure 2..1.4 MRP-II [7]

## 5) ERP formation

In 1990s, with the development of IT, it is the constant penetration to production and inventory to control a more efficient. Accurate data-analysis ability was needed to solve some problems that were caused by massive information from inventory and production control and resource management. Apparently, traditional artificial management methods could not keep up with these and the enterprises could only rely on computer systems, thus a new generation of management theory- computer system unit came out.

ERP system was developed based on MRP and MRP- II with extra financial accounting and controlling. ERP got supply chain management into the system as well. A report in 2000 written by B. Bond, who is the vice president of Asia- pacific region of Gartner, indicated two points about ERP modern concepts: the first one is the concept of 'collaborative commerce' and another one is that realizing the collaborative commerce needs technical conditions of the 'enterprise application integration, EIA'. Briefly, enterprises are trying to find the best location in supply chain and value grid. So the next generation ERP should support enterprises' operating in an e-commerce environment. [3]

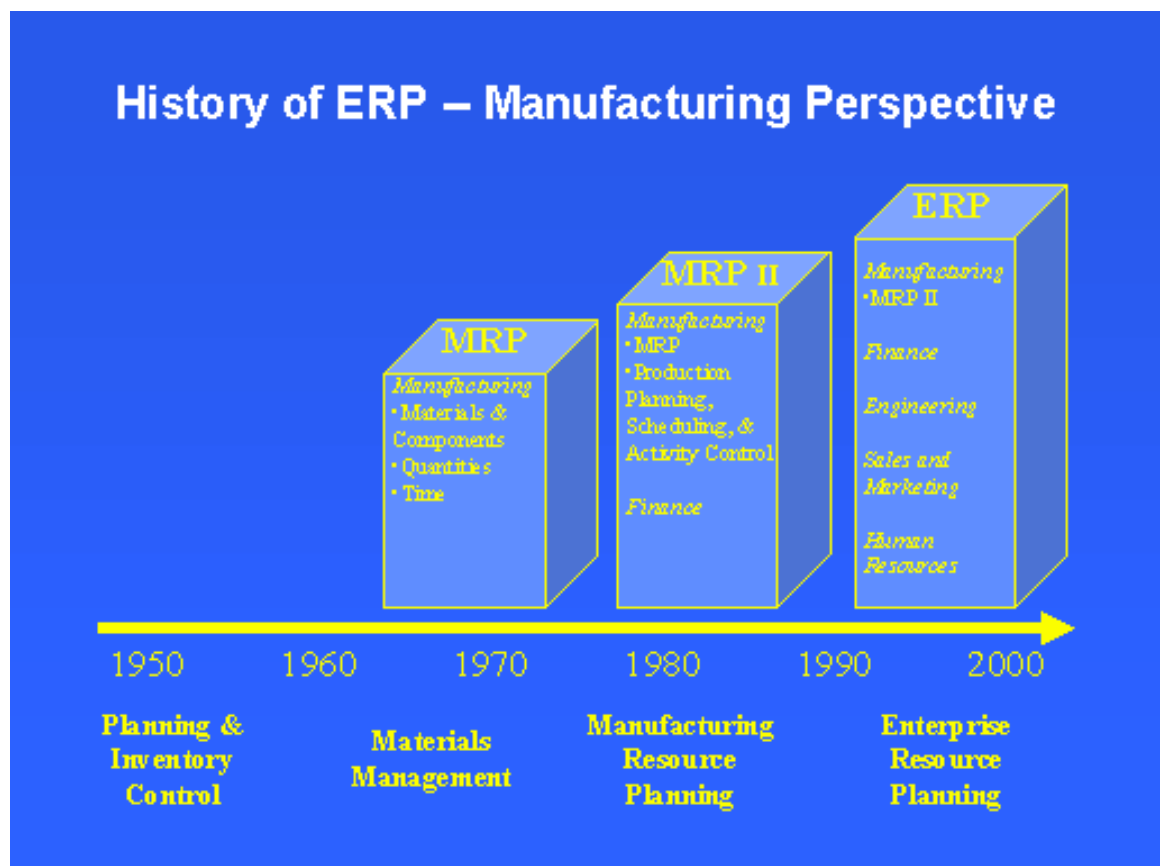


Figure 2.1.5 History of ERP— Manufacturing Perspective[8]

## 2.2 How ERP Supports Business

A 2013 ERP report by Panorama Consulting Solutions showed a pie chart to indicate the reasons for implementing ERP.

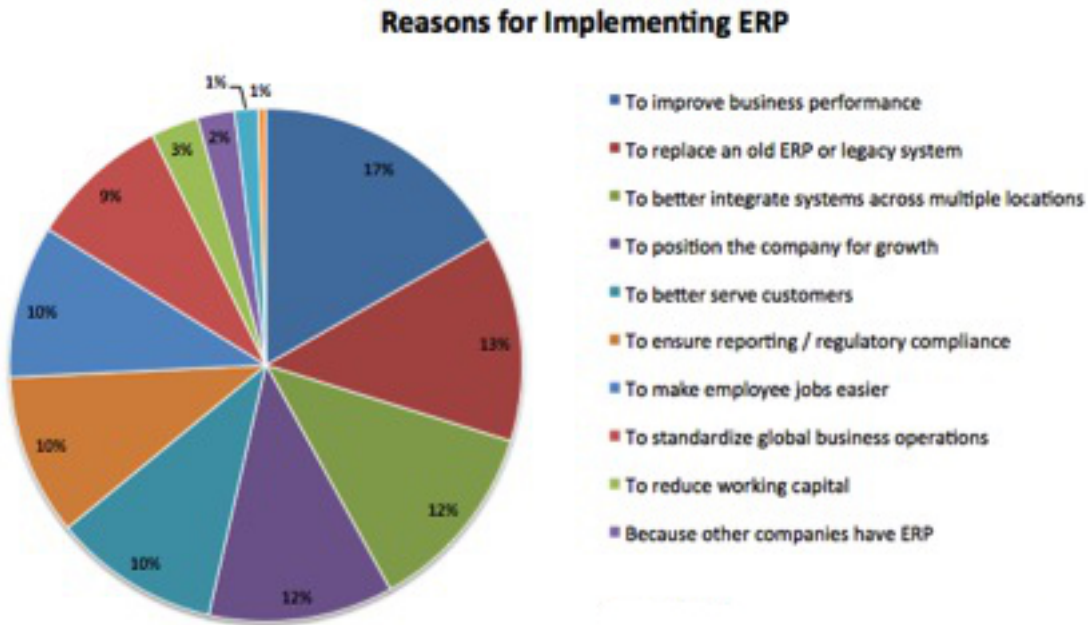


Figure 2.2.1 Reasons for implementing ERP-2013 [9]

In the figure, most of the reasons are related to improving business performance. An ERP system exactly could provide extensive support in every single step. Firstly, a completed business operation could be divided into several functional areas as following.

Functional area of operation	Marketing and Sales	Supply Chain Management	Accounting and Finance	Human Resources
Business functions	Marketing of a product	Purchasing goods and raw materials	Financial accounting of payments from customers and to suppliers	Recruiting and hiring
	Taking sales orders	Receiving goods and raw materials	Cost allocation and control	Training
	Customer support	Transportation and logistics	Planning and budgeting	Payroll
	Customer relationship management	Scheduling production runs	Cash-flow management	Benefits
	Sales forecasting	Manufacturing goods		Government compliance
	Advertising	Plant maintenance		

Figure 2.2.2 Functional area of business operation [10]

These functional areas are interdependent, and each requires data from each other. It is easy to imagine that the data flow in a company is very complicated and frequent, which is superfluous for a staff or dozens of staffs. The information system should be built up to deal with the data to make a better integration of functional areas that lead to improvements in communication, workflow and success of the companies. [10]

A basic use of ERP system is collecting, analyzing and delivering information among the functional areas. Furthermore, it can also aim at current situation and carry out an optimal scheme. Recently, some more specific theories have been linked to the ERP system such as JIT, Lean production, etc. All the theories try to find a way to produce satisfying production with least costs on both materials and human resources.

Overall, ERP system has some functions in business operation:

- Providing instant authority to input and output of the information pool.
- Helping enterprises build up a smooth business operation environment wherever it is, inside or outside with customers or suppliers.
- Reducing workload and improve efficiency.
- Functional divisions are combined by ERP system.
- Making enterprise flexible to react in front of surprising or gradual change.

## 2.3 ERP Software Market

### 2.3.1 Worldwide Market

In the worldwide market, 2013 ERP Report shows overall experience with the majority ERP vendors.

