

**Jianqiao Jiao**

**ANALYSIS OF AN ENTERPRISE RESOURCE PLANNING  
SYSTEM**

**Thesis**

**CENTRIA UNIVERSITY OF APPLIED SCIENCES**

**Information Technology**

**June 2020**

## ABSTRACT

<b>Centria University of Applied Sciences</b>	<b>Date</b> June 2020	<b>Author</b> Jianqiao Jiao
<b>Degree programme</b> Information Technology		
<b>Name of thesis</b> ANALYSIS OF AN ENTERPRISE RESOURCE PLANNING SYSTEM		
<b>Instructor</b> Kauko Kolehmainen	<b>Pages</b> 44	
<b>Supervisor</b> Kauko Kolehmainen		
<p>ERP system is an implement pattern of modern corporations, which integrates the information technology with the advanced ideology of management. It reflects the era when the corporations should rationalize the resource and create well-being for the society to the greatest extent. Therefore, it becomes the footstone for the corporations to survive and develop in the information ear. Now, ERP is widely implemented in discrete manufactories, financial companies, telecom enterprises, and even university and public institutes.</p> <p>And of course, it can be implemented in continuous process industry. There are many differences between different kinds of industries, so development and implementation of ERP has its own characteristics and keystones. Taking the development and implementation for buyer information system of Solectron EMS mill as an example, the development and the implementation of buyer information system of ERP is introduced. Meanwhile the system is analyzed, and its lower functional mode is established. The concept and technology of multi-layer architecture is introduced, and the distributed multi-layer architecture of buyer information system is analyzed in detail.</p> <p>In the end the concept and basic flow of genetic algorithm is introduced, as well as a genetic algorithm based on variable length coding. Based on the specialty of flexible processing eateries, designed and developed production planning system of processing ERP.</p>		

## CONCEPT DEFINITION

### **AM (Agile Manufacturing)**

It refers to that manufacturing enterprises can grasp market opportunities, reorganize production systems in a timely and dynamic manner, and launch profitable, user recognized and high-quality products to the market in the shortest time (compared with other enterprises).

### **ASP (Appliance Service Provider)**

Generally, it refers to the service provider that provides rental application software to enterprises through the network. Enterprises can use these applications for digital management and get external support from ASP professionals at a small cost.

### **BOM (Bill of Material)**

To use computer-aided management, first of all, the system should be able to identify the product structure and all materials involved.

### **BPR (Business Process Reengineering)**

The fundamental rethinking of the enterprise process is to design and improve the cost, quality and speed service thoroughly.

### **CIM (Computer Integrated Manufacturing)**

With the help of computer information technology, a general method based system is provided to integrate all kinds of manufacturing related technical systems in the enterprise to form an efficient and competitive factory in the future.

### **AMT (Advanced Manufacturing Technology)**

It combines information technology software, microelectronics and new organizational practices in the manufacturing process, including the general term of new manufacturing technology and mechanical manufacturing engineering technology.

**KEYWORDS****ERP SYSTEM**

IT SUPPORTS THE COMPANY INFORMATION MANAGEMENT

**PRODUCTION PLAN**

SUPPLIER COMPANY HAVE TO MAKE PRODUCTION PLAN TO FULLFILL MARKET NEED IN ADVANCED

**PROJECT MANAGEMENT**

WHEN WE IMPLEMENT THE SYSTEM, WE MUST SET A PROJECT AND START ACCORDING TO THE PROCESS OF A PROJECT.

**NEW SYSTEM OPERATION**

CONDUCT SELF-EVALUATION BASED ON SONSOLIDATION

**ERP DEVELIPMENT**

ERP INTEGRATES THE WHOLE SUPPLY MANUFACURING PROCUREMENT PROCESS

**OBJECT ORIENTED**

WHAT FUNCTION MUST BE PROVIDED IN THE TARGET SYSTEMS

# TABLE OF CONTENT



.....	<b>1</b>
<b>ABSTRACT.....</b>	<b>1</b>
<b>1.INTRODUCTION.....</b>	<b>1</b>
<b>2 ERP (ENTERPRISE RESOURCE PLANNING).....</b>	<b>3</b>
<b>2.1 Case of ERP implementation.....</b>	<b>6</b>
<b>2.1.1 Purchase ERP management system.....</b>	<b>6</b>
<b>2.1.2 Process industry ERP.....</b>	<b>8</b>
<b>2.1.3 Requirements of ERP in process industry.....</b>	<b>9</b>
<b>2.1.4 ERP system implementation process.....</b>	<b>11</b>
<b>2.1.5 Preliminary work of the project.....</b>	<b>12</b>
<b>2.1.6 Implementation preparation stage.....</b>	<b>13</b>
<b>2.1.7 System implementation process.....</b>	<b>16</b>
<b>2.1.8 Key factors for successful implementation of ERP.....</b>	<b>17</b>
<b>2.2 Development stage of ERP.....</b>	<b>18</b>
<b>2.3 Characteristics of ERP.....</b>	<b>20</b>
<b>2.4 Management idea of ERP system.....</b>	<b>21</b>
<b>2.5 Production planning system in process industry ERP.....</b>	<b>23</b>
<b>3 BACKGROUND DEVELOPMENT AND IMPLEMENTATION OF PURCHASING MANAGEMENT INFORMATION SYSTEM IN ERP.....</b>	<b>26</b>
<b>3.1 Software engineering method.....</b>	<b>26</b>
<b>3.2 Traditional development model.....</b>	<b>27</b>
<b>3.3 Concept and characteristics of multi-layer structure.....</b>	<b>29</b>
<b>3.4 Logistics Dynamic model.....</b>	<b>31</b>
<b>3.4.1 Purchase information flow.....</b>	<b>32</b>
<b>3.4.2 Capital flow.....</b>	<b>33</b>
<b>3.4.3 Control flow.....</b>	<b>35</b>
<b>3.4.4 System implementation plan.....</b>	<b>36</b>
<b>3.4.5 Delphi multilayer development technology.....</b>	<b>37</b>
<b>3.5 System operation.....</b>	<b>38</b>
<b>4 CONCLUSIONS.....</b>	<b>40</b>

**REFERENCE..... 43**

FIGURE 1 Stage of ERP development.....	24
FIGURE 2 Internal and external factors affecting production plan.....	29
FIGURE 3 linear order model.....	36
FIGURE 4 Prototype model.....	37
FIGURE 5 Client application server remote database server.....	38
FIGURE 6 Short area distribution.....	39
FIGURE 7 Information flow.....	40
FIGURE 8 Capital flow.....	41
FIGURE 9 System hardware configuration.....	42
FIGURE 10 Midas structure.....	43

## 1. INTRODUCTION

ERP was originally a management idea based on the internal supply chain of an enterprise. It expanded management based on MRP II. Its basic idea is to regard the business process of an enterprise as a closely connected supply chain.

The department is divided into several supporting subsystems, such as finance, marketing, manufacturing, service maintenance, engineering technology can be applied to all links in the internal supply chain of an enterprise, such as order, purchase, inventory, planning and production system, manufacturing, quality control, transportation, distribution, service and maintenance, finance, cost control, business risk and investment, decision-making, effective management of policy support, laboratory/formula, human resources. The enterprise in terms of management scope and depth. More functions and tools are provided.

In fact, the benefits that ERP can bring really have a considerable temptation for many enterprises. According to the statistics of the American Society for production and inventory control (APICS), using an MRP II / ERP system can bring the following economic benefits to the enterprise. It brings 30% - 50% decrease in inventory, which is the most benefit people say. Because it can reduce inventory investment by 1.4-1.5 times and increase inventory turnover by 50%.(Tsinghua University. 2010.)

Management level is improved, management personnel is reduced by 10%, and production capacity is increased by 10% - 15%. In the wave of global e-business, how to create information system, reduce the cost of internal information processing, improve the efficiency of information processing, reduce the cost of production, realize user differentiated services, and take into account the coordination and consistency with the corporate culture on the basis of business activities as the center, by means of electronic and network, is of great importance to enterprises. In large companies, most of the cross departmental information system projects have tight schedule, strict cost control, high quality requirements, are associated with many different types of huge information

systems and have complex structure. They need to analyze and prevent the risk of various personnel and scope changes in advance, effectively balance, fully communicate, and artistically resolve various conflicts, information system development projects often involve sub project outsourcing. It is particularly important to use project management tools for schedule planning, control and effective risk control, and to set up a backup plan. The project is initiated by the middle and senior managers of D company, based on the new strategy of the enterprise.

The implementation process encountered a series of difficulties such as the flow of developers and the lagging progress of the outsource. During the implementation process, the project management tools were used to plan, implement, control, evaluate and effectively control various risks during the operation, effectively balancing the time, cost and quality of the project, so as to achieve the goal of the project. ( Liu Zhibo 1998,40-48. )

In the global competition environment, enterprises are required to compete in the international market. They must have the brain of international operation to reconstruct their development strategy, reorganize and optimize their resources. Secondly, with the advent of the information age, the rapid development of information technology, the popularization of network and communication, promote the adjustment of economic structure, change people's lifestyle.

The organizational structure and management mode of pyramid type enterprises are difficult to adapt to the development requirements of the new economic era. Therefore, to adapt to the requirements of economic globalization competition and management information, enterprises must carry out management innovation. ERP system, as an integrated tool of advanced management ideas, is an important part of ERP system, it can provide a platform for enterprise management innovation. Therefore, it is necessary to clearly and emphatically discuss the characteristics of ERP system and the role of ERP system in enterprise management innovation.