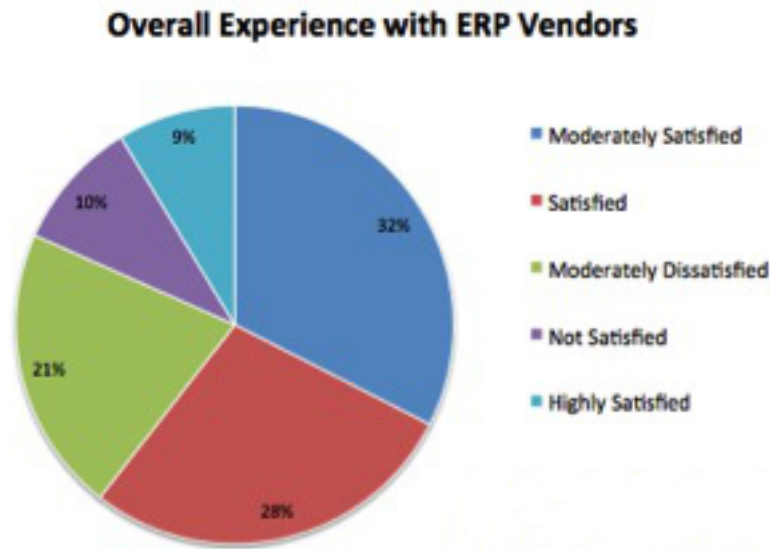


Figure 2.3.1 Overall Experience with ERP Vendors-2013 [9]

About 60% of consumers are satisfied with their chosen ERP vendors. Most of the dissatisfaction could result of the gap between real business development and expectations. Obviously, it would be hard to define which side will take the responsibility of the gap. Too many causes lead a just passable business income as far as ERP concerned.

In terms of ERP software market, the report also offers a chart to show the market share in 2013. Undoubtedly, SAP was the leader with a 34% share and Oracle got 26%. Based on the analysis of Panorama Consulting in recent years, SAP has been taking the biggest share for many years in the right of impressive salespeople, enormous advertising budgets. Oracle's share keeps growing these years since they have decided to pay more attention to ERP with cloud technology.

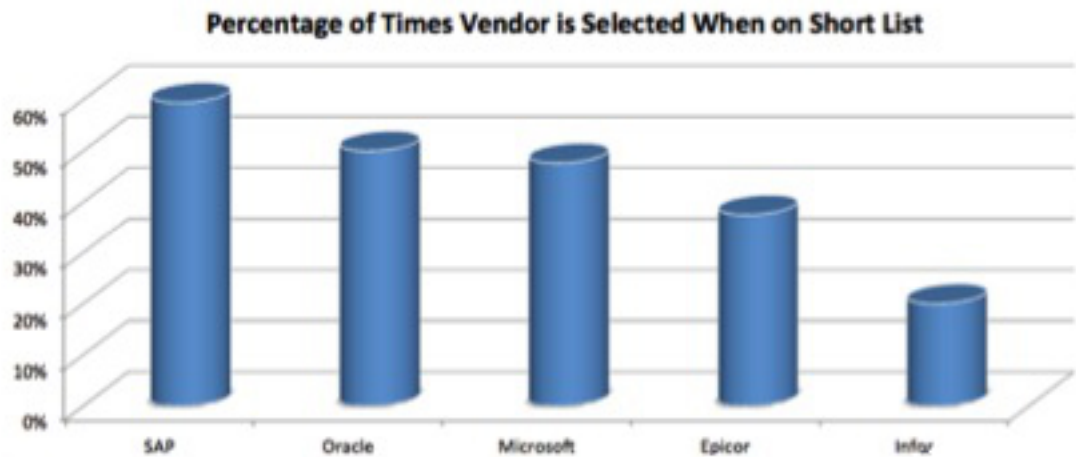


Figure 2.3.2 ERP Software Market Share-2013 [9]

### 2.3.2 China ERP Market

Over decades, informatization of Enterprise management in China, especially large enterprises, speeded up and caught up with worldwide level. They take a chance to use electronic information technology in order to improve management efficiency, product performance and product upgrades. In the meantime, many SMEs were also beginning to preliminarily use basic ERP software and with the increasing need the enterprise management software expanded rapidly.

Now, the competition of ERP software market in China is still divided. One party is some foreign companies with abundant capital, rich experience, technical implementing ability and talent reserves such as SAP, Oracle and so on. Another party is national companies like Yonyou, Kingdee and Digital China... For Chinese software industry, the financial control software has now more than 90% market share. These domestic companies dominate the market and provide valuable experience and confidence for the state-owned brands. However, in this area, China is just beginner and foreign company has obvious technical advantages, better system security and scalability. In 2001, with the joining into WTO, China's economy has been developing constantly and is faced with a heavy challenge as well as big opportunity.

In the meantime, the market share of Chinese ERP vendors especially Yonyou surpassed SAP in 2002 and became the biggest supplier in China and had the leading position still in 2013 and Yonyou's market share was over 30%.

ERP Vendor	Sales Revenue (Billion Yuan)	Percentage
Yonyou	2.49	30.7%
SAP	1.14	14.0%
Kingdee	0.96	11.8%
Inspur	0.87	10.7%
Digiwin	0.52	6.5%
Oracle	0.51	6.3%
Infor	0.41	5.1%
Aisino	0.31	3.8%
Eabax	0.28	3.4%
CDCC	0.16	1.9%
Others	0.47	5.8%
Sum	8.12	100.0%

Figure 2.3.4 2013 China's ERP Market Share [11]

ERP Vendor	Sales Revenue (Billion Yuan)	Percentage
Yonyou	1.97	28.3%
SAP	0.94	13.5%
Kingdee	0.84	12.0%
Inspur	0.73	10.4%
Digiwin	0.45	6.5%
Oracle	0.44	6.4%
Infor	0.38	5.5%
Aisino	0.28	4.0%
Eabax	0.26	3.7%
CDCC	0.15	2.1%
Others	0.53	7.6%
Sum	6.97	100.0%

Figure 2.3.5 2012 China's ERP Market Share [11]



## 2.4 Situation of ERP Implementation

### 2.4.1 Situation of ERP Implementation in Western Countries

Since the birth of ERP system and its discovering of benefit, more and more enterprises started to accept this newest tool to manage business operations. Then ERP tide gave a big shock to America's business field, and ERP became the latest must-haves in the market, and as a result a large number of enterprises were scrambling to implement ERP systems.

At present, in the EU, the US and other developed countries, ERP system has been the most general application. Gradually, global supply chain management and agile logistic system has been promoted and managers have treated the system as the pillar of the digital age of enterprise's survival. More and more SMEs are also applying the ERP system and from the worldwide sight, the trend of ERP system implementation has four features:

1. The extensibility. ERP's management scope is more extensive, which means it provides targeted solution according to the characteristics of industry. For example, the automobile industry had a trend of multi-product, small batch and globalized production line following QS9000 quality assurance system. ERP system offers reliable product data and supply chain management. Furthermore, it is also mixed together with lean production, Kanban technology and quality management in order to meet the demands of the industry and consumers.
2. Advanced technology. The advanced technology of current ERP system displays in three aspects: First one is changed the basic technical structure to be network-centric computing system form the server mode; The second is integration with internet technology; The third is the application of object-oriented technology and event-driven programming.
3. Flexibility. The implementation of ERP is a continuous process, even after the implementation has been completed. Definitely, it is necessary to keep sufficient flexibility in order to be agile when the enterprise is faced with new opportunities.
4. Networking. People have been gone through the Industrial Economy and stepped into the IT age. Naturally, the surrounding of enterprises has been changed fundamentally. So the ERP system is developing and getting close to the network.

Internet business model makes procurement and sales more convenient, and the connection between enterprise and partners has gradually evolved into depending on networks.

#### 2.4.2 Situation of ERP Implementation and Problems in China

Since 1981 when Shenyang First Machine Tool Plant imported the first set of MRP-II, ERP application and popularization in China have gone through over 30 years starting with exploring. There are so many ERP vendors popping up in China. In the period from 1990s to the early of this century, the use of ERP in China has entered a mature phase, whose main features are: ERP became the leading fashion; Application range was extended from manufacturing industry to the second and third industry. What the ERP could offer attracts entrepreneur such as profit analysis, sales analysis, marketing and decision-making.