## **2 ERP (ENTERPRISE RESOURCE PLANNING)**

ERP (Enterprise Resource Planning) enterprise resource planning, which is composed of MRP.) In the early 1990s, according to the development of computer information processing technology and the needs of enterprises for supply chain and value chain management, the American carter group put forward the concept of ERP Based on MRPII (Li Shichun. 2001.)

It uses a series of functional standards to define ERP, which is defined as follows: beyond the scope of MRPII and integrated functions, supporting mixed mode manufacturing environment, supporting dynamic monitoring capability, improving business performance, supporting open client / server computing environment. ERP is an information management software system which plans and controls the resources of the whole enterprise. It is a modern management software tool based on the management idea of enterprise supply chain, which extends the management scope on the basis of MRPII. The basic idea of ERP is to regard the business process of an enterprise as a closely connected supply chain, including suppliers, manufacturing factories, distributors, manufacturing factories, distribution networks and customers, etc., and to divide the enterprise into several supporting systems that cooperate with each other, such as finance, towel marketing, manufacturing, service maintenance, engineering technology.

In the modern computer and network communication as tools, advanced management ideas and methods are adopted to integrate and optimize all resources of the enterprise (including human resources, funds, materials, equipment, information, time and methods) To achieve the purpose of accurate production, accelerating capital turnover, reducing inventory, reducing costs, improving labor productivity, improving customer satisfaction and enhancing the core competitiveness of the enterprise. (O'Sullivan 2016, 115-117.)

As the integration of modern enterprise management ideas and advanced management tools, the core management idea of ERP is to realize the effective management of the whole supply chain.

It embodies the idea of managing the whole supply chain resources. In the era of knowledge economy, if an enterprise wants to participate in the market competition effectively, it needs to make the most effective use of all kinds of resources. It is not only necessary to use its own resources, but also to integrate the relevant parties in the operation process, such as suppliers, manufacturing plants, distribution networks, customers, into a tight supply chain, so as to effectively arrange the production, supply and marketing activities of the enterprise. In a word, modern enterprise competition is no longer the competition between single enterprise and single enterprise, but the competition between one enterprise supply chain and another enterprise supply chain, ERP system can realize the effective management of the whole enterprise supply chain and meet the needs of market competition in the era of knowledge economy.

It embodies the ideas of lean production, synchronous engineering and agile manufacturing. ERP system supports the management of mixed mode of production. Its management ideas are shown in two aspects: first, lean production. It is an enterprise management strategy system proposed by MIT in the United States, that is, when enterprises organize production according to mass production mode, The relationship between an enterprise and its sales agents, customers and suppliers, which includes customers, sales agents, suppliers and cooperative units in the production system, is no longer simply a business relationship, but a benefit sharing partnership. This partnership constitutes an enterprise's supply chain, which is lean. (Dr Jill A O'Sullivan 2016, 71-88, ERP concepts)

The second is the idea of "agile manufacturing". When the market changes and the enterprise meet specific market and product demand, the basic partners of the enterprise may not be able to meet the requirements of new product development and production.

At this time, the enterprise will organize a short-term or one-time supply chain composed of specific suppliers and sales channels to form a "virtual factory", It is the core idea of "agile manufacturing" to regard the supply and cooperation units as an integral part of an enterprise, to organize production with "Simultaneous Engineering (SE)", to bring new products into the market in the shortest time, and to maintain the high quality, diversity and flexibility of products at all times. (Xing Wenxun, Xie Jinxing. 1999.)

The main function of management is planning and control. ERP system can well show the idea of planning and control. ERP system has a complete planning system, which covers all aspects of enterprise production and operation activities. It mainly includes: production plan, material demand plan, capability plan, purchase plan, sales execution plan, profit plan, financial budget and human resource plan, and these planning functions and value control functions have been fully integrated into the whole supply chain system, The financial system in ERP system is closely connected with each subsystem, which can automatically generate accounting information when transaction occurs, and ensure the synchronous record and data consistency of capital flow and logistics. (Li Shichun 2001, 39-40.)

In the ERP system, the planning, transaction processing, control and decision-making functions of an enterprise are all realized in the business process of the whole supply chain. Therefore, it is required to give full play to everyone's work potential and sense of responsibility in the process of business processing of each process, and the spirit of cooperation between processes and processes is emphasized, In order to give full play to the individual's subjective initiative and potential in the organic organization, realize the transformation of enterprise management from "pyramid" organizational structure to "flat" organizational structure, and improve the response speed of enterprises to the dynamic changes of market. ( Shang Wei. 2002.)

## **2.1 Case of ERP implementation**

Shenzhen Sampo Kingdom Furniture Co., Ltd. is a large furniture manufacturing company. ERP was implemented in 2018. It supports the sales performance of the enterprise and lays a competitive foundation for the enterprise to achieve its future development strategic objectives. This paper attempts to analyze the purpose and special needs of the second development of the production and planning module in SAP R/3, including the design of the development process and the effective preparation of the data, and finally gives the specific implementation process of the second development. Provide some experience and thinking for the implementation of ERP. (Li Fangyun, Chaiyueting 1996, 45-47, CIMS: analysis, design and implementation of integrated management information system)

In enterprises, general management mainly includes three aspects: production control (planning, manufacturing), logistics management (distribution, purchasing, inventory management) and financial management (accounting, financial management). In addition, with the strengthening of human resource management, human resource management has also been an important part of ERP system. If we divide the function modules of ERP from the perspective of enterprise internal management, ERP can be roughly divided into three layers. Logistics management is the core module of ERP, and for the process industry with relatively single raw materials, the importance of procurement management system, and many enterprises will purchase and inventory unified management, the core module of process industry ERP logistics management is procurement management system.

### **2.1.1 Purchase ERP management system**

In business management, the quality of purchasing management has a direct impact on the overall situation of the enterprise, and purchasing is the main activity of the enterprise. It plays a decisive role in the management of technology, production, finance,

personnel and so on. The purchase system is also directly facing the suppliers, which is the window of the enterprise and the embodiment of the enterprise image: it provides market information and purchase data for the business decision makers; provides demand information for the production forecast and production planning system; provides customer feedback information for the quality management system; and provides main financial data for the financial system.

Due to the change of working mode, the key point of enterprise procurement will also change correspondingly ERP system will bring quality change to the daily work of procurement management. This change puts forward higher quality requirements for the employees of the purchasing and supply department. (Shen Xiaobo, Pan Gang, Li Ping 2007, 52-54, Design and implementation of purchasing management information system for process enterprises)Due to the great changes in the working procedure, the purchasing personnel get rid of the heavy simple and repeated labor, and their main energy will be to study how to reduce the cost together with the internal personnel and suppliers of the enterprise

Pay attention to the output of enterprises , starting from cost reduction and quality assurance, combined with the corresponding basic skills and the production environment conditions of the enterprise. According to some purchasing activities, the appropriate purchasing methods, or ways to meet the "output" needs of enterprises should be determined. (Shen Xiaobo, Pan Gang, Li Ping 2007, 89-91)For example, for the purchase of parts, decision-making analysis method can be used to determine whether the parts are self-made or purchased and determine the principles to be followed by the enterprise, aiming at reducing costs and ensuring quality.

Emphasis on collaborative work, Learn the corresponding analysis methods and cultivate the cooperative work ability of procurement personnel. Value engineering analysis method is used to analyze the value function of purchased parts and provide necessary analysis information to relevant departments. This process involves the design of parts and the manufacturing of parts.

Together with the design department and the process department, it should participate in the price value analysis of part design to meet the functional requirements at the lowest cost. (Zhou Bosheng, Zhang Li 1998, 78-79, UML support environment)

Coordinate with financial department, Obviously, it involves and is closely related to the cash budget in the financial management of the enterprise. On the one hand, it should be noted that the cash problem is a very important limited resource in the operation of an enterprise, although the purchase management should affect the cash activities of an enterprise. But it is more important to coordinate with the work of the financial department, such as in the procurement activities, unified management of parts and components process outsourcing business, control of enterprise capital expenditure.( Liu Jingyi, Luo Weiqi 2002, 56-61, A preliminary study on the Trinity implementation of ERP system in Chinese enterprises)

Improve control procedures, in fact, controlling the cash outflow of enterprises is not a simple work, which will encounter many unexpected difficulties. In the actual operation of purchasing activities, we should learn to use some sound systems to line control. To achieve this, we can also use the integration function of material and fund information provided by ERP system. (Mei Mei, Zhong Weijun, 1999, 17-21, Development of object-oriented enterprise integrated information system) Make and approve the purchasing budget and purchasing authority and pay attention to the continuous improvement of ERP system.

### **2.1.2 Process industry ERP**

According to its characteristics, industrial production can be divided into discrete manufacturing and process manufacturing. The latter can be divided into continuous process manufacturing and batch process manufacturing. Discrete production is typical of automobile manufacturing industry and mechanical processing industry, which mainly changes the geometry of raw materials.

Oil refining, chemical industry, water treatment, energy and other industrial sectors are typical of continuous process production, which will continuously change a series of physical and chemical states, material characteristics and even composition of raw materials, while maple, medicine, food, rubber and other industries are typical of batch process production. This kind of production is the same as the continuous process production, the material composition of the raw material is also changing, but it is different from the continuous production. Batch by batch production, within each batch, several hours to dozens of hours is continuous production, while between batches is intermittent and has the characteristics of discrete. (Liu Hui 2002, 19-22, Supply chain management)

### **2.1.3 Requirements of ERP in process industry**

At present, most ERP systems in the market are developed from MRP II of discrete manufacturing industry, which is more suitable for discrete manufacturing industry. However, in many industries, the process industry accounts for a very large proportion, and there are few ERP products suitable for the process industry. Therefore, the enterprises in the process industry in China feel very difficult in ERP selection. Many ERP suppliers promise that their products can be used in the process industry. However, the terms they use and the management concepts they provide are not consistent with the concept habits of the inherent process enterprises. Some enterprises buy the so-called general ERP and cannot play a role, or only a few functions can play a role. Therefore, it is necessary for us to recognize the fact that there is a difference between process enterprises and discrete manufacturing industries, and the ERP of process enterprises needs to be treated specially. Requirements of process ERP itself.

In the process industry, the product is produced by a fixed production line. The production line can be divided into several processes according to the process. Each process involves the production formula and the Department responsible for the production task. Especially formula, and discrete BOM (bill of materials) in

manufacturing industry has different meanings, which not only represents the component ratio. It also represents the production level of the enterprise because another meaning of the formula is the composition table of unit production cost. Therefore, enterprises usually take the cost accounting results of the previous year as the production technology assessment indicators of the next year. (Weng Yingjun, Zhu Zhongying 2002, 192-199, A discussion on some frontier research of ERP)

In the process industry, raw materials account for the largest proportion of production costs. Through the management of raw materials, it is of great significance to reduce costs. Generally, raw materials account for 70% - 80% of the product cost, and labor costs account for about 2% - 5%. In addition, the production model also records the production time information. Through the production model, the enterprise plans the product process strictly.

At present, the concept that process enterprises produce according to the market demand has been gradually accepted by people, but sometimes it is necessary to products with large market demand can also be "promoted by production", through mass production, reduce costs and purchase. Therefore, as the basis of the production plan of process enterprises, it is mainly the annual order and forecast the main production plan and operation plan are used to guide the production of enterprises. The main production plan is usually a monthly plan, the operation plan is a daily plan or a batch plan. The function of planning is to coordinate the production of different operation departments.

According to the strict procedures for the control of intermediate products, process planning can be divided into batch planning and no batch planning. Stay between the main production plan and the operation plan, there is "work" instead of doing P11 or ERP separately. but only the instruction plan is released. Different from discrete ERP, process enterprises will release quality inspection plan and equipment maintenance plan with the release of production plan. (Zhang Houqi 1999, 63-65, The concept and management idea of ERP system, Chinese and foreign management guide)



Workshop management, the main task of workshop management is to confirm and receive the production plan of the superior, make statistics of the production completion and main economic and technical indicators as well as personnel management, equipment management and material management in the workshop. The workshop of the process enterprise is relatively simple, mainly picking, feeding and controlling the production process according to the plan, so as to ensure the efficient output of products. Due to the high degree of automation in the process industry, the output, main economic and technical indicators, equipment status and personnel attendance can be automatically recorded by computer.

Cost accounting, Because process industry enterprises are mass production oriented to inventory, the cost accounting is usually carried forward step by step, With the improvement of enterprise automation, the scope of cost sharing will become smaller and smaller, which will be directly included and combined with production management

#### **2.1.4 ERP system implementation process**

After the ERP system came into China in the 1990s, people have high expectations for ERP to solve the backward management situation in our country. Especially in Sampo Co. Ltd. However, the statistical data is disappointing. According to incomplete statistics, tens of thousands of enterprises in China have purchased or developed MRP II / ERP software. In all ERP system applications, there are three situations: successful implementation of system integration on schedule according to budget accounts for 10% ~ 20%; failure of system integration or partial integration accounts for 30% ~ 40%; failure accounts for more than 50%.

Moreover, most of the successful 10% - 20% are foreign-funded enterprises. The low success rate undoubtedly shows us that in the process of introducing ERP system, the implementation is an extremely critical link which cannot be ignored. The success or

failure of the implementation ultimately determines the full play of ERP benefits, especially in the state-owned enterprises with a mixture of planned economy and market economy, the implementation of ERP is even more difficult.( Lu Jia 2001, 144-146, System analysis method for enterprise management object)

A successful ERP implementation process mainly includes the following three stages: project preliminary work, implementation preparation stage and system implementation process. In the whole process of implementation, each stage is closely linked and cannot be rushed, otherwise it can only be half the result with twice the effort.

### **2.1.5 Preliminary work of the project**

This is a stage related to the success or failure of the project and often ignored by people, mainly including: leadership training and needs analysis to establish objectives, software selection. Leadership training, the senior leaders of enterprises are the decision makers of ERP system, while the basic managers and employees of enterprises are the real users. Therefore, the main target of the training should be the senior and primary leaders of the enterprise and the personnel of the ERP project team in the future, so that they can master the basic principles and management ideas of ERP, understand the operation mode, operation mode and final results of ERP system in detail and deeply, and investigate the relevant successful enterprises applying ERP system.( Lu Jia 2001, 169-171, System analysis method for enterprise management object)

These problems need to be raised by the enterprise itself, also need to find the answer. At the same time, through the evaluation of the existing problems in the current management and business process of the enterprise, the expected objectives are made clear, and a demand analysis and investment benefit report are made as the theoretical basis for ERP in the enterprise.

When selecting software, the most important thing is to inspect whether the selected software meets the requirements from the particularity of the industry or enterprise. For

example, in the building materials industry, most of them are process-based enterprises. Their management has the following characteristics: continuity, product oriented warehouse production or mixed production type, complex process: the production of a single product never stops, machinery and equipment operate directly, and do not stop production without special reasons: the annual production capacity of the enterprise is relatively stable, and will not exceed the capacity to produce.

Most of the enterprises have high temperature, high pressure and other production environments, There are special requirements for equipment management and personnel training and assessment; industrial control systems (such as DCS (distributed control system) and PLC (program control system) are mostly used in process enterprises to monitor the production situation through industrial computer; in order to ensure the correct and proficient operation of employees, process enterprises need skill training and skill identification for employees, but usually need simulation optimization system. (Chen Guoliang, Wang xufa 1996, 77-78)

Therefore, after being clear about the characteristics of the industry and the enterprise, the selected management software should include modules that meet the characteristics of the industry, such as formula management, equipment maintenance management, product batch management, tracking cost accounting, gateway interface integrated with industrial control system (DCS, PLC) which can monitor the production status in real time, process device simulation module.

### **2.1.6 Implementation preparation stage**

This critical stage and the previous stage can be crossed, and the work of establishing project organization and preparing business process reorganization can be carried out in the early stage. The implementation of ERP is a large-scale system engineering, which needs organizational guarantee. If the composition of the project is improper and the coordination is not good, it will directly affect the implementation cycle and success or failure of the project. The project organization is generally composed of three layers

Project leading group is composed of the general manager of the enterprise and the vice general manager related to the system. It mainly plays the role of reasonable allocation of human resources, such as the appointment of project manager, the discovery and use of excellent personnel.

Project implementation team is completing the main ERP project implementation work, generally the project manager (the first leader at the grassroots level) will lead the organization work, and other members should be composed of the leaders or business bones of the main business departments of the enterprise.

Each system business group: it is to implement ERP to the grass-roots level, seek a new solution and operation method by mastering ERP system, and verify it with new business process, and finally work together with the implementation group to develop new work procedures and guidelines. The work of the business group also includes the training of grass-roots units. (Xing Wenxun, Xie Jinxing 1999, 55-56.)

In addition, if a consulting company or an industry expert outside the enterprise is invited to implement or supervise the implementation of ERP, another consulting group can be set up. In this way, the team can assist or implement the resolution of the problems that are difficult to solve due to the conflict of interest in the enterprise. In addition, they can also use their experience to guide the implementation process of business process reengineering ERP.

If the ERP system is developed by external personnel, these technical personnel can be integrated into the project implementation team and business teams. If the enterprise purchases ERP software, the technical personnel of the manufacturer responsible for the installation and implementation can also be integrated into the project implementation team and each business team.

Business process engineering and software development. The application of ERP is not only to introduce a set of modern management software to automate the daily business

management activities of enterprises. What is more, fundamental changes is needed to the traditional management mode of the enterprise, make it more reasonable and scientific, to improve the management efficiency of the enterprise.

For most domestic enterprises, business process engineering is the top priority of ERP system. There is no standard, scientific and advanced process within the enterprise, not only the information sharing and resource optimization and allocation within the enterprise advocated by ERP cannot be realized, but also the basic data of each functional module within the enterprise cannot be online. Even if on-line, the data communication between the functional modules will be difficult to achieve. The business process is divided into three parts:

If ERP software is purchased, it can fully absorb the first. Enter management experience, refer to the process in the software. If the ERP software is developed, the development process should be closely combined with the reorganization process. Without affecting the launch of basic data, the process embodied in the developed ERP software should conform to the business process after reorganization. (Jiang Leihong 2016, 188-190)

ERP system operation needs to prepare and input a large number of effective basic data, including some products, process inventory and other information, as well as some parameter settings, such as information required for system installation and debugging, financial information, demand information and so on. However, the system itself cannot judge whether these data are accurate or not. This requires enterprises to optimize and analyze the basic data, that is to say, enterprises must carry out management consultation and business process reorganization before ERP application, and ensure the accuracy of the basic data by strengthening enterprise management, instead of using the original "fuzzy control" experience data.

Based on basic data and preparation of all aspects, the system can be installed, and a series of debugging activities can be carried out. Because of the information integration of ERP system, it should be the test of the whole system, and the personnel of each

department should participate in the test at the same time, so as to understand the integration relationship among various data, functions and processes to find out the insufficient aspects, and put forward solutions to enterprise management problems, so as to carry out customization or secondary development next.