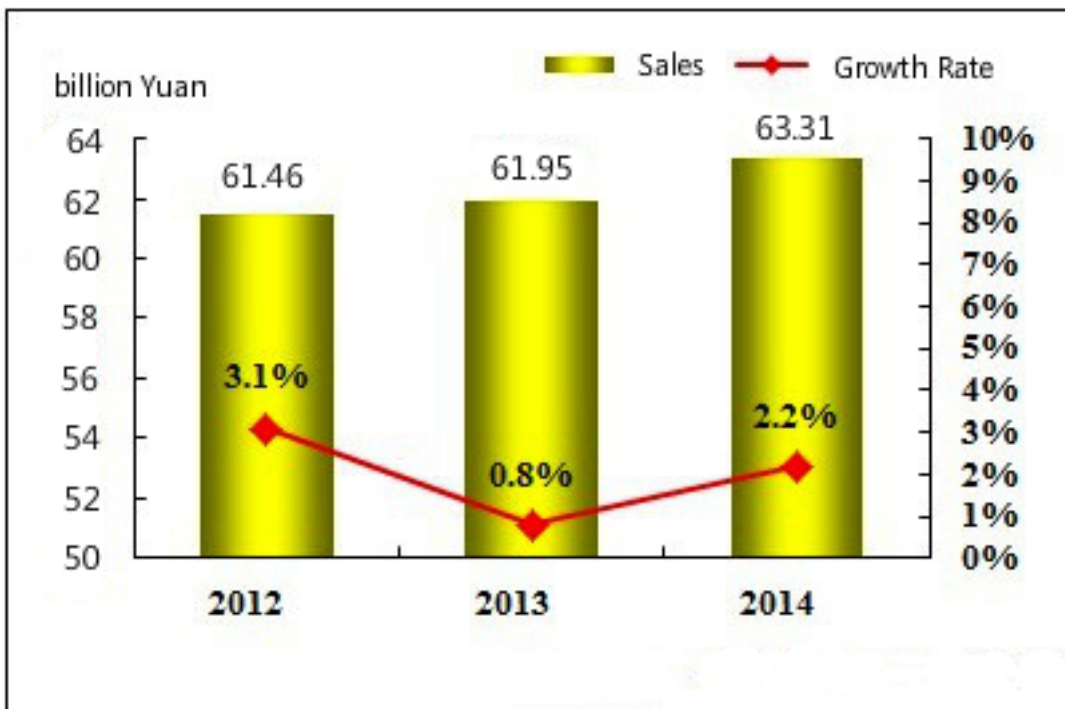


Figure 2.4.1 Informatization Investment of Chinese Manufacturing Industry [12]

The CCW research's data indicates that informatization investment in China has reached 61.95 billion Yuan with a yearly growth of 0.8%. And it also predicted that investment growth in 2014 is expected to rebound slightly but still be lower than 2012 growth level.

Overall, in ERP implementation area, people are still investing so much but get less returned. Some questions like what is the ERP, why and how to use it to get a better

result are still bothering Chinese enterprises, especially SMEs. Truthfully, implementing an ERP system is a wide-range, large-investment and long-cycle systematic project. SMEs in China have to invest various resources including capital, human resource, personnel training, etc. What makes the situation worse is that there are many problems with the enterprises themselves such as limited finance, relatively lower knowledge about ERP system, management level and high turnover rate of staff. The main problems concluded from different sources and related to implementing ERP system are as follows:

1. Some of the entrepreneurs have a wrong view and attitude on ERP application. They are always confused with the concepts of ERP software and ERP project and some of them even think that ERP is just a program installed in the computer, which leads to a negative understanding of the role and effect of ERP. Thus, the management organization does not give enough support for the project.
2. The management foundation is weak. Weak foundation of SMEs in China consists of incomplete regulation, unclear work responsibility, poor execution, unstandardized business process and some other external environment factors. Therefore, when SMEs are applying ERP, the managers should adjust and reform the business process according to the features of the enterprise in order to meet the needs of the external environment of ERP application.
3. System selection is not suitable, and scale is not appropriate. When the SMEs are selecting ERP system, some of them may choose a cheap one to save money. However, it turns out that the ERP function is limited, and others may purchase expensive system but the enterprise can not fully use the ERP because of their limited scale and management level. Furthermore, with the development of ERP scale, both the complexity and risk of the ERP project are increasing, which have a bad impact on SMEs.
4. Informatization training is not enough. The terminal users of the ERP system are personnel in various departments and management level. It is an essential target to make the end users understand how the ERP works and how to use it. The enterprise should pay much attention to training the staff with basic concepts to enhance employees' comprehensive quality. For high level and middle level managers, the training should focus on ERP principle and logical aspects. While for the frontline workers, the tutoring should be the actual operation and applying

ability. But SMEs normally don't have enough resources to guarantee the training results.

5. Professional technical talent is lacking. Due to information asymmetry between enterprise and ERP vendors and lack of experienced experts of IT, it is harder to fully take advantage of ERP system. So it is necessary to hire experts to maintain and upgrade the system constantly with the development of the business.

6. The implementation lacks of effective guidance. The implementation is a sophisticated project, and it is impossible for an independent company to set up.

There is a successful project equation:

Successful project= the prepared enterprise + appropriate software +successful implementation

Not only does an experienced partner bring mature products and enough consulting, but also it provides more effective guidance of methods. If it lacks of a clear method through the project, the result may be not positive.

Obviously, these problems have a huge impact on ERP implementation in SMEs and it affects the expanding of ERP application in China indirectly. In order to be prepared for harsh competitiveness, the SMEs need to have a right view on the ERP or other management theory and technique.

### 3 ANALYSIS OF THE SITUATION OF FINETECH GROUP

#### 3.1 Finetech Group's Business Operations

Anhui Finetech Machinery Co., Ltd. is a group consisting of several branch companies. The headquarters are located in Qianshan County, China. Their main products are automobile parts and practical machinery tools. The products are exported to USA, Belgium, Australia, Syria and other areas. [13] Particularly worth mentioning is the strategic cooperation with AGCO Corp. in the USA that is a leading global manufacturer of agricultural equipment.

##### 3.1.1 Organization Frame

In the Finetech group, international business is mainly divided into two parts, Finetech-AGCO organization and Jingling Branch Company whose main product is steering gears. In the meantime, there are two more branch companies that focus on mechanical parts of tractor and regeneration of resource respectively.

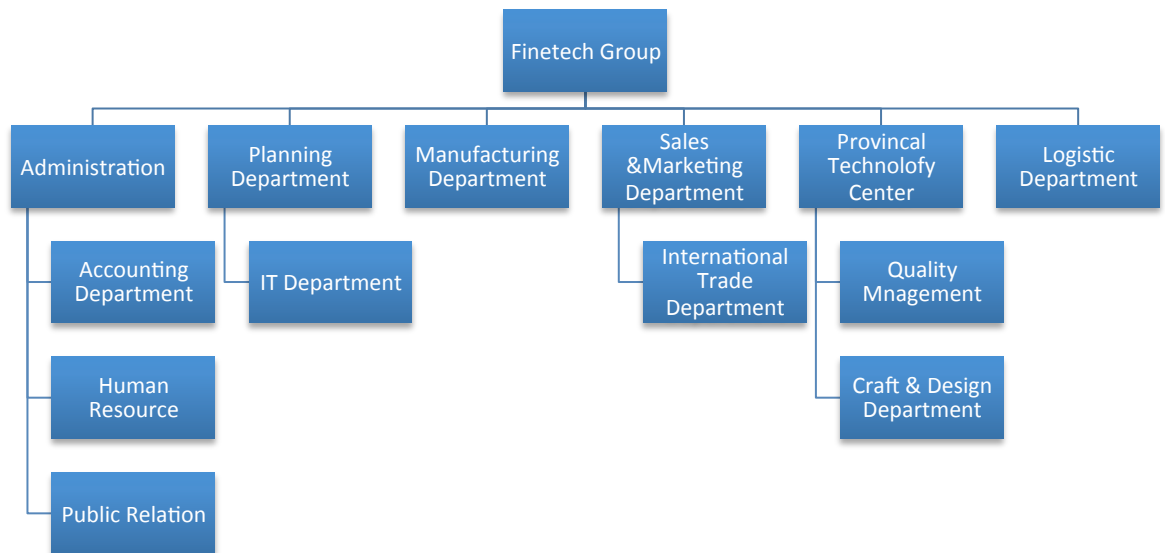


Figure 3.1.1 Chart of Finetech Group organization

### 3.1.2 Business Frame

Finetech's technical advantages are reflected in superior hot and cold mechanical processing capacity, great heat treatment and outstanding creative development. With good quality and reliable customer service, the group gained a good reputation in China and was accepted in worldwide market.

The business of the group can be divided into four parts displayed in the following table:

Company	Main Products	Relative Corp.	Target Market
Finetech Machinery	Mechanical parts for autos		Domestic
Jingcheng Company	Mechanical parts for tractors	AGCO Corp.	USA and other international market
Jingshi Company	Resource Regeneration		Provincial and Self-marketing
Jingling Company	Steering Gear		Domestic and International

Figure 3.1.2 Finetech Business Division

In the corporation, Jingshi Company provides various materials for the entire manufacturing work, which is the most basic and essential part in the business operation. Jingshi purchases used or waste steel and regenerate, which reduces the cost with a big range. In the meantime, Jingcheng has an independent R&D center with the help of AGCO Corp. And the business diagram of Finetech is:

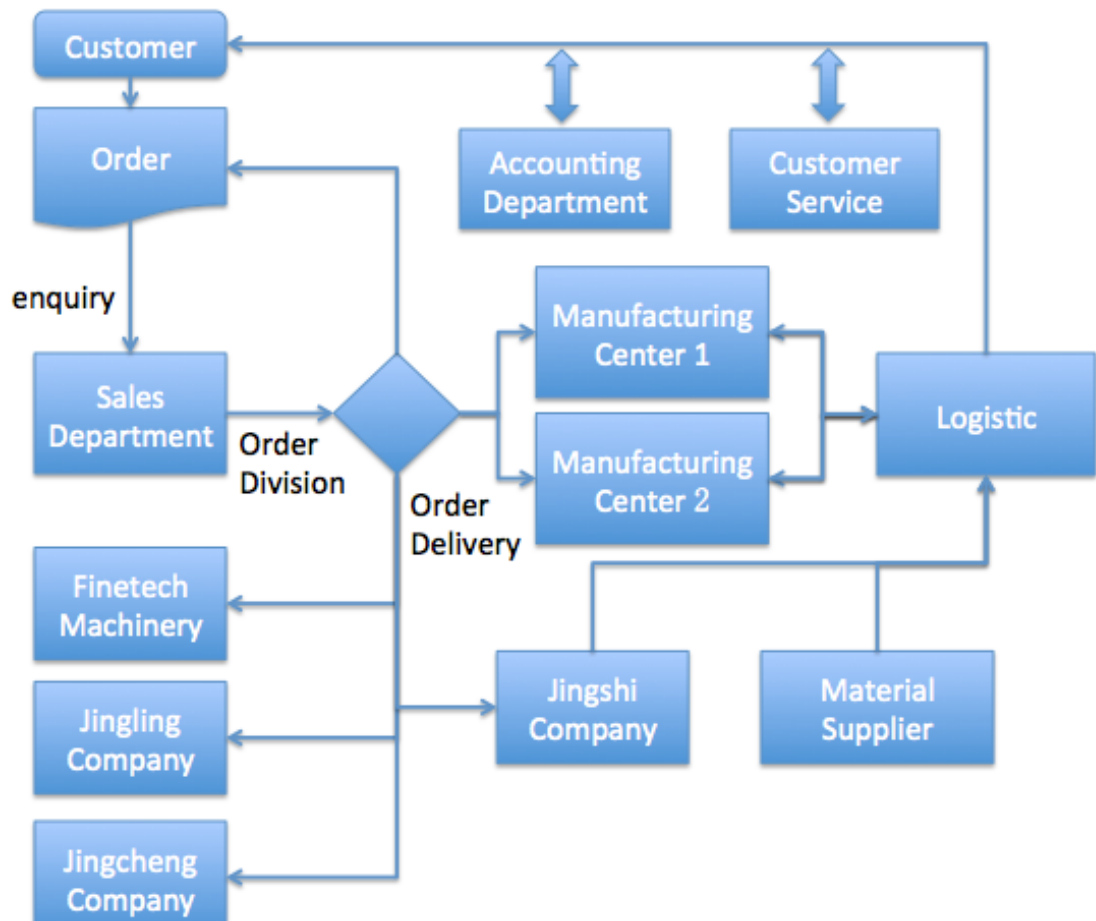


Figure 3.1.3 Business diagram of Finetech Group

## 3.2 Situation of Informatization and Problems in Finetech Group

### 3.2.1 Situation of Informatization

The current operation system in Finetech is mainly based on much manual work, and the flow of information transfer relies on Email, internal phone, fax, etc. There are two file servers in the IT department as a document manager and transmission platform that are used for document resource sharing. In the real case, the system within the department documents transfer depends on printing, email or online sharing, which leads to the result that the path for task information may cause the information isolated. The basic requirement for each staff member is familiar with office automation software like Microsoft Office suite. Every office staff has his own office email and personal computer.

Warehouse: Manual recording is the main way to control the in-out using Office. Specific operation is according to the order plan made by planning department.

Accounting: The accounting department has used particular information system, mainly financial software since 2007. Their duties are account management, inputting of vouchers, auditing, and reporting.

Other divisions like quality management, manufacturing system, logistics still relies on manual work.

### 3.2.2 The problem in the Management

With a deep research on the current management, some key problems are defined as follows:

#### 1. Overall management

The overall management is not sound and standardized. More specifically, the enterprise is passively reactive type. With the emergence of new problems, new measures are developed without deep research or the administration just copies a successful model from similar enterprise. As a result, the new method may not match the actual situation. For example, Finetech started to launch ISO 9000 in 2003 copying others, but the company did not have the capacity to gain a certificate. Therefore, it leads to confusion in quality management.

#### 2. Logistic Management

For the group of companies, logistics management is heavy and one of the most important parts. There are three warehouses and one of them belongs to AGCO in USA. Second one, #1 warehouse, is used for store complete products and the last one, #2 warehouse is for the material including steel material produced by Jingshi Resource Regeneration Company. From the business diagram, the logistics department carries too much work, and there are several problems:

- 1) The same work group controls both of the two domestic warehouses. The moving-in items' ownership is not clear because of the incoordination between purchasing orders and sales orders.
- 2) It is hard to trace when a quality problem occurs because there is no batch number and serial number in the operation process.



- 3) The complexity of warehouse management is increasing because most of the item deliveries are excessive.

### 3. Financial Management

Several problems are outstanding like:

- 1) Purchasing operations mainly depend on sales orders. But the order invoice may not keep up with the warehouse warrant and the invoicing is based on order invoices.
- 2) Because of the lack of information sharing, financial management does not keep an eye on the warehouse, and the use of funds is difficult to plan.
- 3) The asymmetry and out-of-step of information make it hard to support performance management, risk management and decision-making.

### 4. Work Efficiency

The critical point is work division. In the departments of Finetech, especially administration, there is a problem that a work position is responsible for several operation tasks. Thus, it is ordinary to redo the task because of human error. And what the office staff wants is that using IT replaces the tedious manual activities. An ideal condition is that most of the operation is via computer and minimizing human intervention. It is possible to make every process logically automatic. On the contrary, it must lead to many checkpoints in the entire process. So, how to increase the efficiency and design a reasonable operation process is the biggest problem in the administration.

## 4 FINETECH ERP IMPLEMENTATION PROJECT

In order to adapt to current harsh competition and restart with a clear development direction, it is necessary for Finetech group to apply ERP system to realize enterprise informatization. Disordered business process, scattered information system, avoidable errors caused by excessive manual operations and so on are the main obstacles in front of the enterprise. Thus, the group needs a completely informative system to control the resources and improve efficiency.

### 4.1 Preliminary Project Analysis

#### 4.1.1 Project Team Forming

It should be emphasized that the staff in Finetech group did not have many ideas about ERP system, which means the leader needs to pay much attention to how to train internal staff effectively. Actually, the ERP implementation is a process that ERP theories are transferred into practical data. It is needed to make the staff believe that the ERP implementation helps to precede the enterprise reformation, improve management level and efficiency. Thus, the director decided to form an ERP specialized team to carry on the project. The directors or managers from different departments are included and in this way, it is easier to convey instructions to frontline and to make the staff feel the determination applying ERP system.

First of all, IT department was segmented out of administration and got human resource supplement, which is the foundation of technical support. In the meantime, four-experienced specialists were engaged to the ERP implementation consulting, and their duties correspond to financing, business operation, technique and software optimization independently. An IT chief inspector was selected who is good at both IT and ERP system, and several programmers were employed to keep the team having the ability to optimize the whole system.

In addition, group director selected several senior managers from the planning department and logistic department who have experience in business operation and supply chain. Apparently, these managers will play important roles in the future development. At last, the steering committee including senior executive officers was built up that is in charge of the whole project and coordinates each department.

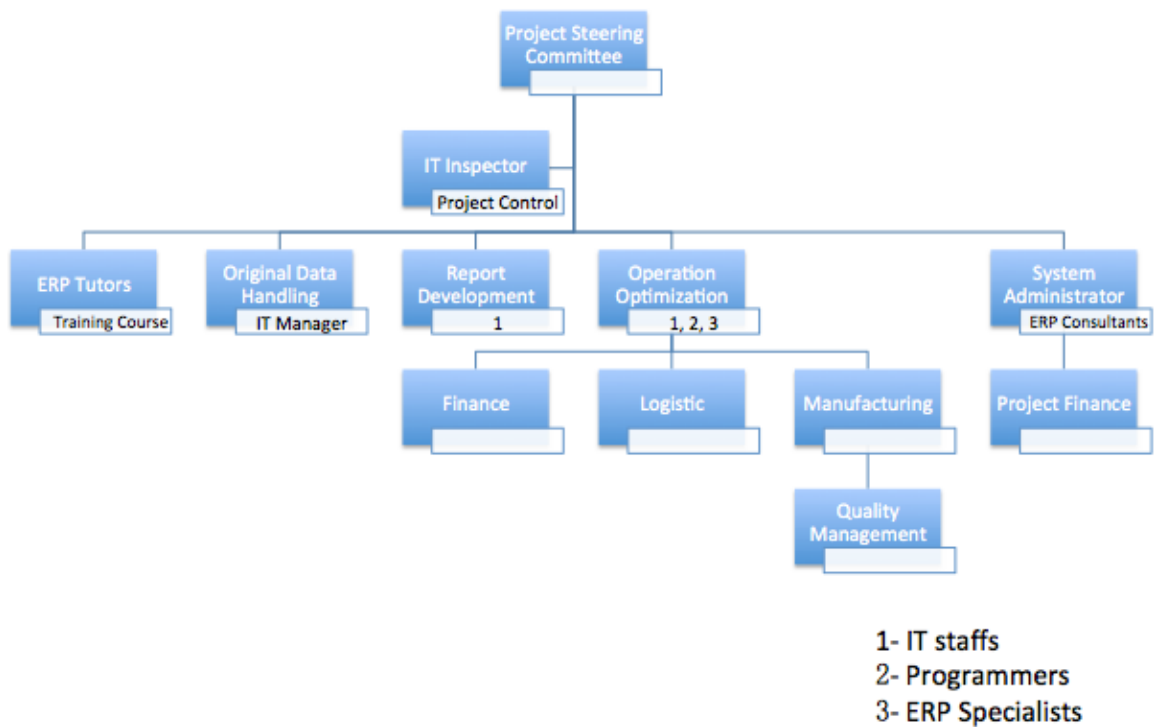


Figure 4.1.1 Project Team Diagram

#### 4.1.2 Requirement Analysis

In order to know better what the Finetech Group needs, a research team was organized and it interviewed each department. After nearly one month, an analysis report showed as following:

##### 1. Manufacturing Requirement

In general, manufacturing line seemed quite well, but the obvious problem was how to reduce the variable costs and eliminate valueless operation via informatization. In the real case, the logistic workshop takes the responsibility to pack the products, which adds more burden onto logistic. It is a normal error that the product amount from the manufacturing department is unsymmetrical to logistic. In addition, when the Finetech gets too big order to produce, the group will distribute the order to other factories, which leads to that product quality cannot always be approved occasionally. Therefore, the operation process of the manufacturing line needs to be simplified and improving efficiency and avoiding getting an excessive order with a capacity analysis by ERP.

## 2. Logistics Requirement

Finetech Group is a typical manufacturing SME whose material-handling turnover is fast and huge. Although current workforce can fulfill the need, it relies on manual work too much and several essential points are defined as:

- 1) The information flow, logistics, capital flow should be organically integrated via network;
- 2) By combining with the business process, the problem like process ownership and work duty are not clear and need to be refined;
- 3) Standardizing operations and strengthening the process of real-time control and supervision

## 3. Financial Requirement

Currently, informatization of financial management is just inside the financial department and is not connected to administration and marketing department. As a result, document flow, logistic information and finance are not integrated so that the financial department cannot timely access relevant marketing information and vice versa. And current financial software is too old for business development. Overall, financial integration application is necessary to achieve the effect of controlling and supervising of the business.

### 4.1.3 Project Risk Analysis

ERP implementation is a systematic project that will lead to a deep reformation, and it is not just simple business process informatization. In the project, there are quite important risks for which the group needs to be prepared:

#### 1. Awareness of ERP concepts

Some members of the staff have a devout belief that business can rely on the ERP system entirely and on the contrary, some of them collide with the system and they just trust manual work. However, management development will be always people oriented. In order to get rid of this risk of misunderstanding, many ERP tutoring courses should be taken by staff including ERP basic concepts and they should be trained what the ERP can deliver in each stage. The project team

has formed a tutoring group, and the scale should be flexible depending on real requirements.

## 2. Suitability of software

Because of the complexity of ERP system, the software could be unsuitable, and there exists some potential designing bugs. In allusion to the software on the Chinese market, several risks should be defined such as coordination between software function and enterprise requirements, integration of system, reliability and friendly Chinese user interface.

Foreign ERP software is better in integrated function and stability, but the advantages of domestic software are reflected in usability. It is more comfortable for Chinese to use and suitable to the Chinese accounting environment. Therefore, selecting suitable software was one of the essential keys to the success of implementation.

## 3. Implementation risks

### 1) Organizing the project team

The implementation is restricted by workability of the project team. Finetech's project team is combined by original internal officers and lately employed specialists and programmers. Thus, it seems important that both parts should be cooperative and mutual understanding.

### 2) Following the schedule

Making the project plan is a key step because simple plan can not fulfill the needs and much more complex one makes the workload and the costs bigger. Some enterprises launched the system rapidly, and one of the reasons is that the project was implemented phase by phase. They believe the realization of basic functions ought to be emphasized in the first phase and later work is system optimization should follow till the all the requirements are fulfilled. Thus, the project team claims that the project scale must be moderate and implemented in stages to reduce the risk.

In conclusion, firstly the entire group should have the same aim and right understanding of ERP system. The project team has organized several seminars about ERP that helps staff have an uniform recognition. Secondly, moderate structure and position duty adjustment are needed to get rid of unstable factors.

#### 4.1.4 Project's Target and Scale

Based on the risk analysis report and feasibility report, the steering committee proposed the project target and scale by phases in order to avoiding losing control caused by excessive workload in a limited duration.

##### 1. Project target

The steering committee made an overall target: Building up a complete informatization system to support the following 5-10 development and making the Finetech group a global corporation with a variety of business.

##### 2. Project targets by phases

Phases (Duration)	Target	Specific Content
1 (6 months)	Preliminary structure reformation and realization of basic ERP function	Building up automatic business operation system, logistic management system and simplified manufacturing system
2 (12 months)	Data synchronization of new ERP system and former Financial system	Establishing a basic analysis of decision-making system, optimizing the analysis system and reporting system
3 (Undetermined)	ERP system's expanding to material supplier and clients	CRM and SRM modules will be established.

Figure 4.1.2 Project targets by phases

## 4.2 Selection of ERP Software

The steering committee realized that it is impossible for current IT team to develop an exclusive ERP system all-alone. Selecting a suitable software will benefit later work and on the contrary, a unsuccessful selection will be an obstacle in the future implementation and application.

### 4.2.1 Selection Standard

Based on the real situation of Finetech group, the project team made the selection standards after discussion.

1. System supports accounting consolidation business process and it can deal with different currencies and reserve consolidating reporting access for the departments which doesn't use the system yet.
2. System supports group's internal supply chain models and overseas orders.
3. System supports giving out batch and serial number to each item for tracking the source
4. Sales forecast and order tracking function. Finetech's main clients are long-term cooperatives, which means that the system has to manage the inventory and manufacturing line flexibly.
5. Customer credit control. System can automatically count receivable balances from customers, sales amount and total payment, and it also can analyze the accounts within any duration and form accounting report regularly to inform relevant personnel via email.
6. Complex material requirement planning.
7. Compatible with current procurement process.
8. A variety of solutions to help enterprise to carry out decision analysis reporting.

ERP implementation is a long-term project. Except for finding suitable software product, selecting a trustable vendor is essential, too.

1. Consulting team's ability. The implementation team should have enough frontline experience and be familiar with business management operations.
2. Industrial experience and reputation. It is better that Finetech had cooperation partners in the past.
3. Rapid response. When the project faces a problem, the vendor needs to give a solution in time.

4. Complete implementation document system. If the enterprise is under human resource adjustment, new employees could get quickly familiar with the process via the document system to reduce the cost and risk.
5. Stability of the implementation team. The supplier should guarantee the stability of the team, especially that of the consultants and managers.

#### 4.2.2 Confirmation of the ERP Software Vendor

After several meetings with the different suppliers, the project team was attracted by U8+ ERP solution from Yonyou. In addition, one of material suppliers of Finetech Group had implemented U8 system successfully, and the project team organized a researcher team to the company and their report showed much confidence of U8+ product.

##### 1. Introduction to Yonyou Co., Ltd.

Yonyou Software Co., Ltd. was established in 1988 and it is the biggest domestic management software and cloud service providers in China. The main business scope covers over thirty different fields such as government affairs, tobacco industry, manufacturing industry and so on. Over 18 million enterprises and institutions in Asia-Pacific area are using Yonyou software to realize fine management and agile operations. [16]

##### 2. Advantages of U8+ ERP solution

Yonyou U8 series has developed for over 16 years with four stages (Finance-Business Integration, U8 ERP, U8 all in one, U8+). It has grown into the first SME management software and cloud service platform and has helped more than 600 thousand enterprises to realize management updates.

Fine management, agile operation and rapid applications are the outstanding features of U8 ERP software. It meets various requirements of enterprise development.