### **2.1.7 System implementation process**

This is a stage from theory to practice, in which all problems will be exposed. This stage is mainly composed of three aspects: simulation operation, online trial operation and formal operation of new system. Based on basic mastery of software functions, select representative products, bring various necessary data entry systems with problems often encountered in the daily work of enterprises, organize project teams to carry out practical simulation. The simulation can be centralized in the machine room and can also be carried out on site without affecting the work of field personnel. (Dr Dong Chuanliang 2017, 11-13)

Online trial operations are solving the problems in the simulation, we can prepare the online work of the basic data and determine the steps to be taken according to the conditions of the enterprise, the implementation team and the business team. We can either implement each module in parallel and once or implement one or two modules first. If the whole business process in the enterprise is clear and clear, the data can be put online as a whole, but the manpower and energy consumed in doing so is huge, and it is not easy to succeed. Generally, the mode of overall deployment is selected after local online. Of course, some enterprises adopt the way of developing a function module and the last function module, which is the safest way. But there are two problems: first, it takes too long; second, the basic data between the last completed module and the previously completed module will be difficult to be deployed.

New system operation is the new system applied to the enterprise, the implementation work is not completely finished, but a summary and self-evaluation of the results of the

system implementation are needed to determine whether the initial goal has been achieved, and then the next work direction is formulated on this basis. In addition, due to the development of the market competition situation, new demands will be put forward continuously. In addition, the upgrading of the system will always pose new challenges to the system. Therefore, it is necessary to conduct self-evaluation based on consolidation.

Price and understanding, set the next goal, further improve, and improve, and constantly consolidate and improve. In the above three processes, relevant training work runs through the whole process, from the leadership's training on ERP principles to soft.

Hardware product training, system personnel, programmer training and operator training, each link is indispensable. Therefore, in order to successfully implement ERP in state-owned enterprises, we must respect science, pay attention to actual effect, and never copy mechanically, otherwise we can only get a result with huge investment and little effect.

### **2.1.8 Key factors for successful implementation of ERP**

Finally, four key steps in ERP implementation are proposed. Information construction is a long-term and arduous project for enterprises. Only when leaders attach great importance to it and have strong determination can ERP implementation be guaranteed. Its called leader training.

ERP implementation is possible only when business process engineering is carried out thoroughly in accordance with advanced management concepts and industry experience. Its called implementation of business process. In the process of ERP implementation, in a series of training, only when a group of backbone personnel who are proficient in business and management and have a certain understanding of I technology emerge,

can ERP be implemented stably and effectively for a long time. Its called training of business backbone personnel.

With the increasing number of ERP sub-systems put into use, the degree of enterprise information integration continues to improve. Its called Long term planning and phased implementation: The benefits of enterprises in optimizing resource utilization, shortening procurement lead time and production cycle, reducing inventory capital occupation, reducing manufacturing costs and other aspects are also increasingly significant. The enterprise leader should combine the current situation of the enterprise and the development strategy of the enterprise, make the medium and long-term ERP implementation plan, and define the scope and goal of the ERP implementation project. We should determine the business process areas that ERP application should cover in the medium and long term and put forward clear and quantifiable objectives for business process optimization. (Zhong Hua 2016, 59-60.)

## **2.2 Development stage of ERP**

The development of ERP has gone through four main stages, The first stage is MRP (material requirements planning) is produced. In the 1960s, it was mainly used for purchasing management and inventory control. Its main function is to use BOM inventory data and master production plan to calculate material demand. (Wang Ninghong 2000, 57-60.) The second stage is closed-loop MRP came into being in the 1970s. Based on MRP, it integrates the capacity demand planning, production and purchase of rough capacity planning, forms feedback, and forms a closed cycle. The third stage is MRP II (Manufacturing Resource Planning) was born in the 1980s. Based on the closed-loop RP, it integrates finance, supply chain management and manufacturing, forming a complete enterprise management process. The fourth stage: ERP (Enterprise Resource Planning) came into being in the early 1990s. On the basis of MRPI, it adopts more advanced IT technology, such as Internet network technology, graphical interface, the fourth-generation computer language, relational database, client server distributed database processing, open system and simplified integration. In terms



of function, ERP has more powerful functions, can support multiple manufacturing types and hybrid manufacturing, and integrates more functional modules including supply and marketing chain.

ERP integrates the whole supply, manufacturing, and procurement process, and extends the system to suppliers and customers. At the same time, the system integration ability is stronger, which can support the global operation of enterprises. (Li Shichun 2001, 69-91, the challenge of modern resource management mode to Chinese enterprises) In addition to the manufacturing, finance, purchasing and other functions of the traditional MRP II system, the functions of distribution management, human resource management, transportation management, warehouse management, quality management, equipment management, decision support. are also added: to support the operation of the group, cross region and cross-border, its main purpose is to fully allocate and balance the resources of all aspects of the enterprise, In this way, the enterprise can exert enough ability in all aspects in the fierce market competition, to obtain better economic benefits. with ERP as an enterprise management tool in the Figure 1.

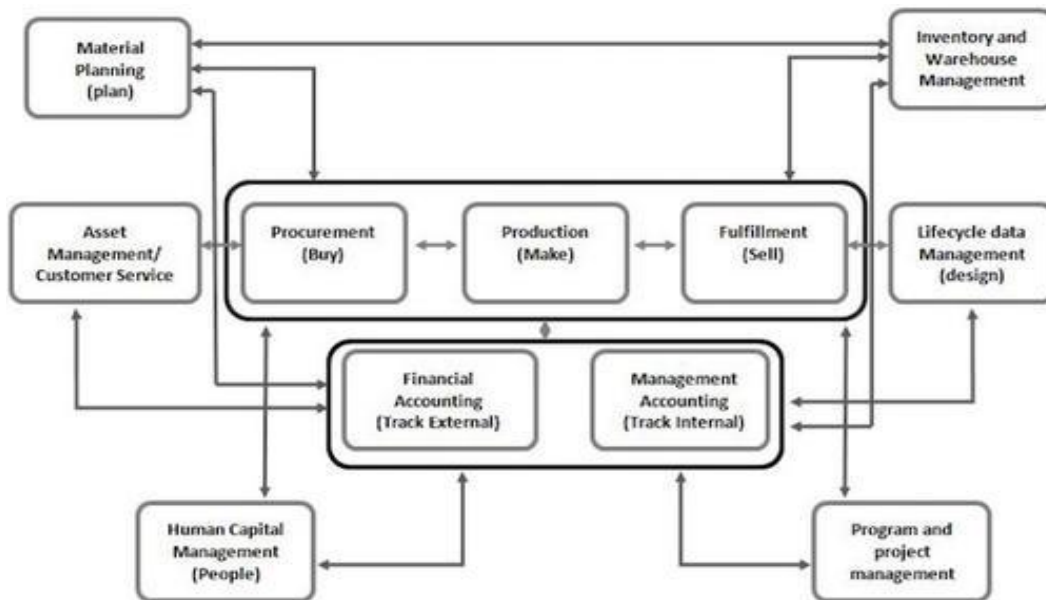


FIGURE 1. Stage of ERP development (Carol A Ptak, 2016)

## 2.3 Characteristics of ERP

The main features of ERP are as follows. The consistency and feasibility of the plan: ERP is a plan-oriented management mode. The plan is detailed layer by layer from coarse to fine, but always consistent with the business objectives. "One plan" is the principle of ERP, which unifies the multi-level management. The planning work is concentrated in the factory level management department. (Wu Yantai, Xue Hengxin 2001.) The workshop team can only implement the plan, schedule and feedback information. At the same time, it provides rich management tools, such as BOM module which can store long-term product structure, capability requirement plan which can verify the feasibility of the plan. Therefore, before the plan is released, the production capacity can be repeatedly verified and balanced, and adjusted in time according to the feedback information, so as to handle the contradiction between supply and demand, and ensure the consistency, effectiveness and enforceable of the plan.

Flexible decision-making flexibility: ERP is an information system from an overall point of view, which combines all systems within the enterprise to form an integrated system for the whole enterprise. It requires tracking, controlling and feeding back the rapidly changing actual situation. The management personnel shall make quick response according to the change of internal and external environment at any time, adjust the decision in time, and ensure the normal production plan. Because it can grasp all kinds of dynamic information in time and keep short production cycle, it has strong adaptability. (Wang Ninghong 2000, 136-145)

ERP has the function of simulation, which can simulate various results according to different decision-making policies, so it is also a decision-making tool for the upper level of the enterprise. Managers can more accurately prepare future production and supply plans, human demand and resource plans, and improve the prediction and evaluation of several plans. For example, according to the items to be produced in the production plan, inventory status and bill of materials, simulate the future inventory and

missing parts status, and prepare the planned order to be released in advance according to production to ensure efficient production.

The unification of logistics and capital flow includes cost accounting and financial functions, which directly transforms material flow in physical form into capital flow in value form. Ensure that production and financial figures are consistent. Financial department can reach. It can analyze the economic benefits of the enterprise at any time, which is used to guide the operation and control the production activities. (Weng Yingjun, Zhu Zhongying 2002,13-15)

Structure and distributed data processing technology, object-oriented processing technology, graphical, windowed interactive processing, relational database structure, the fourth generation language and user development tools, electronic data exchange EDJ, intranet network technology, multimedia application technology. in addition, applications across different computer platforms and interactive network technology are also adopted. The application of these technologies makes ERP system realize the integrated management of the whole supply chain information. The above characteristics show that ERP is a complete management system and an effective management mode to realize the overall benefit of manufacturing industry.

## **2.4 Management idea of ERP system**

The core management idea of ERP system is to realize the effective management of the whole supply chain, which is mainly reflected in the following three aspects.