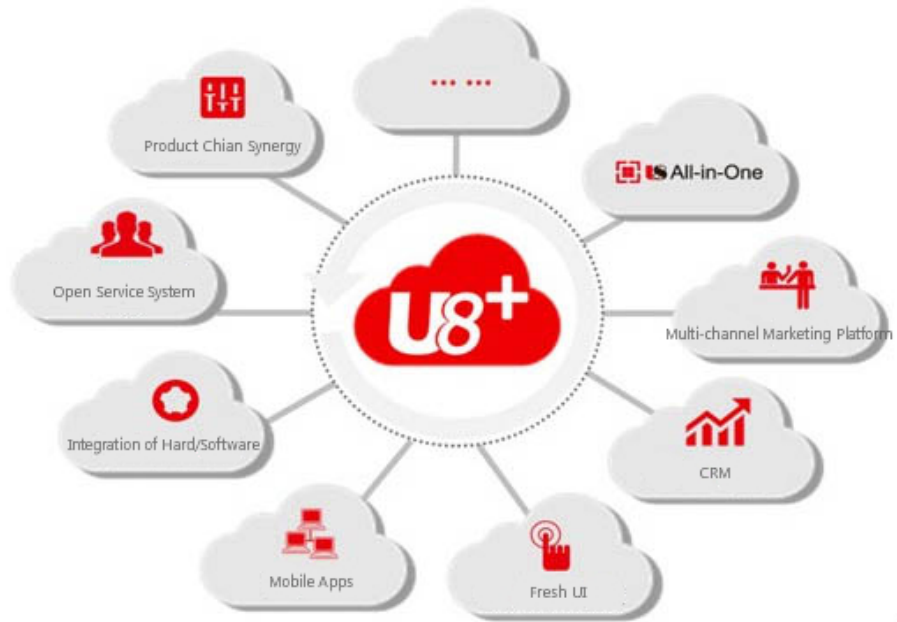


Figure 4.2.1 Features of U8+ ERP software [17]

In addition, more specific features are as follows: [17]

- Comprehensive application, On-demand deployment, Effective result
- Business-scenario driven, Personalization platform
- Business operation traceability
- Multi-dimension budget control
- Multi-language support
- Comprehensively supported by the manufacturing and trading industries
- Fully support of the latest accounting standards in the Mainland China and overseas countries
- Compatible with the latest Chinese National Taxation System
- Supporting latest Labor Law in the Mainland China
- More than 10 industrial solutions are provided.

There are many features attracted by Finetech Project team, especially the multi-language support and various accounting standards that benefit Finetech's globalization strategy.

### 3. Specific ERP solution

After several negotiations with Yonyou implementation team, the project team reported the confirmation of the ERP software selection.

Name	Yonyou U8+ ERP Solution
<b>System Structure</b>	Terminal/Server
<b>OS Platform</b>	NT
<b>Implementation Duration</b>	260 Days
<b>Software Investment</b>	550,000 CHN Yuan
<b>Hardware Investment</b>	100,000 CHN Yuan
<b>Implementation Investment</b>	800,000 CHN Yuan
<b>Database</b>	Free
<b>Total Investment</b>	1700,000 CHN Yuan
<b>License Amount</b>	40 Registered Users

Figure 4.2.2 Introduction to Yonyou Solution

### 4.3 Project Plan and Task List

#### 4.3.1 Division of Project Phases

The Yonyou consultant team was in Finetech project team and they defined a project plan for the first stage that is parted into 5 phases:

Project Phases	Milestones	Ending Time
Phase 1	Project Preparation	31/06/2013
Phase 2	Business Requirement Analysis	10/08/2013
Phase 3	Prototype Launching	18/10/2013
Phase 4	Prototype Testing	22/10/2013
Phase 5	System Launching	01/11/2013

Figure 4.3.1 Project Phases in Stage 1

In each phase, the steering committee checks the implementation status and held meetings to discuss some topics such as function realization and data collecting. The director supervises the plan via the task list. (Appendices 2)

#### 4.3.2 Project Control

There are several aims to control the project implementation:

- Supervising the process of every task
- Guaranteeing work efficiency and avoid resource wasting
- Adjusting the task duration or task content according to real situation and be flexible
- Coordinating the relationship among team members
- Optimizing personnel allocation.

In order to make the project implemented smoothly and efficiently, the director and project managers in different divisions applied some measures:

- Establishing a supervision team consisting of managers. The supervisors report to the director in time when the implementation is in trouble.
- Analyzing staff information to figure out their advantages and put them into the most suitable position
- Applying internal forum for front line workers to exchange ideas
- Establishing a rewarding system to encourage employee's enthusiasm

Overall, the executive director makes the weekly schedule and renews the schedule every two weeks and then the plan will be delivered to team members.

## 4.4 Launching Supports

### 4.4.1 Preparation of Launch

Before the system launch, the project team needs to make a clear plan to keep the success of the new system as follows:

1. Every operator in a different position has been trained and given authorization. The handbooks written based on respective responsibilities have been distributed to operators.
2. There is a tutor in each department to help with problems in the real operations.
3. A half of the month before the launching, all the trades and accounts are closed to ensure that the data collecting and transfer are finished.

### 4.4.2 Handling of Exception

In the real case, worker may run into some accidental problems, the team built up these instructions as follows:

1. A FAQ webpage is established in the internal network. Every staff member can use private account to log in and fill in the FAQ to give feedback.
2. According to the problems from the front line, the project team needs to discuss together carrying out a modification or adjustment plan.
3. Before the launch, all the paperwork and invoicing are still available and after the system is running, the paperwork will be reduced gradually.

## 4.5 Preliminary Effects on Finetech after Implementation of ERP System

Overall, the ERP system works well after 1-month real application. The staff has gradually chosen to accept and rely on ERP system instead of conflict. After the process redesigns in Finance Management, Purchase and Warehouse Management, Marketing Management etc., both of the fixed cost and variable costs have been reduced. Some enormous change are as follows:

- The information flow, material flow and other resources are organically integrated, which leads to a great change in cooperation among different departments, respond speed and real time monitoring.

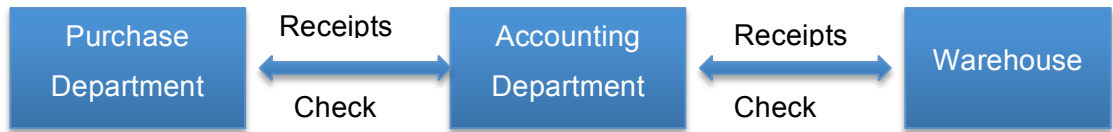


Figure 4.5-1 Information Flow before ERP Application

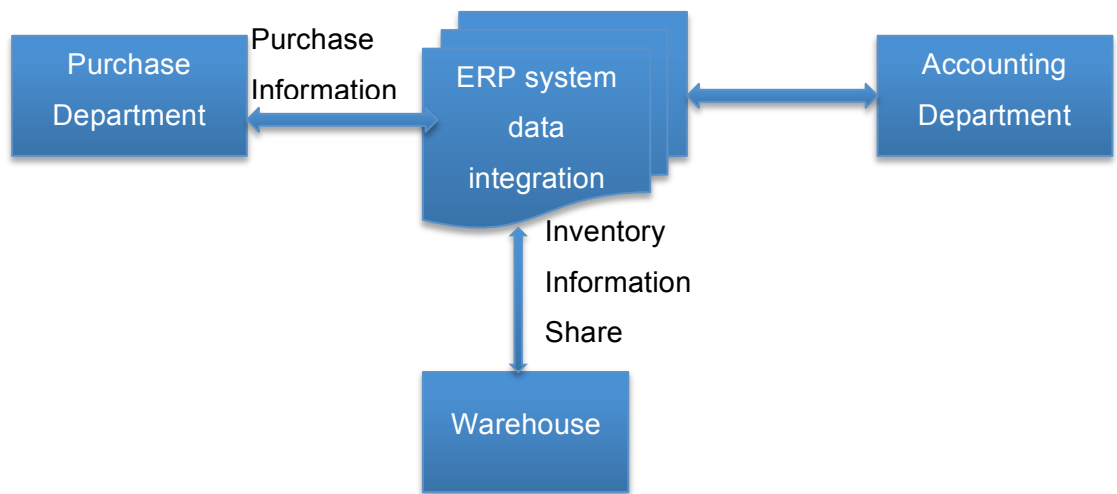


Figure 4.5-2 Information Flow after ERP Application

- Financial control ability has been strengthened obviously. With the optimization of logistics structure and integration, cash flow increased and capital occupation on material procurement and other parts have been reduced. Therefore, the application of capital is freer and more efficient.
- In the manufacturing aspect, the production line is optimized, operation processes have been standardized and work efficiency of staffs is improved enormously. The information flow is faster without information lag. The system requires just one inputting and share the information is shared to every department.

## 5 ERP SYSTEM RESEARCH AND CASE DESIGN

Yonyou U8+ is a highly integrated system. For the Finetech group, it was adjusted to meet a variety of requirements especially in accounting and logistics. In the meantime, U8+ integrates marketing planning, manufacturing management and other internal resources. It is worth mentioning that the system helps the enterprise to establish the Production and Marketing Balance System to adapt to lean production and agile manufacturing module that manufacturing operations always follow an every single order. The main modules and functionality is completed. (Appendices 3) [17]

### 5.1 Design of Accounting System

Based on the former analysis on the accounting system, several solutions are as follows:

1. In the former situation, only the accounting department uses the informatization tool and other didn't, which made the information flow limited.

Solution: ERP system is an integrated information tool that reduces manual work and increases the accuracy.