Reflecting the idea of managing the resources of the whole supply chain is competition of modern enterprises is not the competition between a single enterprise and a single enterprise, but the competition between one enterprise's supply chain and another enterprise's supply chain, that is, enterprises not only rely on their own resources.

In order to gain competitive advantage in the market, it is also necessary to integrate all parties involved in the business process, such as suppliers, manufacturing plants, distribution networks, and customers, into a close supply chain. ERP system meets the needs of the market competition and realizes the management of the whole enterprise supply chain.

ERP system supports the management of mixed production mode, and its management ideas are manifested in two aspects: first, lean production LP (lean production) idea, that is, enterprises bring customers, sales agents, suppliers and collaborative units into the production system, and establish a partnership with them to share interests, And then form a supply chain. The second is the idea of "agile manufacturing".

When there are new opportunities in the market, and the basic partners of the enterprise cannot meet the requirements of new product development and production, the enterprise organizes a short-term or one-time supply chain composed of specific suppliers and purchasing channels to form a "virtual factory", regards the supply and collaboration unit as an integral part of the enterprise, and uses "Synchronous Engineering", The core idea of "agile manufacturing" is to organize production, use the shortest time to bring new products into the market, and keep high quality, diversity and flexibility of products at all times.( Zhang Houqi 1999, 59-60)

Reflect the idea of planning and in-process control is the planning system in ERP system, mainly including main production plan, logistics demand plan, capacity plan, purchase plan, sales execution plan, profit plan, financial budget and human resource plan, and these planning functions and value control functions have been fully integrated into the whole supply chain system. On the other hand, ERP system automatically generates accounting entries when transaction occurs by defining accounting subjects and accounting methods related to transaction, which ensures the synchronous records and data consistency of capital flow and logistics. Thus, according to the current situation of financial funds, we can trace the origin and development of

funds, and further trace the relevant business activities, so as to realize in-process control and real-time decision-making.

## **2.5 Production planning system in process industry ERP**

In the whole ERP system, the supply chain system is the basis of the whole enterprise operation. It includes sales and distribution subsystem, purchasing and outsourcing subsystem, logistics and inventory management subsystem, production planning and implementation subsystem, equipment maintenance subsystem and quality management subsystem. Among them, the production planning and execution system is the core of the whole supply chain. Its function directly affects the operation effect of the whole supply chain. The production planning system makes the production plan, tracks the implementation of the production plan, and dynamically adjusts the production plan at any time to ensure the enterprise's control of the production status at any time, which can effectively guarantee the smoothness of the supply chain and reduce the internal consumption of the enterprise. Reduce production costs. Production planning system can make a feasible production plan for enterprises, improve the service level of enterprises, increase the competitiveness and adaptability of enterprises on the basis of meeting the business objectives.

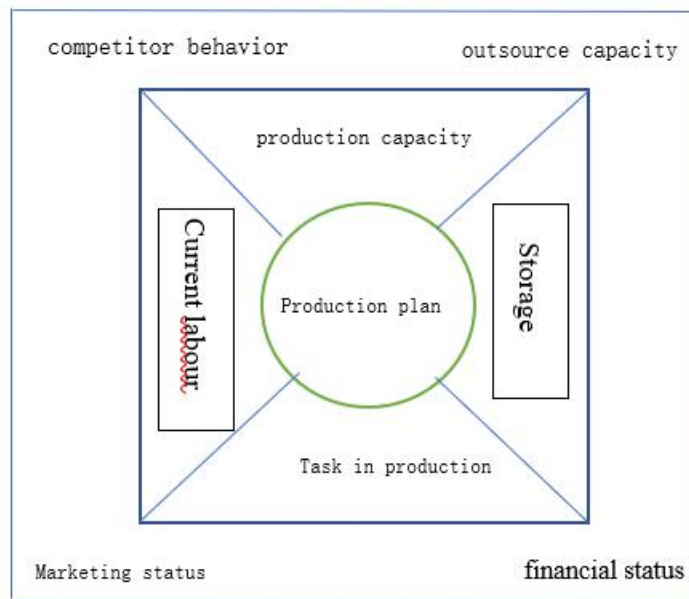


FIGURE 2. internal and external factors affecting production plan (Stephen Harwood 2017.)

In the Figure 2. There are some internal and external factors that will affect the formulation of production plan as shown in the figure. Internal factors can be controlled, while external factors are difficult to control. For external factors, we should not only consider the relatively predictable factors, the unpredictable factors or unexpected factors to make timely response, but also reduce the cost of internal factors as much as possible if allowed, such as striving for zero inventory to reduce the cost of inventory. This is the requirement of modern agile production and the problem we need to solve when we design the production planning system. (Mei Mei, Zhong Weijun 1999, 26-27.)

Because there are many factors that affect the production plan, there are generally more than one required objective. For the complex multi-objective optimization problem, it is difficult to solve it by using the general linear optimization algorithm, while the genetic

algorithm has the characteristics of large search space, strong adaptability and robustness, which are widely used in the current production planning algorithm.

### **3 BACKGROUND DEVELOPMENT AND IMPLEMENTATION OF PURCHASING MANAGEMENT INFORMATION SYSTEM IN ERP**

Sampo kingdom Co., Ltd. (SLR) is a furniture production company. Our products are widely used in the fields of computer information, network communication, semiconductor technology, medical treatment and aviation navigation. Its main customers include many international well-known high-tech electronic equipment manufacturers, more than 150. The mission of Sampo company is to provide customers with high-quality, low-cost, and satisfactory global manufacturing services integrating design, supply chain services and manufacturing solutions through long-term cooperation with customers based on compliance with business ethics.

Based on the belief of "customer first, respect for employees, attach importance to quality, develop partnership with suppliers, abide by business ethics, safeguard the interests of investors and give back to the society", the company will cooperate with domestic and foreign suppliers and customers for a long term with stable quality, fast demand response and leading technology, jointly create business opportunities, expand business, and provide domestic manufacturing technology and management We should try our best to improve the management level and the development of national economy. Purchasing management information system is a unified, standardized and information management system solution for Sampo kingdom Co., Ltd. (Li Ping 2015,46-47.)

#### **3.1 Software engineering method**

In the previous chapter, we mentioned that in the ERP development and design project of Sampo Kingdom Co., Ltd., we used the method of combining object-oriented method and data platform method to analyze the function of the whole ERP system. The purchase management is a sub module system in the logistics module. Due to the relatively less data to interact with other modules or sub modules, and the strong



interrelationship of various information within the sub module, we intend to use a data platform, namely a database, for this sub module.

The sub module we developed, if the decision support function is removed, is actually equivalent to a management information system (MIS). With the development of management information system, several development methods have been formed. Establishing and mastering scientific, reasonable, advanced and practical engineering development methods is one of the key factors to reduce and eliminate the risk of system development and ensure the success of the system.

### 3.2 Traditional development model

Up to now, there is no perfect engineering development method for MIS. The traditional development models commonly used are linear sequence model, prototype model and RAD model. Here we introduce linear sequence model and prototype model.

Linear order model. The linear sequence model of software engineering, also known as "traditional life cycle" or "waterfall model", is shown in the diagram. The linear sequence model proposes a systematic and sequential method of software development, starting from the system level, followed by



FIGURE 3. linear order model (AMT ERP research group, ERP early stage (8): ERP system in 1990s)

Linear order model is the earliest and most widely used software engineering method.

It is often difficult for users to give all the requirements clearly, but the linear sequence model requires that. Users must be patient, because feasible programs can only be obtained at the end of the project. If errors in the initial design are found at this time, the consequences may be catastrophic. The actual projects rarely follow the order required by the model, so it is likely to cause confusion in the development process.

Developers often delay unnecessarily, and blocking state often occurs in the linear sequence process, which causes some project members to wait for other members of the group to complete the tasks they depend on first.

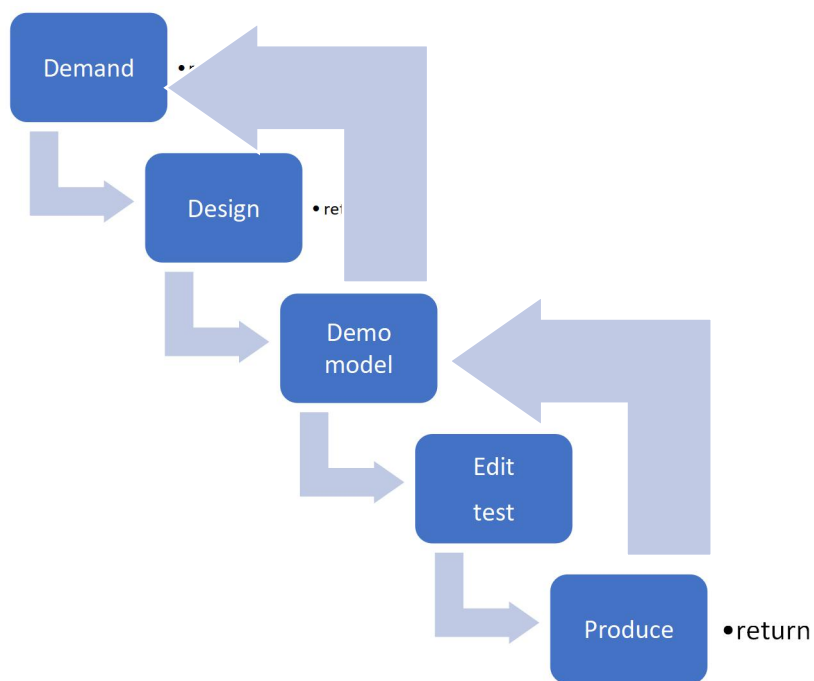


FIGURE 4. Prototype model (AMT ERP research group, ERP early stage (8): ERP system in 1990s)

The basic assumption of the prototype model is that the preliminary analysis of the system is imperfect and needs further revision. It is proposed for the problems of linear order model. In essence, the prototype method avoids the requirement definition stage of classical meaning, and the user's requirements are gradually clear through the active participation of the user in a rapid and feedback development process. ( Zhu Zhongying 2002, 15-19)

Figure 4 is a prototype model, which requires software developers to build a model of the software to be developed. The implementation steps are as follows. Visit key decision makers and key individuals, and draw out the experience and ideas of what the system should do. Quickly deliver the basic functions and relevant screens of the prototype and present these functions and screens to key users to listen to their opinions. Correct the problem immediately and accelerate the prototype construction until the user is satisfied.

Make the system run in a short period of time, users are more widely involved in the whole process, ensure that users contribute to the development process, and "own" to achieve solutions, users accept the new system.

However, the prototype method has its own shortcomings: due to the construction of the prototype in a short time, users sometimes mistakenly use the prototype as the final system, and do not wait patiently for the completion of the final version of the system, and refuse to work on the final version of the system. In order to make the prototype work as soon as possible, developers use inappropriate system or programming language. Due to the habit, these undesirable choices are likely to become part of the system. In addition, the prototype method does not include the confirmation process, nor the backup and recovery process. It is difficult for users to estimate the real completion time of the system under the condition of constantly changing requirements.

### **3.3 Concept and characteristics of multi-layer structure**

In order to solve these problems, multi-layer application system came into being, that is to put application server in the traditional two-layer C / S model. Application server is simply an application program containing enterprise logic. Developers use a specific component form, such as microsoft com / DCOM, COrba objects, or enterprise Java beans, encapsulate the program code of enterprise logic. After encapsulation, the objects that can perform specific enterprise functions are called "enterprise objects". These enterprise objects are distributed to the application server, and developers can

use the services provided by these enterprise objects when developing applications. The typical multi-layer structure is three-layer structure. Its basic idea is to separate user interface and enterprise logic. The overall structure is shown in the figure 5.

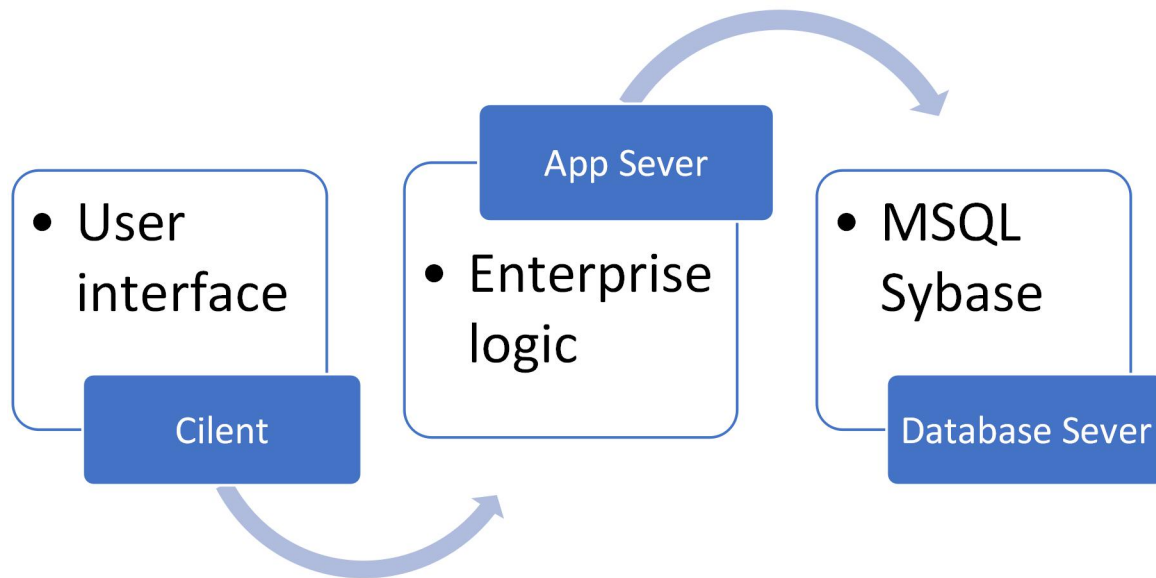


FIGURE 5. Client application server remote database server

Client applications. The main function of providing user interface is to guide operators to use the interface, input data and output results. It does not have enterprise logic, or only has some application logic that does not involve the core of the enterprise and is confidential. In this way, the client is very thin, which is called "瘦" client.

Application server, it is the main body of application, including the core and changeable enterprise logic (planning, operation method, management model.) in the enterprise, it provides data access service and customers to the database. Remote database server. That is, database management system (DBMS) is responsible for the management of data reading and writing and maintenance.

In a more complex multi-layer architecture, more intermediate servers can be added between the "thin" client and the remote database server, such as an intermediate

security server or an intermediate conversion server, to process data from different platforms.

Distributed multi-layer architecture divides the execution of the whole application system into several different parts and executes in different machines. The application server, as the middle layer, realizes the enterprise logic, coordinates the requests among the layers, grasps all the details of the data set definition and communicates with the remote database server. In this way, the client application focuses on displaying data and interacting with the user. (Stephen Harwood 2017,23-25)

### **3.4 Logistics Dynamic model**

The complete logistics process refers to the flow process from the raw materials entering the production workshop of the enterprise to the product purchase of the enterprise and finally to the customers, which is the most important and basic management object of the enterprise. The original logistics does not include the end-users, but with the emergence and development of Internet and e-commerce, the whole logistics extends to suppliers and end-users, forming a supply chain and value flow linked by market mechanism. In the product purchase management of EMS enterprises, the nodes of logistics include production workshop, warehouse and customers, where customers include dealers and final customers. ( Stephen Harwood 2017,189-199 ) Large enterprises usually have transit warehouses all over the country, so they should also include transit warehouses, which are connected by activities generated by various enterprise operations between nodes. Pictured here.

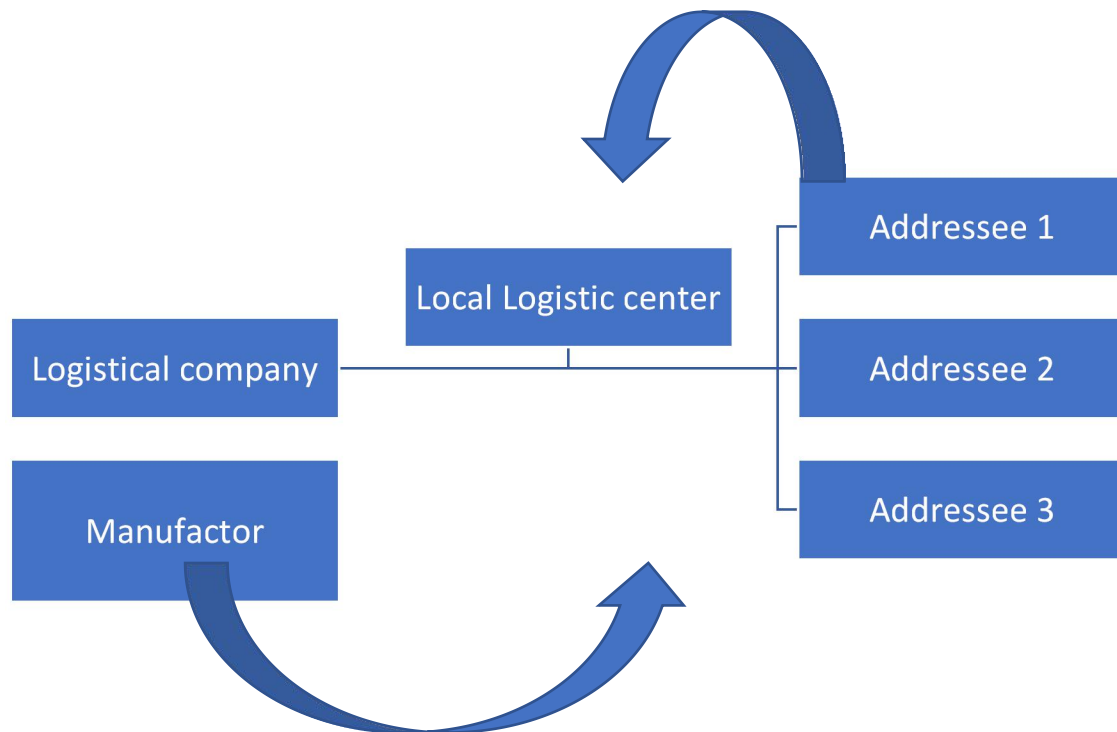


FIGURE 6. Short area distribution (Stephen Harwood 2017.)

### 3.4.1 Purchase information flow

Purchasing information flow is also the basic object of paper-making enterprises, which can be divided into three categories. First collecting information, the collected information includes instant information and historical information, which is usually the user's daily business operation information, such as the previous period fund information transferred by the customer into the current period.

Then statistics, from the original information layer by layer calculation, concentration of information that can reflect the business status of the enterprise, such as the quarterly sales status of each paper product, regional procurement status shown in the Figure 7.