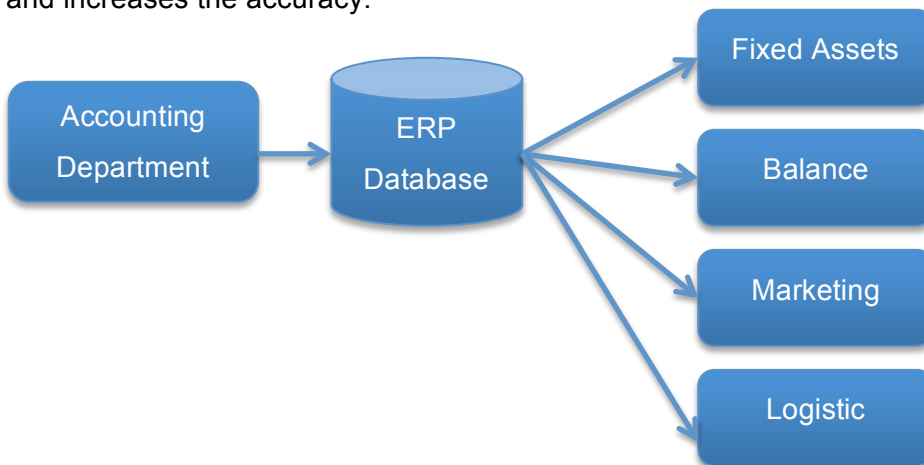


Figure 5.1-1 Accounting Information Flow

2. Various currency requirements. Finetech group has a share in the international market especially in the US. It is needed to handle different currency.

Solution:

- Setting different codes for currencies
- Installing a system to define the currency pattern in each order or customer
- At the end of every quarter, the system calculates the gains or losses automatically caused by changing exchange rate.

- There are three branch companies under Finetech Group and the same department managed the accounting. And as a result, it was complex and low-efficiency for the same people to control.

Solution: The ERP system supports the operating accounting of different companies in the same window and it manages the search engine, too.

There are other modifications in the accounting system like installing budgeting, reporting.

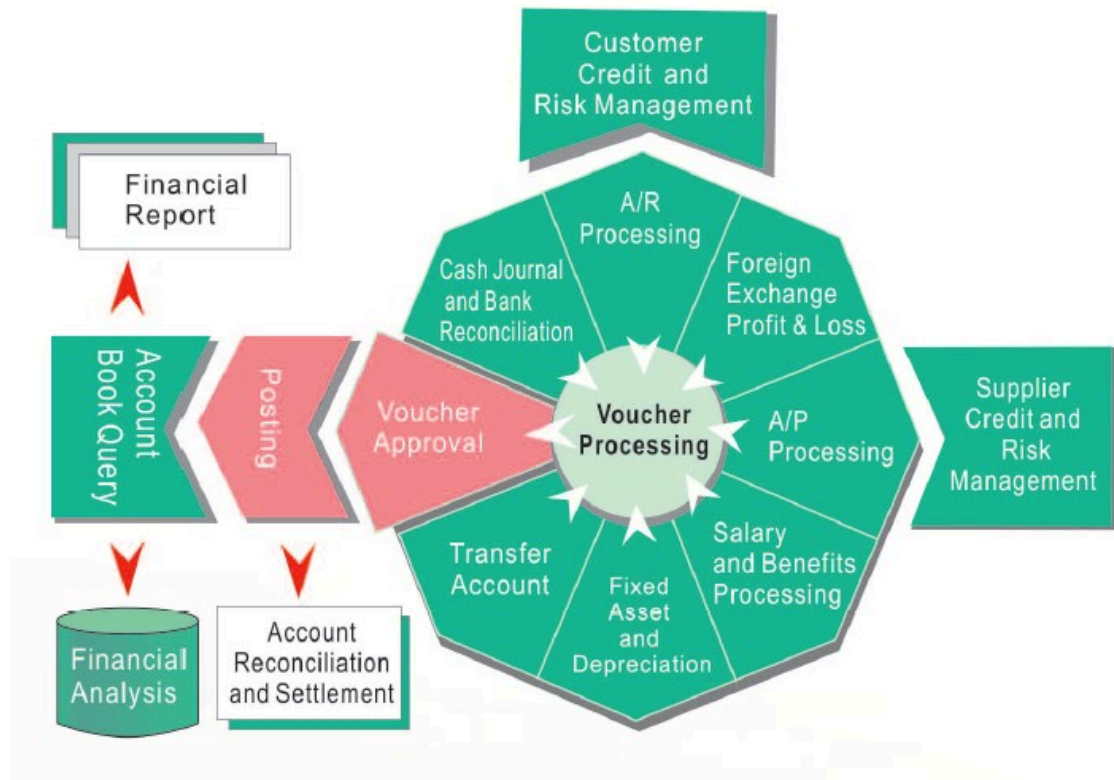


Figure 5.1-2 Finetech Accounting System [18]

## 5.2 Design of Procurement Management System

Based on the former analysis on the procurement system, several solutions are as follows:

- Finetech Group makes purchasing orders according to the sales order, and the purchasing orders are defined using different company title. Thus, the transfer relationships among companies and the purchasing amount are particularly important.

Solution: Manufacturing list and purchasing order are driven by sales order and the material flow conversion depends on the customization scale. It is important to distribute one single order to several suppliers and record the price every time to make it convenient to control the purchasing amount to maximize the interests.

2. Business group members determine the purchase order according to the sales lists and inventory, and submit them to the manager for confirmation. Referring to the process, it is needed to determine the approval process of unification and establish an early warning mechanism.

Solution: Every purchase order needs to go through several approvals including requisition, quotation and so on. And the approval could be set up based on the capital amount and sent to related personnel in time via email.

3. As a result of bad quality of some material, the suppliers always deliver more than an order to keep the manufacturing line working well. But, the material flow list cannot match the amount in the purchase order. Thus, the logistic department could not control the inventory.

Solution: The system creates the financial lists automatically according to inventory receipts, which makes the process avoid the inequality between the material flow and the financial change. In the meantime, an independent supplier warehouse is established out of old one. Therefore, it is easier to check the accounts.



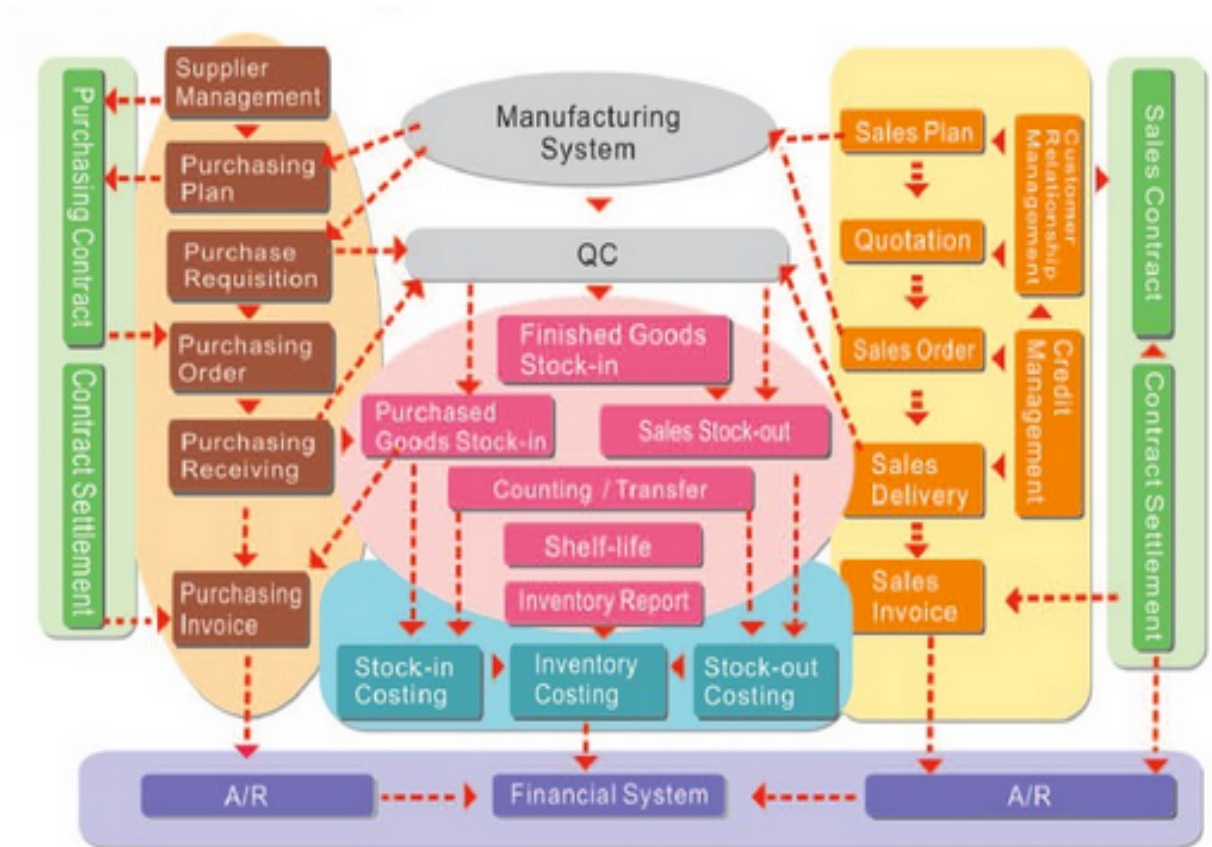


Figure 5.3-1 Finetech Logistic System [19]

### 5.3 Design of Marketing System

Based on the former analysis on the marketing system, several solutions are as follows:

1. Complex trade relationship including internal shipments makes it difficult to keep an eye on every single order. Internal shipment such as Jingshi always delivers some regenerated steel pipes to other branch companies.