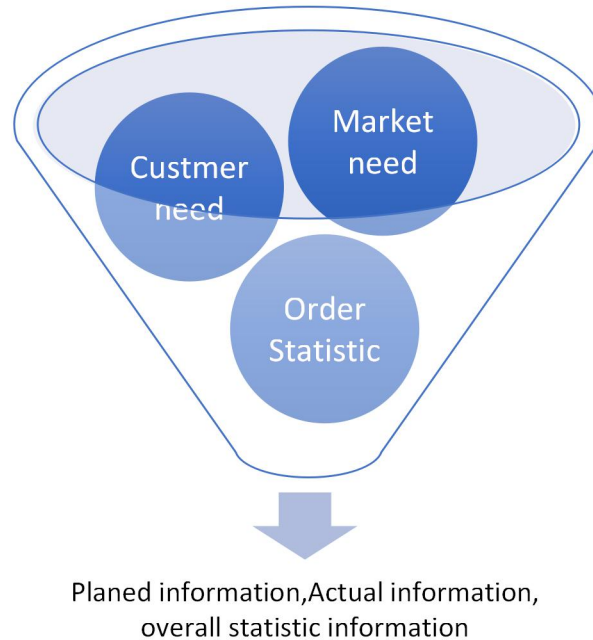


FIGURE 7. Information flow (Li Ping. , 2013.)

The purchase information flow management of EMS enterprise ensures the integrity of the collected information. For example, the supplier's file should be very detailed, and the supplier's file information includes the detailed information of customer unit, settlement unit, receiving unit and contact person. The plan information should be market-oriented, pay attention to the change of enterprise management object, and be incorporated into the plan system as much as possible. In the information flow analysis of the purchase system, the main line is the customer's order and delivery, as well as the purchase and supplier statistics.

### 3.4.2 Capital flow

Capital flow is very important in an enterprise. Capital management is the strictest and detailed in the whole management because capital maintains the survival and operation of a real enterprise. In the relationship between capital flow and other models, capital

flow and the relationship of logistics is the most critical. The value of logistics is constantly changing in the flow, but it always follows such a rule: value = quantity \* market price. This rule is reflected in every link. Similarly, there are value changes in every link, that is, value, cost and value-added. This is the value chain that embodies the business activities of enterprises. (Li Shichun 2001.)

The customers of EMS enterprises are usually big customers, with a large number of capital transactions, but each login and logout need to be very detailed. There are two main lines of capital flow in the purchasing department, one is the customer's remittance flow, including cash, wire transfer, bill; the information system needs to handle every account of customer's remittance; the other is the value flow after delivery, including The information system also needs to process the corresponding accounts for the payment of goods, freight, insurance and other accumulated payments. Based on the data of customer's capital account, capital flow also includes capital calculation flow, capital statistics flow and customer's credit analysis.

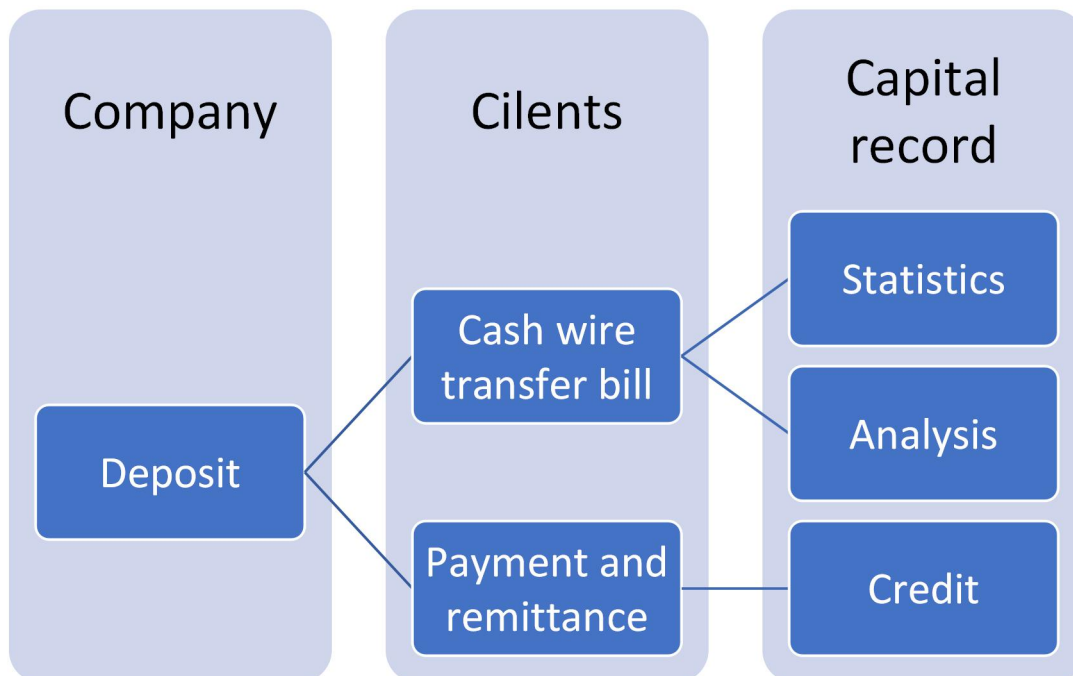




FIGURE 8. Capital flow (Lu Jia. System analysis method for enterprise management object (resource) - Exploration of ERP analysis method, computer engineering and application, 2001, 37 (16): 144-146)

### **3.4.3 Control flow**

In some system analysis, control flow is regarded as one of the information flows, but it is widely used in practical projects. We regard control flow as an enterprise object. In management, the control flow is the most complex, has many changes, is difficult to unify, and is closely related to each part of the business process. The purchase business control flow of EMS enterprise includes business process definition, coding rules, user permission grouping, document submission permission control and data constraint control. The analysis and design of control flow are difficulties in information system

The definition of control rules is the basis of the whole system. The change of rules often results in great changes in the design of the system, which is difficult to analyze comprehensively and carefully in the early stage of the system.

The document submission authority control in the control flow involves the security of document confidentiality. For example, the recipient can view the content of a certain mail, and the mail is completely confidential to the recipient of the mailing group. The approval of contracts and agreements is divided into different levels. Only after the approval of the next level can they be transferred to the next level for approval. Some aspects of the definition of these control rules are lacking. If we think less about it, there may be security risks.

### 3.4.4 System implementation plan

The procurement management system adopts the multi-layer structure implementation scheme of Midas and 115, and the client adopts two forms of Win32 app and browser. The Win32 app client is used for daily purchase business processing, while the web client is used for intranet internal data statistics and query. Database server adopts SQL Server 2000 database platform, application server is configured with DCOM / mids service middleware, web server is configured with IIS, and ASP technology is used to access application server interface methods, supporting remote call. The hardware configuration of the system is shown in the figure.

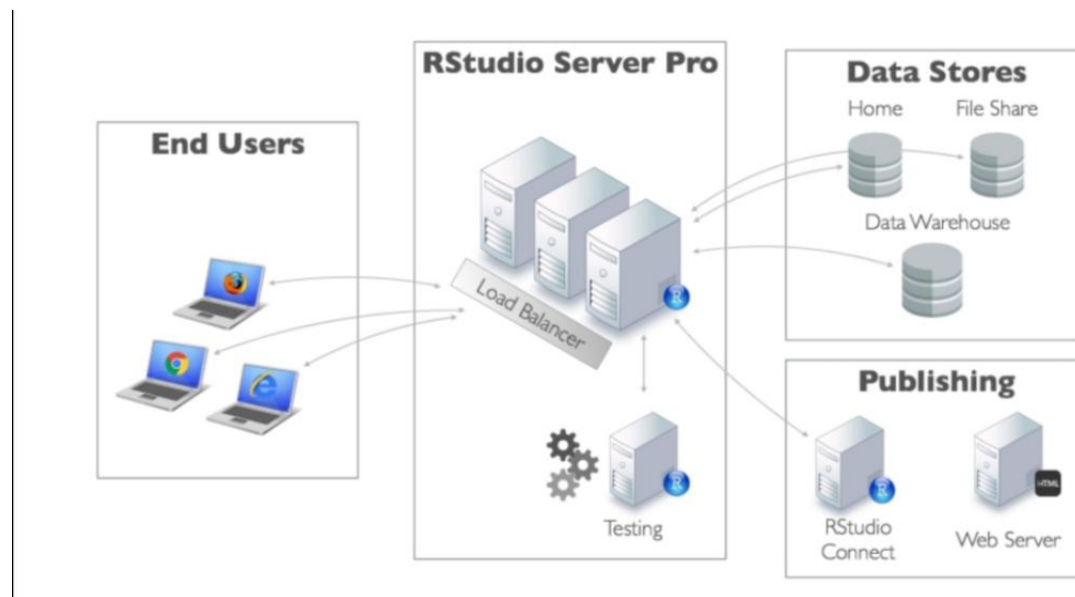


FIGURE 9. System hardware configuration (Sun Shudong, 1999.)

### 3.4.5 Delphi multilayer development technology

The foundation of multi-layer structure in delph soil is Midas (multi-layer distributed application service suite) technology. (Wang Ninghong 2000) Midas is a collection of different technologies. Whether it is an application server or a client, Midas technology needs the support of dB client. DLL and Midas, DLL. These two dynamic link libraries are used to manage data packages and publish this file when publishing Midas applications. The multi-layer structure based on Midas is still divided into client application, application server and remote database server, as shown in the figure 10.