Solution: System supports the internal shipments and generates different orders to supervise the business operations. In addition, use keyword to identify different orders from external market.

2. When a customer in the US want to exchange or return the product, the staff in the US warehouse respond to deal. The items lack of original trace and repair record.

Solution: The shipment department checks the batch number and serial code in every delivery. Thus, the customer can keep an eye on the shipment according to the numbers. Once some problems happen to some batch of products, customer service can take measures and give feedback to the manufacturing department.

3. Developing a new product is full of risks and most products are customized. In the developing process, the system needs to supervise the operation and guarantee the quality by data model.

## 6 CONCLUSION

Throughout the Finetech Group ERP implementation project, the key factors were like follows:

### 1. Support from leadership and determination of entire group

In the whole process, the leadership gave sufficient support and classified the final target of the project. The support did not just reflect the invested money, but their trust to operators. In the meantime, collecting the opinions and advices from frontline in the regular meeting was an essential part of success. Thus, all the staff members were devoted to this project and played important roles in the implementation process.

### 2. Professional implementation team

Except that the steering committee and leadership management were handling the direction, distributing resources and coordinating the relationships, the project team consisting of managers and officers showed their excellent executive abilities in the process. In addition, the external consultants carried the responsibility with the officers, which strengthens the implementing power and reduces the risks.

### 3. Sufficient requirement analysis and risk analysis before implementation

Before the implementation, the project team interviewed every department to find their urgent needs and submitted the risk analysis report combined with the situation of Finetech after analyzing the ERP implementation cases. Within later project implementation, the team tried their best to take some measures in order to avoid the risks intentionally. For example, some brainstorm-style training seminars were held frequently to reduce the risk of personnel's misunderstanding of ERP concepts.

### 4. Suitable ERP software and vendors

ERP implementation project is a long-term process. In the selection of ERP vendor and products, the vendor's technique level, future development and so on should be included into the discussion. After the ERP launching, the Finetech still needs long-term technical support from the vendor. Therefore, the management needs to have a

completed knowledge about the group itself before selecting the software and vendor.

#### 5. Moderate project scale

The whole project needs to be divided into several stages in order to reduce the risks caused by inadequate experience and stimulate staffs' confidence by the way that "The easier, the First". Finetech set up several targets in different phases and the target in the first phase was establishing a basic system and information-sharing database. Only in this way can the Finetech realize cutting down the inventory and variable cost, improving product quality and efficiency.

ERP implementation is a complicated process. Though some SMEs in China will get in trouble when they are establishing the system, the management still needs to be faced with facts and take measures on their confidence, human resource development and so on. Actually, it is a good time for SMEs in China to expand and taking advantage of ERP to improve the management level, which is the best way to increase the core competitiveness.

I worked in Finetech as an intern for over 6 months to take part in the project. Because of the limited time and limited resources, I could not analyze the whole project thoughtfully. The setting-up project was divided into three stages, and this thesis is completed when the stage two is ongoing. In this period, I learned how to find useful resources and how to organize a logic article, and I appreciate my supervisor's help and the support from Savonia UAS.

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## Appendix 1 Definition of Abbreviated Terms Based on WIKIPEDIA

1. ERP: Enterprise Resource Planning. A business management software—usually a suite of integrated applications—that a company can use to store and manage data from every stage of business
2. SME: Small and Middle-Sized Enterprises.
3. OPM: Order Point Method or Reorder Point. The level of inventory when an order should be made with suppliers to bring the inventory up by the Economic order quantity
4. MRP: Manufacturing Resource Planning. A method for the effective planning of all resources of a manufacturing company. Ideally, it addresses operational planning in units, financial planning
5. CRM: Customer Resource Management. A model for managing a company's interactions with current and future customers. It involves using technology to organize, automate, and synchronize sales, marketing, customer service, and technical support.
6. HRM: Human Resource Management. The management function of an organization responsible for attraction, selection, training, assessment, and rewarding of employees, while also overseeing organizational leadership and culture and ensuring compliance with employment and labor laws. In circumstances where employees desire and are legally authorized to hold a collective bargaining agreement
7. SCM: Supply Chain Management. The management of the flow of goods. It includes the movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption.
8. APICS : American Production and Inventory Control Society

Appendix 2 Project Task List

	Task Name	Duration
1	<input type="checkbox"/> <b>Project Management</b>	<b>150 days</b>
2	<input type="checkbox"/> <b>Phase1:Project Preparation</b>	<b>12 days</b>
3	Project Launching Meeting Preparation	1 day
4	Project Launching Meeting	1 day
5	Software Installation	5 days
6	<input type="checkbox"/> <b>Train Key-users</b>	<b>12 days</b>
7	Basic Operation Training	0.5 days
8	<input type="checkbox"/> <b>Training of Accounting</b>	<b>5 days</b>
9	Total Accounting Management	2 days
10	Receiveable Capital Management	1 day
11	Payable Capital	1 day
12	Fixed Capital Management	1 day
13	<input type="checkbox"/> <b>Training of Sales</b>	<b>8 days</b>
14	Inventory Management	1 day
15	Procurement Management	2 days
16	Markeing Management	2 days
17	<input type="checkbox"/> <b>Training of Operation Technique</b>	<b>4 days</b>
18	Basic System Management	2 days
19	Reporting Developing Tools	2 days
20	<input type="checkbox"/> <b>Phase2: Business Requirement Analysis</b>	<b>6 days</b>
21	<input type="checkbox"/> <b>Requirement Interviews</b>	<b>6 days</b>
22	Financial	2 days
23	Marketing	4 days
24	<input type="checkbox"/> <b>Business Process Design/Discussion/Confirmation</b>	<b>26 days</b>
25	<input type="checkbox"/> <b>Accounting Process</b>	<b>26 days</b>
26	Designing	10 days
27	Presentation	1 day
28	Modification	3 days
29	Final discussion and Confirmation	5 days
30	<input type="checkbox"/> <b>Marketing Process</b>	<b>18 days</b>
31	Designing	8 days
32	Presentation	1 day
33	Modification	3 days
34	Final Discussion and Confirmation	5 days

35	☐ <b>Phase3: Prototype Established</b>	<b>76 days</b>
36	☐ <b>Technical Strategy Seminar</b>	<b>1 day</b>
37	Hardware/Network/Backup/Authorization etc. Discussion	0.25 days
38	Developing Strategy Discussion	0.25 days
39	Data Management Discussion	0.25 days
40	Data Transfer Discussion	0.25 days
41	☐ <b>Data Transfer Details and Definition</b>	<b>3 days</b>
42	Subject	0.5 days
43	Methods	0.5 days
44	Preparation	2 days
45	☐ <b>Customization</b>	<b>5 days</b>
46	Discussion	1 day
47	Content Design	3 days
48	Content Confirmation	1 day
49	☐ <b>System Implementaion</b>	<b>46 days</b>
50	System Configuration-Accounting	20 days
51	System Configuration-Marketing	20 days
52	System Development-Reporting	46 days
53	System Development-Customization	25 days
54	System Development-Data Transfer	15 days
55	☐ <b>System Testing/Modifing</b>	<b>15 days</b>
56	Testing Environment Simulation	3 days
57	Functional testing	5 days
58	Modification	3 days
59	Prototype Presentation	1 day
60	Modification	3 days
61	☐ <b>Technique Implementation</b>	<b>26 days</b>
62	User ID Establish	5 days
63	System Role Definition	8 days
64	Permission Setting	13 days



65	<b>Phase 4:Prototype Testing</b>	<b>20 days</b>
66	<b>Testing Preparation</b>	<b>5 days</b>
67	Testing Script editing-Accounting	3 days
68	Testing Script editing-Marketing	5 days
69	Testing	10 days
70	Modification	5 days
71	<b>Final User Handbook Drafting</b>	<b>5 days</b>
72	Accounting Users	5 days
73	Marketing Users	5 days
74	Technique Users	5 days
75	<b>Teminar Users Traning</b>	<b>5 days</b>
76	Accounting	5 days
77	Marketing	5 days
78	<b>System Launching Preparation</b>	<b>10 days</b>
79	Data Transformation	3 days
80	Launching Planning	2 days
81	Operation Environement Adjustment	3 days
82	Launching Evaluation and Assessment	2 days
83	Launching Conference	1 day
84	<b>Phase 5: System Launching</b>	<b>20 days</b>
85	Accounting Data inputting	5 days
86	Inventory Data Inputting	5 days
87	Balance Inputting	5 days
88	Order Information Inputting	5 days
89	System Launching	1 day
90	Supports of System Operating	3 days

Appendix 3 Yonyou U8+ ERP Functionality