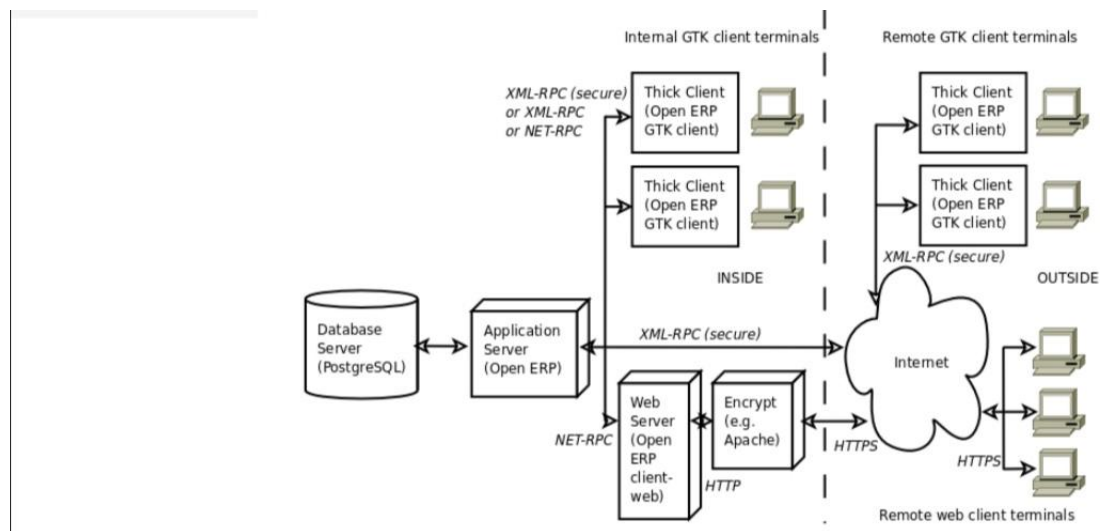


FIGURE 10. Midas structure (Lu Jia. System analysis method for enterprise management object (resource) - Exploration of ERP analysis method, computer engineering and application, 2001, 37 (16): 144-146)

The remote data module is like the common data module. The difference is that the remote data module can be used as DC command server or c0rba server to let the client application program access its interface.

T-data-set-provider and t-provider components are described. These two components are used on the application server side, mainly to provide the iprovider interface, and the client program obtains data and updates data sets through the iprovider interface.

The connection components are in the client, including dcomconnection, olenterpriseconnection, corbaconnection, socketconnection, midasconnectio, remoteserver and other connection components, which locate the application server and iappserve interface for the client application. System application socket connection connection component.

T-client-data-set component is described app-server interface is located at the client side and accesses the server side. It is a component inherited from t-dataset, but it does not need the component of BDE.

### **3.5 System operation**

Sampo Kingdom mainly produces and sells furniture. Up to now, the procurement management system has experienced many system upgrades and has been successfully operated for many years.

After the system has been put into operation, the purchasing personnel get rid of the heavy data statistical analysis and maintenance work. Then develop market and improve the service quality to users. The new system transforms the traditional purchase mode of "slice and contract" into a unified standard purchase mode. Any business can be in the charge of any purchasing personnel, and there will be no shortage of purchasing personnel.

Purchasing staff and decision-makers can get the latest purchasing data at any time, master the current purchasing form and market changes, and greatly improve the work

efficiency. The system is easy to use and learn. All purchasing personnel can quickly master and skillfully operate the system. It brings huge intangible benefits to Sampo, such as improving the corporate image and improving the service quality to customers.

## 4 CONCLUSIONS

The globalization of market, the aggravation of competition among enterprises in all walks of life and the great development of IT technology provide the necessity and possibility for the application of ERP system in large and medium-sized enterprises. Large and medium-sized process enterprises play an important role in China's national economy. The main characteristics of process industry are the large scale of production, the continuity of production process and the diversification of products. The implementation of ERP system, which represents advanced management concept and its technology, will have a significant and far-reaching impact on China's process industry enterprises. It is a necessary factor and strong guarantee for China's large-scale continuous enterprises to standardize business processes, clarify management ideas, reduce resource consumption, improve economic benefits, accelerate the response to market and customer needs, and enhance the global competitiveness of enterprises.

This paper takes the design of the whole ERP system of Sampo Kingdom Co., Ltd. and the development and implementation of the procurement management information system (including the production scheduling module) as an example. According to the characteristics of the process industry, this paper discusses the ERP design and implementation of large-scale process industry enterprises from the perspective of engineering application, and focuses on the design of its system function sub modules and At the same time, some research work has been done on the scheduling system and its algorithm. The work of this paper includes:

This paper explained the important position of purchasing management information system in ERP, the relationship between purchasing management information system and other systems and points out the main functions of distribution management module of ERP system. And the definition, development process, characteristics and management idea of ERP system, gives the hierarchical function module diagram of

ERP, compares the differences between process industry ERP and discrete industry ERP, and analyzes the requirements of process industry ERP.

This paper introduces two ERP system design and development methods: object-oriented method (OTM) and data platform method (DPM) and focuses on the process of ERP implementation. Then, the practical process industry ERP system is developed by the combination of the two methods, the basic functions of each module of the system are described, and the operation environment and system characteristics of the ERP system constructed by modern advanced IT technology (such as Internet / Intranet, B / S mode) are pointed out.

This paper discusses and compares several widely used software engineering methods in the development of medium-sized management information system, puts forward the method of concurrent development mode, and the good effect obtained in the development of purchasing management information system, establishes the functional model of the system, and makes a systematic analysis;

This paper introduces the concept, characteristics and application technology of the distributed three-tier structure, gives the distributed three-tier object model of the purchase management system, and analyzes the system model in detail from logistics, information flow, capital flow and control flow, gives the system implementation scheme based on the multi-layer structure, and analyzes its application technology and advantages.

This paper introduces the concept of genetic algorithm and its implementation steps. According to the characteristics of production planning in flexible process enterprises, a production planning system for process ERP is designed and implemented. A genetic algorithm based on variable length coding is proposed to solve the procurement problem in production planning.

A set of purchasing management information system for large and medium-sized EMS enterprises is developed. The operation of the system is briefly introduced. The system is open and extensible. It is easy to integrate with other subsystems in ERP system. It

has been successfully applied in Sampo kingdom Co., Ltd. and has been well received by users.

The design and implementation of ERP system in process industry and its function module system or subsystem involve a lot of knowledge coverage and workload. In the process of design, development and implementation of ERP and its subsystems, system analysts are required to adopt mature and advanced modeling methods to strengthen the communication with developers and business personnel, and always pay attention to the overall grasp. At present, the procurement management information system developed by us has been running in Qingshan Paper Industry for nearly a year. The future work includes how to further optimize the production scheduling module by using advanced algorithms, and how to maximize the data exchange and sharing with other modules. In the face of a large amount of information collected by management information system, how to use artificial intelligence, data mining and other means to obtain useful information hidden in the data is also a promising research direction.



## REFERENCE

- AMT ERP research group, ERP early stage (8): ERP system in 1990s
- Carol A Ptak. 2016. ERP: Tools, Techniques, and Applications for Integrating the Supply Chain. Second Edition (Resource Management).
- Chen Guoliang, Wang xufa. 1996. Genetic algorithm and its application. People's post and Telecommunications Press.
- Dr Jill A O'Sullivan. 2016. ERP concepts.
- QingHua University. 2011. ERP basic knowledge (2): ERP concept and development stage.
- Jiang Leihong, Dong Chuanliang, Zhong Hua, Shanghai Jiaotong University. 2017. Based on the campus network MIS construction planning.
- Li Fangyun, chaiyueting. 1996. CIMS: analysis, design and implementation of integrated management information system. Tsinghua University Press.
- Li Shichun. 2001. From MRPII to ERP: the challenge of modern resource management mode to Chinese enterprises. Research on technology economy and management.
- Lin Yingxian, Lin Dabin. 2019. The application of multilayer distributed structure technology in enterprise material management information system.
- Liu Hui. 2002. Supply chain management. China Renmin University Press.
- Liu Jingyi, Luo Weiqi. 2002. A preliminary study on the Trinity implementation of ERP system in Chinese enterprises. Journal of Jinan.
- Liu Yi. Delphis. 2000. Enterprise solution and application analysis, mechanical industry press.
- Liu Zhibo. 1998. A modern enterprise resource planning management model. Modern electronic technology.
- Lu Jia. 2001. System analysis method for enterprise management object (resource) - Exploration of ERP analysis method. Computer engineering and application.

- Mei Mei, Zhong Weijun. 1994. Development of object oriented enterprise integrated information system. Journal of Southeast University.
- Tsinghua University. 2010. Object oriented research group. Object oriented modeling technology.
- Shang Wei. 2002. Design and implementation of application system based on multi-layer structure, Computer development and application.
- Shen Xiaobo, Pan Gang, Li Ping. 2000. Design and implementation of purchasing management information system for process enterprises. Mechanical and electrical engineering.
- Stephen Harwood. 2017, ERP: The Implementation Cycle
- Wang Ninghong. 2000. Analysis of ERP application in enterprise management. Taxation and enterprise.
- Weng Yingjun, Zhu Zhongying. 2002. A discussion on some frontier research of ERP. Microcomputer application.
- Wu Yantai, Xue Hengxin. 2001. ERP system: the development trend of accounting computerization. Accounting monthly.
- Xing Wenxun, Xie Jinxing. 1999. Modern optimization calculation method. Tsinghua University Press.
- Zhang Houqi. 1999. The concept and management idea of ERP system, Chinese and foreign management guide.
- Zhang Yuzhen. Huang Dong. 2002. Analysis of multi-layer structure and its implementation in Delphi. Computer engineering and design.
- Zhou Bosheng, Zhang Li. 1998. UML support environment, computer world.
- Zhou Ming, Sun Shudong. 1999. Principle and application of genetic algorithm. National Defense Industry Press.